

COMMONWEALTH OF PUERTO RICO
DEPARTMENT OF EDUCATION

Technology Plan

July 1, 2014 ó June 30, 2019



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EXECUTIVE SUMMARY

Situation Assessment

As the third largest school district in the United States, Puerto Rico's Department of Education [PRDE] serves about one-half million students at about 1,500 public PK-12 schools. Like most large districts, PRDE faces significant challenges, and sees technology as one important tool to help meet those challenges. Currently, about 90% of Puerto Rico's public schools do not fully meet Federal guidelines for academic achievement.¹ About 300 of the schools do not meet the minimum standards to receive E-Rate funding, due to inadequate electrical power and other issues. While many teachers use technology in planning or delivering instruction, many more express the need for increased professional development relating to technology. Very often, only the teacher uses technology, such as a smart board; students do not have regular access to technology for learning. Where student technology access is available, it is often in a traditional "computer lab" setting rather than integrated into the everyday classroom curriculum. There is a broad consensus that Internet bandwidth is woefully inadequate, not only in the schools, but also in the regional offices, district offices and even, to a lesser extent, at the department headquarters. This Technology Plan outlines how PRDE intends to meet these and related challenges, leveraging newer technologies, in better ways, to significantly improve educational outcomes over five years.

This plan has been prepared at a time when several significant trends are converging to galvanize a *sea change in education*, including major shifts in how educators think about and deploy technology to enhance student achievement.

- Nearly every U.S. state has adopted the **Common Core State Standards [CCSS]**.² Adoption of the **Next Generation Science Standards**³ and online assessments, either Partnership for Assessment of Readiness for College and Careers [PARCC]⁴ or **Smarter Balanced Assessments [SBA]**⁵ (online adaptive testing, aligned to the new standards) will soon follow. These new standards reflect a growing understanding of the importance of moving from teacher-centric, fact-oriented models of education toward learner-centric, project-based learning that emphasizes problem solving, creativity and critical thinking skills.
- Careers requiring **Science, Technology, Engineering and Mathematics [STEM]** degrees have seen *job growth triple* that of other sectors of the economy, for a decade, yet the U.S. ranks 27th out of 29 countries in the developed world in graduating STEM majors.⁶ Significant funding opportunities, from foundation grants to Federal programs, are emerging to address this huge need, through both in-school and out-of-school offerings.

¹ From <http://www.de.gobierno.pr/el-perfil-escolar>, The School Profile ("Report Card").

² <http://www.corestandards.org/>. Puerto Rico has been an active participant in the planning phases of the CCSS Initiative. The content and pedagogy of CCSS are largely philosophically consistent with the existing Puerto Rico standards. Working under an NCLB waiver, PRDE is working to update its own standards in a fashion similar to CCSS but does not currently plan to adopt CCSS per se.

³ <http://www.nextgenscience.org/>

⁴ <http://www.parcconline.org/>

⁵ <http://www.smarterbalanced.org/>

⁶ 2010 National Academies report reference from <http://www.usnews.com/news/blogs/stem-education>.

Studies show that, if students are not enthusiastic about STEM by sixth grade, they will not pursue STEM-related college majors or careers.

- **Mobile devices, such as tablets**, are being adopted by schools at an unprecedented rate,⁷ whereas desktop computer deployments are plummeting. Smaller devices take less space in the classroom, use less power and are more student-friendly. Within five years, the norm for educational computing will be a 1:1 ratio of mobile computing devices to users.⁸
- **Wireless connectivity**, enabling anytime, anywhere computing, is reaching levels of performance and reliability that significantly alter the user experience.⁹ Wireless solutions also change the type and quantity of data cabling required in schools, even as the number of end user devices continues to rapidly increase.
- **Cloud computing**, moving everything from educational software applications, to multimedia content, to standardized assessments, to student work out to the Internet, provides seamless access to vast resources, independent of physical location. This reduces the need for schools to use highly skilled IT labor to manage file servers and disk images cutting IT costs but it also implies a requirement for *much* higher bandwidth Internet connections.
- President Obama recently announced **ConnectED** initiative¹⁰ (also know as "E-Rate 2.0"), setting a five-year goal of **high speed connectivity for all schools**, reflecting widespread recognition of these trends, will educate the next generation for life in the digital age.¹¹

While change is never easy, PRDE intends to boldly embrace change and to leverage these powerful forces to best serve its students:

- Rather than the Common Core Standards, PRDE follows the Estandares de Contenido y Expectativas de Aprendizaje por Grado de Puerto Rico (Content Standards and Learning Expectations Grade of Puerto Rico), a flexibility plan approved by the federal government.¹² Program Directors are entitled to implement the plan in accordance with the specific objectives of their program. Current testing is not online; future online testing is anticipated
- STEM focus in grades 3, 4, 5, 6, 7, 8, 11 (same grades as PPAA tests)
- Mobile devices, in particular Bring Your Own Device [BYOD], minimize the need for extensive cabling and electrical upgrades in classrooms. Allowing staff and students to

⁷ For example, Los Angeles Unified School District recently spent \$30M to purchase 35,000 iPad tablets for 47 schools, with the stated goal of eventually providing iPads to every single teacher and student in LAUSD.

⁸ K-12 Ed Tech Trends for 2012, <http://thejournal.com/articles/2012/01/10/5-k-12-ed-tech-for-2012.aspx>.

⁹ Current generation wireless access points already incorporate dual radios, each capable of transmitting 450 Mbps.

¹⁰ http://www.whitehouse.gov/sites/default/files/docs/connected_fact_sheet.pdf

¹¹ See, for example, <http://www.wjla.com/articles/2013/06/connected-obama-s-new-education-intitiave-89749.html>.

The proposed goal is to provide 100 Mbps per 1000 students, initially, with 1 Gbps per 1000 students, for 99% of U.S. students, within five years.

¹² See http://www.de.gobierno.pr/sites/de.gobierno.pr/files/Aproved_Flexibility_Plan.pdf (request) and http://www.de.gobierno.pr/sites/de.gobierno.pr/files/20130228103742366_0001.pdf and <http://www.de.gobierno.pr/secretario-del-de-se-reune-con-lideres-magisteriales>.

Approval letter is not yet available on the PRDE website.

bring their own devices relieves much of the financial burden for PRDE. While the BYOD strategy introduces additional challenges, specifically Child Internet Protection Act [CIPA] compliance and potential inequities, all agree that the primary concern is not family access to devices, but the preparedness of the schools' networks to handle a rise in users.

- Wireless connectivity which also minimizes the need for electrical upgrades in classrooms
- Cloud computing which will necessitate significant Internet bandwidth upgrades
- PRDE's five-year goal for high-speed connectivity for all schools is to provide 100 Mbps per 1000 students (not quite the proposed ConnectED goal of 1 Gbps per 1000 students, but significantly more than current).

Technology is one critical element of the Puerto Rico Department of Education [PRDE]'s overall strategy to improve educational outcomes. Preparation of this Technology Plan has served as a catalyst to bring some of these major trends to the forefront of the conversation.

Last 10 Years	Next 10 Months
3 ó 4 Desktop PCs in Back of Room	1:1 Tablet Initiatives Everywhere
Sage on the Stage	Guide on the Side
Instruction, Lecture	Construction, Hands On Projects
Dept. of Ed Decides	Customers Decide
Literacy, Numeracy Focus	STEM Focus
Brick and Mortar Schoolhouse	Anytime, Anywhere Learning
No Child Left Behind	Common Core Standards
College Degree = Best Chance for Life Success	Top Students Question ROI on Huge Student Loans
“Narrowing Achievement Gap” = Slowing Down Best & Brightest	Self-Paced, Individualized Learning
“Smart Boards” Used as Expensive, Dumb White Boards	Professional Development and “BYOD” Higher Priorities

By preparing this plan, at this unique time ó just as PRDE's E-Rate applications have begun to see rejuvenated successes ó PRDE is poised to emerge as a visionary leader, not only in technology integration but more generally as a compelling exemplar in a broad movement to modernize and reform the nation's educational system.

This PRDE Technology Plan will guide the efforts of the department as it integrates technology into all aspects of public education. Through this plan, PRDE will begin to systematically align its efforts with the National Educational Technology Plan,¹³ scholarly research on the impact of technology on student achievement, collaborative efforts across the nation to reform standards and assessment (such as Common Core and Smarter Balanced) and best practices specific to Puerto Rico (such as strategies to help students succeed in a bilingual learning environment, reflecting their unique cultural heritage).

This document has been informed by online surveys open to educators throughout Puerto Rico, numerous discussions with key PRDE staff and comprehensive analysis of numerous existing materials, including the previous 2010 ó 2014 Technology Plan. It describes PRDE's existing educational technology situation, as of 2013/2014, and its vision for educational technology in the future. It identifies needs and potential barriers to meeting those needs. It establishes bold yet achievable goals to overcome those barriers and to help students benefit from the opportunities

¹³ <http://www.ed.gov/technology/netp-2010>.

ahead. Through analysis of the gap between what is and what should be, an implementation strategy emerges to ensure substantive, measurable progress toward a compelling vision. The plan covers five years: from July 1, 2014 through June 30, 2019.

An approved Technology Plan, covering at least the next funding year, is *required* to access Federal *E-Rate* funding¹⁴ and to comply with Part D of the Elementary and Secondary Education Act of 1965 [ESEA], as amended by the No Child Left Behind Act [NCLB], sections §§ 2413 and 2414 of 2001.¹⁵ Even as these various requirements change over time, there remains a compelling need to plan for educational technology and to use the technology plan to guide technology procurement and implementation. Technology plans may cover up to five years but must be submitted for re-approval at least every three years.

The goals and budget of this Technology Plan will be updated annually, establishing an “evergreen,” rolling five-year window of guidance. These Technology Plan revisions will be submitted for re-approval *annually*, creating a rolling three-year window of approval. This active revision process will allow the plan to both accurately reflect PRDE’s reality and to continuously support PRDE’s E-Rate applications.

To qualify for E-Rate and other programs, a Technology Plan must contain a specific set of elements.¹⁶

- **Element 1 – Curriculum Integration:** Clear goals and a realistic strategy for using telecommunications and information technology to improve education or library services.
- **Element 2 – Professional Development:** A professional development strategy to ensure that members of the staff know how to use these new technologies to improve education or library services.
- **Element 3 – Infrastructure:** A needs assessment of the telecommunication services, hardware, software, and other services that will be needed to improve education or library services.
- **Element 4 – Monitoring and Assessment:** An evaluation process that enables the school or library to monitor progress toward the specified goals and make mid-course corrections in response to new developments and opportunities as they arise.

¹⁴ As of 2011, with implementation of the FCC’s Sixth Report and Order, a Technology Plan is no longer required for E-Rate “Priority 1” funding (telecommunications and Internet) but continues to be required for the more substantial “Priority 2” category of funding (internal connections and basic maintenance). PRDE seeks both Priority 1 and Priority 2 funding. Developing and implementing a formal Technology Plan is always recommended as a best practice even when not required for E-Rate or other funding mechanisms.

¹⁵ PRDE is currently seeking waivers from some requirements of NCLB, but a Technology Plan is still required.

¹⁶ The detailed requirements for E-Rate Technology Plans are set forth on the web site of the Schools and Libraries Division [SLD] of the Universal Service Administrative Corporation [USAC], tasked by the Federal Communications Commission [FCC] with administration of the E-Rate program. See: <http://www.usac.org/sl/applicants/step01/default.aspx>. As of FY2011, Element 5 (Budget) is no longer strictly required for E-Rate funding; however, Item 25D of Form 471 requires budgetary information that is supported by substantially similar documentation, so best practice still dictates inclusion of this Element. Also, Element 1-CP, listed here, is not required for E-Rate but has been included to reflect PRDE staff priorities.

- **Element 5 – Funding and Budget:** Sources of funding and sufficient budget to acquire and support the non-discounted elements of the plan, including hardware, software, professional development and other services.
- **Element 6 – Community and Parental Involvement:** Although not required by E-Rate rules, this element has been identified by PRDE personnel as critical to the success of public education in Puerto Rico. Technology planning is needed to support and facilitate communication and collaboration with parents and the larger community, including the business community.

Each Element is detailed in a separate section of this document: the current status, the desired outcome, the gap between the current status and the desired status, and the specific action steps to bridge those gaps over the next five years. Each element has one or more **goals** that are further refined by detailed **objectives** (specific milestones or benchmarks with implementation steps, milestone dates, monitoring mechanisms and individuals or organizational units identified as responsible for achieving those objectives).

Plan Objectives

The following table summarizes PRDE’s Goals and Objectives for each Element of the Plan:

Element	Goal/Objective
Curriculum Goals	Improve student academic achievement in mathematics, language arts and science; ensure that graduating students meet the ISTE NETS for Students standards for information fluency; adopt data-driven, online assessments; improve productivity for educators and administrators.
Curriculum Objective	Increase student achievement in math , as measured by standardized tests (using various strategies such as 1:1 learner-centric models, “flipped classroom” with Kahn Academy, transitioning technology from labs to classrooms, etc.). Use technology activities to help ensure that students acquire 21 st century skills such as critical thinking, meta-cognition and problem solving, with less emphasis on rote memorization.
Curriculum Objective	Increase student achievement in Spanish and English language arts , as measured by standardized test scores (using various strategies such as 1:1 learner-centric models, simulation tools, transitioning technology from labs to classrooms, etc.). Use technology activities to help ensure that students acquire 21 st century skills such as critical thinking, meta-cognition and problem-solving, with less emphasis on rote memorization
Curriculum Objective	Increase student achievement in science , as measured by standardized tests (using various strategies such as 1:1 learner-centric models, “flipped classroom” with Kahn Academy, transitioning technology from labs to classrooms, etc.). Professional development activities associated with evolving standards or assessments should be designed to leverage these activities as opportunities to model the integration of technology into teaching and learning, for the participating adult educators.
Curriculum Objective	Improve student information fluency , as measured by ISTE’s NETS for Students, through such action steps as increasing the ratio of devices to students and transitioning technology usage from labs to classrooms.
Curriculum Objective	Adopt online testing tools that foster data-driven decision-making . Phase out offline, summative assessments in favor of online tools that also support ongoing formative assessments to guide instruction.
Curriculum Objective	Improve productivity for educators and administrators via rollout of PRDE data warehouse.

Element	Goal/Objective
Professional Development Goals	Provide comprehensive and continuous professional development to encourage effective integration of both new and existing technologies in teaching and learning, thereby improving academic achievement, consistent with adopted standards and assessment. As new standards are adopted, integrate technology-related PD with curricular PD around new standards and new assessments.
Professional Development Objective	Increase percentage of educators certified on Digital Literacy Virtual Platform, which includes MS Office basic skills from 20% (about 7,000) to 99%.
Professional Development Objective	Move to a focus on integration of information technology into the curriculum (from a focus on basic skills) including newly adopted standards with greater emphasis on learner-centric, project-based learning. Offer modules on use of technology in all disciplines (e.g., how to integrate Office or scientific calculator into the curriculum).
Professional Development Objective	Implement PRDE Guidelines for Personnel Technology Skills (based on ISTE NETS-T) and Technology Integration in Classroom Instruction Assessment. Establish a norm that every teacher has a web site/blog/wiki and participates in online virtual communities of practice.
Infrastructure Goals	Improve access to current information technologies and technology usage by all PRDE stakeholders and provide appropriate system support
Infrastructure Objective	Every school will have adequate electrical capacity and power distribution to support the technology described in this plan.
Infrastructure Objective	Every school will have fast, reliable Internet , initially 10 Mbps per 1000 students, 100 Mbps per 1000 students within the scope of this plan (eventually 1 Gbps per 1000 students), using fiber or other 99.9% reliable technology.
Infrastructure Objective	Every school will have a modern, local area network [LAN] to distribute access to each classroom. Technologies such as high capacity wireless access points, load balancing access point controllers and power over Ethernet [PoE] switches will minimize the required count of electrical outlets and data drops per classroom: 2 to 3 PoE-enabled gigabit drops to each room from the nearest Intermediate Distribution Frame [IDF] will suffice to meet all power and data distribution requirements. Larger high schools may also want a lab, (or rolling cart concept), such as for professional development events or classes in business administration.
Infrastructure Objective	Every teacher will have dedicated use of a modern laptop computer or tablet; every student will have dedicated use of a wireless computing device such as a tablet. Devices will have long battery life, minimizing need for additional A/C power outlets in the classrooms; devices can be charged overnight in a locked data closet.
Monitoring Goals	Create and maintain a technology plan document and process that is seen as, and over the next 5 years, continues to serve as a model for other states.
Monitoring Objective	Improve data-driven decision-making, productivity, and effectiveness at all levels of the agency through the use of technology.
Monitoring Objective	At least once per year, include a comparison of tech plan progress to tech plan goals in a report that is available to the general public.
Monitoring Objective	Once per year, update the goals and budget of the Technology Plan to ensure an òevergreen,ö living, rolling, five-year document that truly guides and rationalizes decision-making for technology procurement and implementation.
Budget Goals	Over 5 years, ensure that PRDE’s participation in E-Rate and other funding mechanisms aimed at educational technology reaches 99% of the amount to which it should be entitled based on poverty demographics and other applicable criteria. Ensure that no school suffers from inadequate funding for technology due to funding denials caused by flawed procurement procedures or inadequate proactive investment in necessary but ineligible supports such as electrical capacity, devices for teachers and students, or professional development.
Budget Objective	Reduce to approximately \$0.00 the amount of funding lost due to noncompliance and non-reporting.
Budget Objective	Increase by 200% the total dollars per student allocated to investment in educational technology and supporting infrastructure , without significant adverse consequences to other priorities.

Element	Goal/Objective
Budget Objective	Through identification of additional funding source, reduction of waste and lost funding and prioritization of technology, fully fund implementation of each element of this plan.
Community and Parental Involvement Goals	Improve communications and promote leadership among administrators, parents and community members to strengthen cooperation, involvement and support of academic achievement
Community and Parental Involvement Objective	Further develop school websites, so that most schools have a site, most teachers have a page and a blog, and most schools have an open parent portal.
Community and Parental Involvement Objective	Double the reach and accessibility of Parent and Guardian Resource Centers.

This technology plan emphasizes the importance of integrating technology into instruction.

Use of technology, *not only by teachers, but also by students*, will motivate and engage students, enliven instruction, extend learning beyond the classroom walls and improve student achievement. Implementation of the strategies proposed in this plan will ensure that students and teachers will be more than technologically *literate*; they will be able to use technology as a *power tool* for learning and teaching.

This plan provides a framework for the direction, scope, and timing of implementation activities. It provides for rigor and flexibility, setting standards and minimum requirements for access and usage. It suggests options and offers guidance for expanding the role for technology at all of PRDE’s 1500 individual schools. While setting aggressive goals, the plan strives to be comprehensive and realistic, and to represent the best interests of PRDE’s varied stakeholders. It is aligned with the 2010 National Educational Technology Plan, including these calls to action:

- Engage and empower learners
- Measure what matters
- Prepare and connect teachers
- Enable access to a comprehensive infrastructure
- Radically enhance productivity.

Where appropriate, discussions are categorized by grade level, school size, urban/rural locale, academic results (e.g., schools identified for improvement) and other differentiating factors.

Due to the vast scope of PRDE’s jurisdiction, any document of this sort will inherently lack precise detailed information about individual school populations, infrastructure and needs. One of the monitoring objectives is to actively maintain detailed databases including equipment inventories, connection speeds, reliability statistics, demographic data and similar information. Implementation of these types of databases as well as tools to merge data across the databases is well underway.

While this technology plan was being prepared, a separate initiative to develop a Ten-Year Plan for Education in Puerto Rico (Plan Decenal¹⁷) has also been proposed. Plan Decenal appears to be garnering support from a broad constituency. The Plan Decenal initiative reflects a consensus that

¹⁷ <http://www.cienciapr.org/en/tags/plan-decenal>

public education in Puerto Rico falls far short of where it needs to be, and that major changes are necessary. Since the process to develop the Ten-Year Plan has not yet officially begun, this PRDE technology plan cannot fully anticipate or leverage its guidance. However, it is hoped and expected that Plan Decenal will bring to light the huge opportunities that technology offers, as one key component of educational improvement. Ideally, many ideas and recommendations from this technology plan will be incorporated into the Plan Decenal. Future revisions of the PRDE Technology Plan will reference and align with the guidance that is expected to emerge from Plan Decenal.

INTRODUCTION

This introduction summarizes PRDE background information, demographics and student data, including capturing “fast facts” needed for planning and future E-Rate applications.

The Importance of Integrating Technology into Instruction

Academic performance and professional success in contemporary society require that our students develop mastery of information and communications technologies. In addition, they must be able to use these as tools in deep and lasting learning. The educational system must seek to make it possible for students to grasp these tools that society offers for their development.

PRDE upholds the principle that students are the focus of educational activity and that knowledge is generated socially, as constructivist, cognitive, humanistic and sociological theories hold. Technology is not what defines educational experience but it is an important tool that, properly integrated, strengthens the learning process of our students.

From the beginning of the twentieth century, each new technology with educational potential and each new educational theory have awakened the interest of educators in exploring the application of these in the school environment. However, it was the arrival of the personal computer and the Internet, and the research based on project-based, constructivist learning models, that demonstrated that technology could have a positive impact. The benefits of integrating technology into the learning process include: helping to motivate students, focusing the attention of students on the concepts being studied, allowing students to participate more actively in their own learning, increasing students' sense of control over their own learning, helping students visualize problems and solutions, developing skills that students will require in the workplace and for lifelong learning, and supporting new approaches to thinking and learning.

Recent research shows that educational practice can be a more humanizing experience and a more viable endeavor when technology is integrated. Technology, in its broadest sense, can increase levels of efficiency in educational practice. Optimal development of appropriate educational technology is desirable, possible and vital for the economic and social development of our country. However, for the potential to be realized, technology must be properly integrated into educational systems in such a way that attention is given to the different learning styles and needs of all students, including talented students, those at risk of failure in school, those who have linguistic limitations and those who require special education.

“America needs a public education system that provides all learners—including low-income and minority students, English language learners, students with disabilities, gifted and talented students, early childhood learners, adult workforce learners, and seniors—with engaging and empowering learning experiences. Our education system also should help learners set goals, stay in school despite obstacles, earn a high school diploma, and obtain the further education and training needed for success in their personal lives, the workplace, and their communities.” *National Education Technology Plan 2010*

In speaking of technology integration, we are talking about making education more complete, of having technology be a part of the educational process as a whole. Education is shifting from a teaching-focused paradigm to a learning-focused paradigm. The presence of technology in the lives of our students demands of the Puerto Rico Department of Education an integrative approach that models technology as a positive learning tool. Technology acts as a catalyst to change the roles of teacher and learner. The learner becomes more self-directed and more responsible for his or her own learning; the teacher becomes less of a lecturer and more of a resource and intellectual coach.

Effectiveness in the integration of technology in the curriculum does not depend only on teaching but also on how learning is evaluated and how teaching is adjusted to the results of the evaluation. Technology offers a broad range of tools to facilitate the collection, analysis and dissemination of information related to teaching and learning, thus providing a basis for well-informed educational decision making.

“The model of learning requires new and better ways to measure what matters, diagnose strengths and weaknesses in the course of learning when there is still time to improve student performance, and involve multiple stakeholders in the process of designing, conducting, and using assessment. In all these activities, technology-based assessments can provide data to drive decisions on the basis of what is best for each and every student and that, in aggregate, will lead to continuous improvement across our entire education system.” *National Education Technology Plan 2010*

Full access to technology, as a cultural and educational tool, is a step in the desired direction. It must be accessible to be incorporated consciously, critically, and boldly by the protagonists of the educational system: the teachers and the students.

In the course of developing the strategies for integrating technology in the curriculum in a coordinated way and of implementing information systems that answer the needs of teachers and provide data for decision-making, the PRDE will be contributing to an effective environment that will lead to the improvement of student academic achievement. (Based on the Proyecto de Renovación Curricular: Fundamentos Teóricos y Metodológicos [Curriculum Renewal Project: Theoretical and Methodological Foundations], PRDE, 2003 and the Marco Conceptual de la Tecnología para el Aprendizaje del DEPR (Borrador) [Conceptual Framework of Technology for Learning (Draft), PRDE], 2010).

PRDE Vision for Education

PRDE schools must be effective instruments for building a just and democratic society. They must be dynamic units in social change, capable of uniting wills for the collective good, but rooted in the real circumstances of the communities. The educational process, which is to be conveyed in each school, must be a response to the varied needs and talents of the students, diversifying its offerings with creative forms of learning and evaluation, both in the regular school day and in after-school activities. It is necessary to address the formation of students in all their dimensions. We recognize the importance of their development in knowledge and academic competencies, in harmony with their emotional, social, physical and moral development. This

will promote, among other things, an environment of peace, solidarity, and collaboration in school and in the communities.

PRDE Vision for Educational Technology

We seek the full development of the abilities of students through coordinated use of technology in the various subjects in the curriculum during their years in school. That is, students and teachers are to make technology their own, being able to work independently and in collaboration with others, and being able to decide what technology is required for a task and when it is appropriate to incorporate it.

To accomplish PRDE’s vision for educational technology, we believe that *within the next 5 years, every student must have one-to-one access to a technology device with responsive Internet access to enhance learning.*

PRDE Mission for Education

To guarantee education that is free and non-sectarian, that develops the abilities and talents of all the students so that they will be productive, independent citizens, life-long learners, respectful of the law and the environment, and capable of contributing to the general well being.

PRDE Mission for Educational Technology

By providing optimal conditions, such as a curriculum wholly permeated by crosswise integration of technology; on-going, sustained and intensive professional development; effective parental and community involvement in the educational process, access to technological educational resources, and decision making based on tangible data, students will be able to use technology effectively and ethically in learning, creating, solving problems, doing research, making decisions and communicating, thus taking on the responsibility of their own learning.

Puerto Rico’s Vision and Mission

Restated in the ESEA Flexibility Request, “the vision of the Puerto Rico Department of Education is that our students should be the primary focus of the system, our teachers are the main agent of change, and our school directors are the facilitators of all processes which occur within each of our schools. To help make this vision a reality, the mission of the Department of Education is to promote the development and formation of the student based on the core values of society, through a free education system accessible to all.”

PRDE Strategic Goals

The PRDE has defined five overall strategic goals in relation to the academic work of the agency:

Overall Strategic Goals	Discussed in Element
Quality development in the academic, personal and social dimensions of students	Curriculum
Effective participation by parents, communities and the business world in the educational process	Community and Parental Involvement
Highly qualified human resources	Professional Development
Optimal conditions for learning	Infrastructure
Strengthening of the administrative and fiscal processes of the agency	Monitoring

PRDE Goals for Educational Technology

PRDE has established the following goals for this technology plan, which contribute to the achievement of the overall strategic goals of the agency:

Goals for Technology	Discussed in Element
Improve student academic achievement and assist students and teachers in developing technology and information literacy skills through the incorporation of technology in the curriculum.	Curriculum
Improve communications and promote leadership among administrators, parents and community members to strengthen cooperation, involvement and support of academic achievement	Community and Parental Involvement
Provide comprehensive and continuous professional development to encourage effective integration of technology in instruction and so to help students achieve high academic standards.	Professional Development
Improve access to current information technologies and technology usage by all stakeholders and to provide appropriate system support.	Infrastructure
Improve data-driven decision-making, productivity, and effectiveness at all levels of the agency through the use of technology.	Monitoring

Background¹⁸

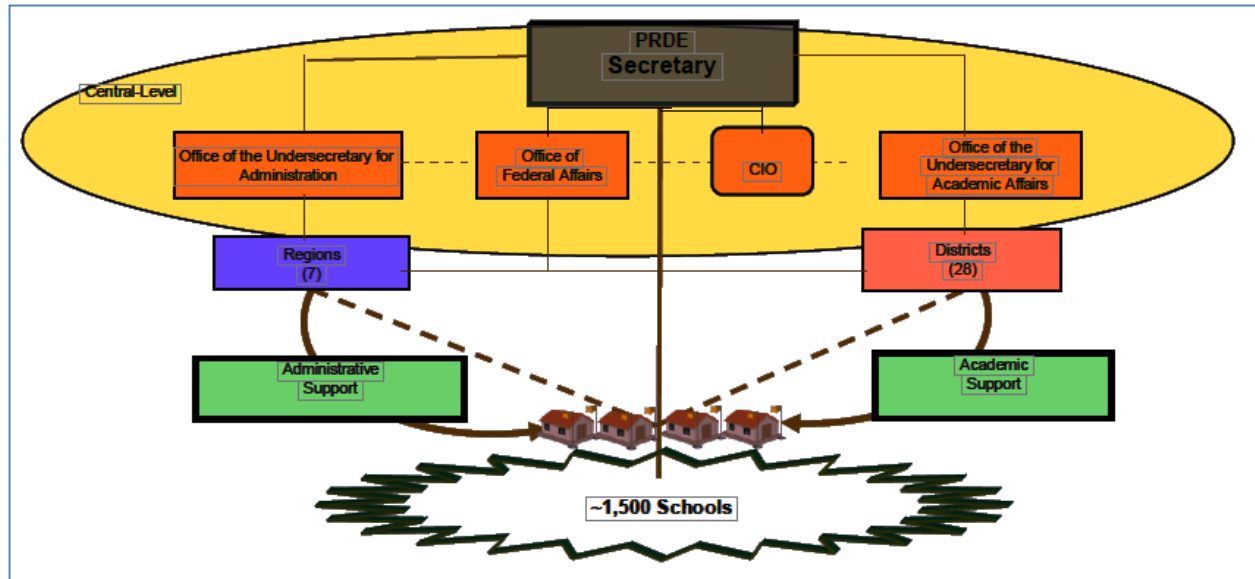
As a unitary system, the Puerto Rico Department of Education [PRDE] acts as both the State Educational Agency [SEA] and the Local Educational Agency [LEA]. PRDE is made up of four administrative levels:

- Central level (including the Office of Federal Affairs)
- Educational regions (7 regions provide administrative support)
- Administrative districts¹⁹ (28 districts provide academic support)
- Schools (~1500).

Because of this internal structure, technology plan activities are carried out across all administrative levels.

¹⁸ For a more comprehensive description of the structure of Puerto Rico’s Educational System, see <http://www.de.gobierno.pr/sites/de.gobierno.pr/files/Aproved Flexibility Plan.pdf>.

¹⁹ Although the PRDE uses the term “districts,” they are not local, independent educational agencies or school districts as would be found in the states. Rather, an administrative district is an administrative term of the PRDE. The PRDE, as a whole, is the sole LEA operating in Puerto Rico. The administrative districts do not have autonomous decision-making authority.



FAST FACTS / Demographics

PRDE has about 1500²⁰ schools serving almost half a million students in grades PK-12 with about 72,000 staff (teachers, principals and administrators/support staff). Typical enrollment is about 300 students per school, with about 90 smaller schools (with less than 100 enrolled) and about 90 larger schools (with more than 650 enrolled). Slightly less than half of the schools are in urban areas; slightly more than half of schools are in rural areas.²¹ Nearly all students are eligible for free or reduced lunch under the National School Lunch Program.

These public school students account for approximately 57% of the island’s total population of students in grades PK-12 while 43% of Puerto Rico’s students attend private schools. This percentage is higher than reported national rates where enrollment in private schools is 10% (NCES, 2010). The population of students who attend public versus private schools may have significant demographic patterns such as the distribution of economic status and disability.

PRDE’s public school population is fairly homogenous; less than 3% of the student population consists of ethnicities other than Puerto Rican. The two largest subgroups on the island are students with disabilities and economically disadvantaged students. Approximately 20% of all students in our public school system have been identified as students with disabilities, compared to approximately 13% of public school students nationally (NCES, 2011). The Center for Special Education Services (Centro de Servicios de Educación Especial, CSEE) coordinates the process of identifying students eligible to receive special education services.

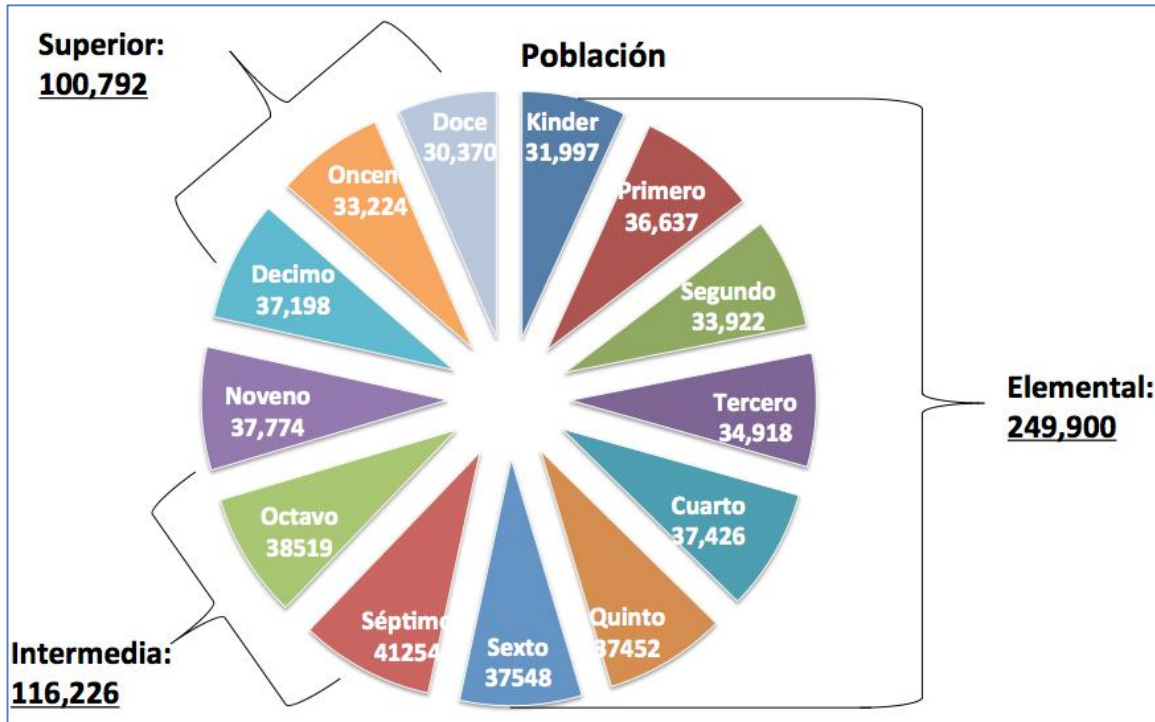
²⁰ ESEA Flexibility Request states 1457 schools, 471,000 students, 31,136 teachers, as well as slightly different (+/- a few) school counts.

²¹ From 2012_school_directory_20120319.xlsx.

There are:

- 859 elementary schools (grades PK-6, some with head start classrooms)
- 210 middle schools (grades 7-9)
- 164 high schools (grades 10-12)
- 39 secondary schools (grades 7-12)
- 168 second unit schools (grades K-9)
- 23 schools with grades K-12.²²

Students are fairly evenly distributed by grade per 2011 statistics:²³



²² From PRDE Proposed Budget 2012-2013, Statistical Data, page 4, which notes “The statistical data is Information provided by the Agency during the budget process of the fiscal year 2012-2013.”

²³ From 2011_Presentation Student Population.pptx, Student Population by Education Level

PRDE has 7 Regions and 28 Districts.



Schools are fairly evenly distributed per region.²⁴

Percent of Schools	Region
13.2%	ARECIBO
12.6%	BAYAMON
15.2%	CAGUAS
14.1%	HUMACAO
15.4%	MAYAGUEZ
15.3%	PONCE
14.1%	SAN JUAN

“Puerto Rico’s Public Education Profile” (<http://flamboyanfoundation.org/wp/wp-content/uploads/2011/06/Puerto-Ricos-Public-Education-Profile.pdf>) provides these statistics:

- PRDE is the 3rd largest school district in the US (after NYC and LA Unified)
- Personnel breakdown:
 - 46% active teachers²⁵
 - 2% school directors
 - 51% administration and support
- Over 80% of schools are in need of academic improvement, according to federal standards. Achievement results include:
 - National Assessment of Educational Progress [NAEP] FY09 8th grade results for PR were 26 percentage points below the US national average of 51%
 - 11th grade PPAA (PR public school standardized achievement test) proficiency levels in FY09 were 2% in math, 36% in science, 35% in Spanish and 44% in English

²⁴ From 2012_school_directory_20120319.xlsx

²⁵ Alternate source suggests 57% of staff are teachers.

http://en.wikipedia.org/wiki/Puerto_Rico_Department_of_Education: over 72,000 staff including more than 41,000 teachers.

- Graduation and Dropout Rates
 - PR public schools have a 64.5% graduation rate, while the US national average is 74.9%
 - Official dropout rate is low, yet studies show PR middle school dropout rates are higher than in the US.
- Most schools have chronic physical infrastructure problems resulting in unsatisfactory learning conditions. The PR government has already invested approximately \$60 million to address the most pressing issues in about 1/3 of schools and implemented a \$750 million capital improvement project to rehabilitate 95 schools and build 5 new ones.
- PRDE budget for FY2011 was \$4,040,075,000²⁶ with 55% coming from State resources and 45% from Federal resources
 - 14% of state revenues go to public K-12 education
 - 70% of PRDE budget goes to payroll.

²⁶ Alternate source suggests PRDE budget is \$3.5 billion.

http://en.wikipedia.org/wiki/Puerto_Rico_Department_of_Education: It is also the largest agency of the executive branch of Puerto Rico with an annual budget of more than \$3.5 billion USD.

Current and projected statistics are:

PRDE	<u>2012-2013</u>	<u>2013-2014</u>	<u>2014-2015</u>	<u>2015-2016</u>	<u>2016-2017</u>	<u>2017-2018</u>	<u>2018-2019</u>
Schools or campuses ²⁷	1523	1515 ²⁸	1492	1465	1434	1392	1360
Buildings ²⁹							
Classrooms/Offices							
Grade K	1,254 ³⁰	1,229	1,205	1,181	1,157	1,134	1,111
Grade 1	1,280	1,254	1,229	1,205	1,181	1,157	1,134
Grade 2	1,465	1,280	1,254	1,229	1,205	1,181	1,157
Grade 3	1,357	1,465	1,280	1,254	1,229	1,205	1,181
Grade 4	1,397	1,357	1,465	1,280	1,254	1,229	1,205
Grade 5	1,497	1,397	1,357	1,465	1,280	1,254	1,229
Grade 6	1,498	1,497	1,397	1,357	1,465	1,280	1,254
Grade 7	1,502	1,498	1,497	1,397	1,357	1,465	1,280
Grade 8	1,650	1,502	1,498	1,497	1,397	1,357	1,465
Grade 9	1,541	1,650	1,502	1,498	1,497	1,397	1,357
Grade 10	1,511	1,541	1,650	1,502	1,498	1,497	1,397
Grade 11	1,488	1,511	1,541	1,650	1,502	1,498	1,497
Grade 12	1,329	1,488	1,511	1,541	1,650	1,502	1,498
Total Classrooms	18,769	18,669	18,386	18,056	17,672	17,155	16,764
Offices							
TOTAL Classrooms/Offices ³¹							
Students							
Grade K	31,357 ³²	30,730	30,115	29,513	28,923	28,334	27,777
Grade 1	31,997 ³³	31,357	30,730	30,115	29,513	28,923	28,334
Grade 2	36,637	31,997	31,357	30,730	30,115	29,513	28,923
Grade 3	33,922	36,637	31,997	31,357	30,730	30,115	29,513
Grade 4	34,918	33,922	36,637	31,997	31,357	30,730	30,115

²⁷ This determines the number of Billed Entity Numbers [BEN] needed for E-Rate.

²⁸ Projected based on average of 308 students per school.

²⁹ This information will be helpful for Form 471, Block 2, Item 7g. Note: if buildings are separated by a public thoroughfare, separate Billed Entity Numbers are required for E-Rate.

³⁰ Estimated based on reported 25 students per classroom.

³¹ This information will be helpful for FCC Form 471, Block 2, Item 7b.

³² Estimated at -2% of 2012 statistics in keeping with Wikipedia (http://en.wikipedia.org/wiki/Demographics_of_Puerto_Rico) report of continued emigration and below-replacement birth rate. The 2010 Census recorded Puerto Rico's first population drop in history.

³³ PRDE's 2011 enrollment per grade offset 1 year to estimate 2012 enrollment per grade.

PRDE	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019
Grade 5	37,426	34,918	33,922	36,637	31,997	31,357	30,730
Grade 6	37,452	37,426	34,918	33,922	36,637	31,997	31,357
Grade 7	37,548	37,452	37,426	34,918	33,922	36,637	31,997
Grade 8	41,254	37,548	37,452	37,426	34,918	33,922	36,637
Grade 9	38,519	41,254	37,548	37,452	37,426	34,918	33,922
Grade 10	37,774	38,519	41,254	37,548	37,452	37,426	34,918
Grade 11	37,198	37,774	38,519	41,254	37,548	37,452	37,426
Grade 12	33,224	37,198	37,774	38,519	41,254	37,548	37,452
TOTAL Students	469,226	466,732	459,649	451,338	441,792	428,882	419,112
% Students NSLP Eligible ³⁴	100%	100%	100%	100%	100%	100%	100%
EóRate Discount % ³⁵	90%	90%	90%	90%	90%	90%	90%
Staff ³⁶ and Teachers ³⁷ (about 6.52 students per PRDE staff)	72,000	71,617	70,531	69,263	67,790	65,809	64,310
TOTAL END USERS	541,226	538,349	530,180	520,651	509,582	494,692	483,422

³⁴ The percentage of students eligible for the National School Lunch Program (Free or Reduced Lunch [FRL]) determines E-Rate discount based Discount Matrix at: <http://www.usac.org/res/documents/sl/pdf/samples/Discount-Matrix.pdf>.

³⁵ The E-Rate discount percentage guides funding application decisions. All E-Rate discount levels (20% - 90%) are funded annually for Priority 1 services (Telecommunications and Internet Access). Only higher discount levels (80% - 90%) are funded for Priority 2 services (Internal Connections and Basic Maintenance of Internal Connections) due to fund cap of \$2.27B annually.

³⁶ <http://www.de.gobierno.pr/como-negociar-con-el-departamento-de-educacion-de-puerto-rico>: The Department of Education is the largest agency of the entire Executive Branch of the Commonwealth of Puerto Rico. This agency has about seventy-two thousand (72,000) employees, distributed in 1,538 schools, eighty-four (84) school districts, ten (10) educational regions and a central office

³⁷ http://en.wikipedia.org/wiki/Puerto_Rico_Department_of_Education: over 72,000 staff including more than 41,000 teachers. The department is also the third largest school district in the United States by enrollment with over 473,000 students and over 1,500 schools.

For the upcoming 2013-2014 school year (and E-Rate funding year) PRDE expects the following:

Block 2: Impact of Services Ordered for Schools and Libraries from this Form 471³⁸		
Item 7³⁹	Description	Qty
a	Number of students to be served ⁴⁰	354,075 ⁴¹
b	Telephone service: Number of classrooms or rooms with phone service	4648
c	Direct connections to the Internet: Number of drops ⁴²	36,022
d	Number of classrooms or rooms with Internet access ⁴³	2324
e	Number of computers or other devices with Internet access ⁴⁴	36,022
f	Number of buildings with:	
	At or greater than 200 kbps and less than 1.5 mbps	2
	At or greater than 1.5 mbps and less than 3 mbps	0
	At or greater than 3 mbps and less than 10 mbps	1099
	At or greater than 10 mbps and less than 25 mbps	101
	At or greater than 25 mbps and less than 50 mbps	0
	At or greater than 50 mbps and less than 100 mbps	1
	Greater than 100 mbps	0

From these details we can calculate that 112,657 students (466,732 - 354,075), about 24%, will not be served, with the benefit of 90% E-Rate discount funding; PRDE will have to pay the 100% of cost for E-Rate eligible services for these students. For funding year 2013-2014, PRDE applied for \$8,053,908 of E-Rate funding for Internet access alone, or \$22.75/student (\$8,053,908 / 354,075). Had the other 112,657 students been included in the request for E-Rate funding for Internet access, PRDE would have saved \$2,562,533 (112,657 x \$22.75). Ideally these savings will be exploited going forward, making more funds available for technology that is not eligible for E-Rate funding such as computing devices, electrical power, professional development for staff, etc.

Important Codes

To successfully complete E-Rate forms the following codes, IDs, and other numbers are needed.

Item	Number
LEA Name	Puerto Rico Department of Education
FCC Registration Number ⁴⁵	0015405046
Billed Entity Number ⁴⁶	157779
National Center for Education Statistics ID ⁴⁷	NCES District ID: 7200030 State District ID: 01

³⁸ Statistics pulled from Block 2 of Funding Year 2013 Form 471 Application# 918308 (PRDE Int 2013) for Billed Entity Number 157779

³⁹ This information supports FCC Form 471, Block 2 (October 2010).

⁴⁰ This information will also be helpful for Form 471, Block 4.

⁴¹ This smaller number than the half million students excludes those schools deemed "Not E-Rate Ready."

⁴² Another way to think of this is "how many devices could be physically plugged in for Internet access?" (Wireless devices are excluded from this count.)

⁴³ Even if a physical connection is not available, count rooms where Internet access is available via wireless.

⁴⁴ How many computers, projectors, iPads, smartphones, etc. can connect to the Internet (regardless of performance issues)?

⁴⁵ <https://fjallfoss.fcc.gov/coresWeb/simpleSearch.do;jsessionid=PJfTTvHShLX370J4w2SVycV22yyM9Mdk2Q2j8kLv5b0hJpc2lQWD!63150204!-1105498975>

⁴⁶ http://www.sl.universalservice.org/Utilities/BilledEntitySearch_Public.asp

⁴⁷ <http://nces.ed.gov/ccd/schoolsearch/>

Plan Duration

This plan covers five years: July 1, 2014 to June 30, 2019.

SLD guidance is that a technology plan should not cover more than three years, since: new technologies and services develop and change rapidly; funding can be reduced or increased; staff changes can lead to modifications of organizational goals. For these and other reasons, technology plans can become out-of-date in a relatively short period of time. While recommending that a technology plan not cover more than three years, SLD also recognizes that in certain situations a technology plan may be in effect for longer than three years.

As described in the Monitoring and Evaluation element, the goals and budget of this Technology Plan will be updated annually, establishing an “evergreen,” rolling five-year window of guidance. These Technology Plan Revisions will be submitted to Puerto Rico’s Education Secretary for re-approval *annually*, creating a rolling three-year window of approval. This active revision process will allow the plan to accurately reflect PRDE’s reality. Once updated and internally re-approved each year, the revised plan will be resubmitted to the US Department of Education for re-approval as the required support for federal funding. This annual resubmission cycle will establish a “rolling” 3-year E-Rate approval and maintain an evergreen plan.

Resources

The 2014-2019 PRDE technology plan builds on the previous PRDE technology plan and attempts to align goals and action steps with current PRDE and national programs, demands and opportunities. This PRDE technology plan consolidates recommendations relevant to PRDE from:

- The 2010 United States Department of Education National Education Technology Plan.
- The set of action steps proposed in the Agenda Académica del Departamento de Educación de Puerto Rico (Puerto Rico Department of Education Academic Agenda, 2005-2010) with these 5 key areas: integration of technology in the curriculum, professional development, providing a technology-rich learning environment and support, community and parent involvement, data-driven decision making and accountability.
- The approval requirements of an E-Rate level technology plan with these 4 elements: Curriculum, Professional Development, Infrastructure and Monitoring. While no longer strictly required, Budget is also included as a planning mechanism for PRDE.
- The 2009 USAC decisions that define minimum environmental requirements⁴⁸ for a PRDE school to be funded for E-Rate, or “E-Rate Ready,” specifically:
 - The school has computers
 - The computers have Internet service

⁴⁸ Because of significant changes in the nature of technology for education, such as migration from desktop computers to mobile, wireless devices such as tablets, it is argued in this plan that USAC’s 2009 guidelines should be updated. Tablets do not need to be in an air-conditioned, raised floor data center with bars on the windows. Also, because they operate on long-life batteries, they are less affected by limited classroom outlets or intermittent power outages. They can be locked in a data closet and charged overnight. While Internet service, adequate power to the data closet, uninterruptible power supplies [UPS] (also eligible for E-Rate funding), a sufficient number of devices and adequate professional development remain prerequisites to successful use of technology, some of the environmental guidelines USAC had imposed are obsolete and now seem needlessly stringent, given the use of more modern technologies.

- The school has trained teachers in technology integration curriculum
- The school has teachers that integrate technology with the curriculum
- The power in the classroom where the computers are located is stable
- The classroom where the computers are located has some type of security
- The classroom where the computers are located has air conditioning.

Other relevant dates and timeframes include:

- PRDE's E-Rate history (BEN 157779) includes applications for all seventeen years (1998-2013) of the E-Rate program, except for 2004 and 2005.
- In the past 5 years, PRDE has requested funding for internal connections as follows:
 - Y12 (2009-2010) = none
 - Y13 (2010-2011) = none
 - Y14 (2011-2012) = \$7,183,080.00 requested, but cancelled
 - Y15 (2012-2013) = \$50,172,965.30 requested, but as yet unfunded
 - Y16 (2013-2014) = none

As these prior years are funded and internal connections are implemented, PRDE's "2-in-5 rule"⁴⁹ status list will be updated.

After internal approval by Puerto Rico's Education Secretary, this plan will be submitted for approval⁵⁰ to:

Jenelle V. Leonard, Director
 School Support and Rural Programs
 Office of Elementary and Secondary Education
 United States Department of Education
Jenelle.Leonard@ed.gov
 Primary Phone: (202) 401-3641; 202-401-0039 (Main Number)

From Jenelle Leonard's July 18, 2011 letter approving PRDE's 2010-2014 technology plan, these are requirements for State Educational Agency [SEA] and Local Educational Agency [LEA] technology plan approval:⁵¹

- Satisfactorily addressing the statutory provisions
- Strategies for improving academic achievement through the use of technology in schools
- Strategies that address technology literacy by students, teachers, and administrators
- Strategies for addressing high need areas
- Stated goals, objectives, and strategies for implementing and integrating technology into the classrooms, curriculum and instruction
- Strategies for providing professional development.

⁴⁹ Per BEN, internal connections may be funded twice in every five consecutive funding years.

⁵⁰ Per <http://www.usac.org/sl/applicants/step01/approval-process/state-educ-agency-schools.aspx>, the sole approver for State Education Agency (SEA) technology plans is the U.S. Department of Education.

⁵¹ To receive funding under the Educational Technology State grant program authorized under Title II, Part D of the Elementary and Secondary Education Act of 1965 (ESEA), as amended by the No Child Left Behind Act (NCLB), State educational agencies (SEAs) and eligible local educational agencies (LEAs) must have in place strategic technology plans that address the requirements of the legislation.

Stakeholder Participation and Contributors

The Chief Information Officer of Puerto Rico Department of Education led the development of this technology plan. Starting from PRDE's 2010-2014 technology plan, industry consultants interviewed department personnel, visited over 375 schools, surveyed stakeholders, consolidated a wealth of information from service records and incorporated guidance from numerous respected educational resources. From this effort, a rough draft of the plan was compiled.

A Tech Plan Committee was created with one individual assigned responsibility for each of the separate chapters. On 10/17/2013, PRDE's CIO conducted a Tech Plan Committee meeting during which all committee members in attendance (a majority) confirmed review of the draft tech plan and agreement with:

- Goals and Objectives outlined in the draft Executive Summary⁵²
- Five year timeline outlined in the draft Executive Summary
- BYOD as a key strategy to achieve 1:1 computing ratios for both staff and students within 5 years.

This meeting and Tech Plan Committee discussion and agreement (with follow-up email) fulfill the E-Rate requirement that the Tech Plan be "written" prior to posting E-Rate Form 470s and RFPs for the 2014-2015 funding year. To fully support the 2014-2015 E-Rate applications, the Technology Plan needs to be approved by 7/1/2014.

Stakeholders then participated in the refinement of the draft into this final plan.

Stakeholder involvement in plan development

Stakeholders (listed below) were involved in the development of the plan as follows:

- All PRDE staff were invited to participate in an online survey (Technology Integration into Curriculum, presented in both English and Spanish) regarding the current and anticipated use of technology in the curriculum, as well as personal technology literacy skills (see APPENDIX 6 TECH PLAN SURVEY).
- Existing survey data relating to professional development was also used.
- Students' feedback about technology use and needs has been incorporated through their teachers and/or administrative staff.
- Each⁵³ Tech Plan Committee member (chapter owner) participated in at least 1 meeting discussion for detailed review and comment on the chapter draft.
- Each Tech Plan Committee member (chapter owner) developed the details of the Goals, Objectives, Benchmarks, Strategies [GOBS] tables per chapter. For each plan objective, chapter owners (and their teams) developed:
 - Implementation plan activities for accomplishing the objectives
 - Timeframes for completing each activity
 - Monitoring tools for each activity
 - Responsible party for each activity

⁵² Specifically, 0_exec_sum_shared_20131003.docx

⁵³ The Budget chapter discussion has been deferred until all chapters' content is sufficiently stabilized to warrant further budget development.

- The stakeholders then joined together in an advisory role to expand and polish the draft, creating this current plan through an iterative process of reviewing and commenting.
- On-going involvement includes periodic review of plan progress and recommended mid-course corrections and plan revisions.

Both the initial review and comment process, and continuing involvement, consists of distribution of current document versions to participants, with requests for:

- Careful reading of the latest version of the document
- Focus on the relevant changes as noted
- Email replies with comments, questions, and suggested changes
- 1:1 meetings as needed
- Comments to be returned within a week or two, depending on urgency and individual schedules.

Feedback is sought from these stakeholders whenever substantive changes are made to the document, or at least annually in preparation for budget development.

PRDE’s internal approval process for adoption of the Technology Plan requires sign off by PRDE’s Chief Information Officer, then both Academic and Administration Undersecretaries, and finally the Secretary of Education.

Special thanks go to following individuals for their active participation, contributions and careful review of various sections of this Technology Plan.

Puerto Rico Department of Education

Name	Title / Position
Rafael Roman Melendez	Secretary of Education
Lilia Torres	Subsecretary of Administration
Carmen Pintado Espiet	Subsecretary of Academics
Maribel Picó Piereschi*	Chief Information Officer
Marie Ortiz Sánchez*	OSIADT Executive Director
Lourdes E. Díaz Ortiz*	Program Director of Technology Integration (Curriculum chapter owner)
Carmen Rivera López*	Secretary of Student Services (Community chapter owner)
Marilyn Ramos Rodríguez*	Teacher’s Professional Development Institute (Professional Development chapter owner)
Victor Ortiz Pizarro*	OSIADT Network Administrator (Infrastructure chapter owner)
Evelyn Rodríguez Cardé*	Budget Office Director (Budget chapter owner)
Yomara Martínez Rivera*	Planning Office Director (Monitoring chapter owner)
Francisco Alonso Cruz*	OSIADT Administrative Systems Analyst
Fernando _____	OSIADT Telecom Administrator
Milagros Aponte	Teacher Specialist, Educational Technology Curriculum, Barranquitas
Guillermo Rodríguez Vázquez	ESL Teachers Facilitator, District Office of Guaynabo
Juan F. Fernández	Special Assistant, Regional Office San Juan
Gabriel Franco	General Manager, OMEP
Viviana Santos Pérez	OSIADT Administrative Assistant

*Technology Plan Committee

Consultants (Wynndalco Enterprises)

Name	Title / Position
David Andalco	Chief Executive Officer
Dan Curley	Project Manager, Technology Planning
Jose Flores	Chief Operating Officer
Nazario Bueno	Operations Manager
Teresa Rodriguez	E-Rate Coordinator
Arlene Martinez	On Island Coordinator
Marissa Crawford	On Island Coordinator
Mark L. Miller, Ph.D.	Executive Director / Tech Plans & E-Rate
Eileen Miller	Vice President / Tech Plans & E-Rate
Byron Davies, Ph.D.	Senior Educational E-Rate Consultant
Andree Miller	Senior Educational E-Rate Consultant
Derek Rochelle	Educational Technology Consultant

ELEMENT 1 – CURRICULUM INTEGRATION

Goals and a realistic strategy for using telecommunications and information technology to improve education

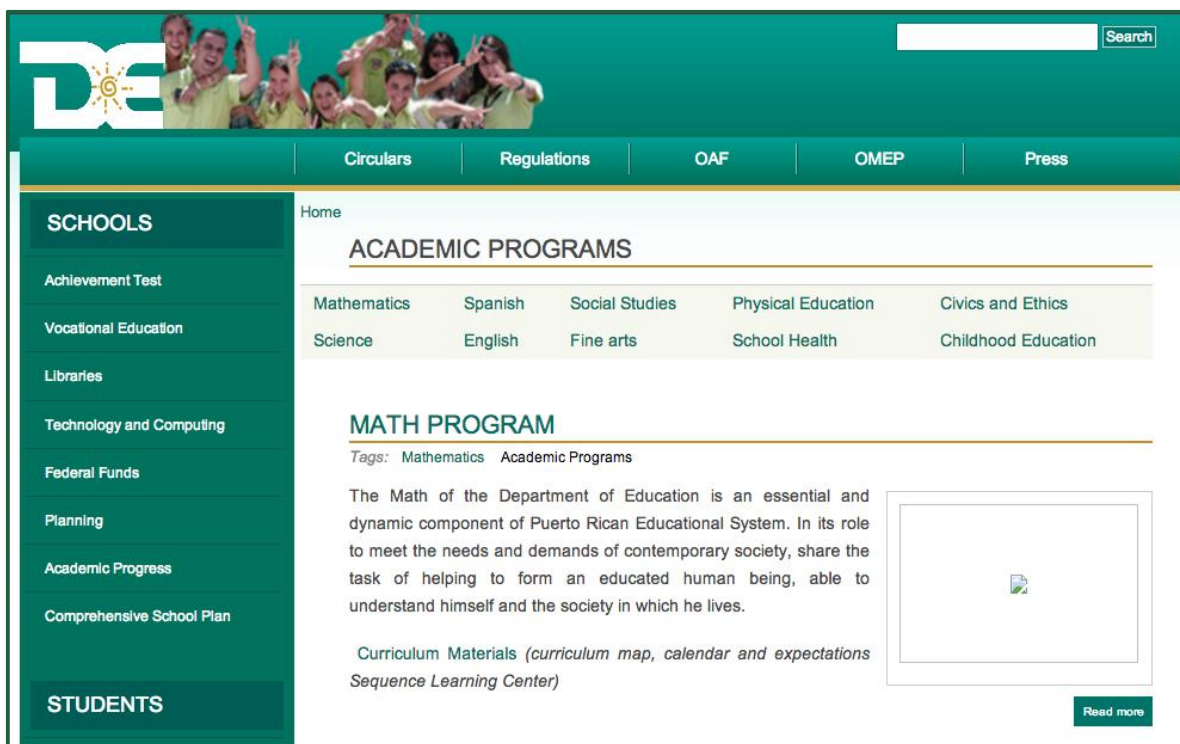
The plan must establish clear goals and a realistic strategy for using telecommunications and information technology to improve education

Our discussion of future goals and strategies for integrating technology into the curriculum derives from identifying what currently exists, comparing the current status to our anticipated needs, and developing strategies to close that gap.

Current Curriculum Integration Model

Standard Curriculum Development

PRDE’s curricular goals and academic content standards are developed by the Office of the Undersecretary for Academic Affairs and the Technology and Curriculum Unit (Unidad de Tecnología y Currículo [UTC]). PRDE’s comprehensive website (<http://www.de.gobierno.pr/>) has curriculum standards and expectations for each subject and each grade under Teachers, Academic Programs (<http://www.de.gobierno.pr/tags/programas-academicos>):



Note that PRDE’s website is in Spanish.⁵⁴ Although Spanish is the language of instruction in Puerto Rico, the Law No. 149 states that each school must help its students acquire mastery of oral and written communication in both Spanish and English. PRDE’s dual language requirement

⁵⁴ Using Chrome web browser advanced setting for language, pages in other languages can be automatically translated, albeit imperfectly.

is different from other states and adds an additional requirement outside of NCLB requirements.⁵⁵

Curriculum Materials include scope and sequence, expectations per grade, additional materials that may be available (<http://intraedu.dde.pr/sitepages/curriculum.aspx?subject=ciencia>):

Type	Name	Title	Grado
	Alcance y secuencia de matematicas	Estandares de Contenido y Expectativas de aprendizaje en materias de Matemática	
	Calendario de secuencia de matematicas - 4to grado	Calendario de secuencia de aprendizaje en materias de Matemática	4to
	Calendario de secuencia de matematicas - 5to grado	Calendario de secuencia de aprendizaje en materias de Matemática	5to
	Calendario de secuencia de matematicas - 6to grado	Calendario de secuencia de aprendizaje en materias de Matemática	6to
	Calendario de secuencia de matematicas - 7mo grado	Calendario de secuencia de aprendizaje en materias de Matemática	7mo
	Calendario de secuencia Matematicas - 1ro grado	Calendario de secuencia de aprendizaje en materias de Matemática	1ro
	Calendario de secuencia Matematicas - 2do Grado	Calendario de secuencia de aprendizaje en materias de Matemática	2do
	Calendario de secuencia Matematicas - 3ro Grado	Calendario de secuencia de aprendizaje en materias de Matemática	3ro

Each subject area (e.g., Mathematics, Spanish) has a Program Director responsible for the curriculum content. Teachers bring ideas to the Program Directors, including recommendations for textbooks or other resources. The program teams meet frequently, constantly enhancing the materials. Once adopted, established program curriculum remains in effect for several years.

Organizing curriculum definition work by academic discipline has some obvious benefits, but also yields an unfortunate side effect. Except where program directors specifically emphasize interdisciplinary coordination, efforts can be isolated and overlook opportunities for cross-pollination. There are opportunities for better integration of subjects as curriculum undergoes revisions, particularly as PRDE implements under its Flexibility Waiver and attends to career planning updates. PRDE will not be adopting the Common Core State Standards⁵⁶ [CCSS], Next

⁵⁵ The public school system in Puerto Rico was established at the turn of the 20th century under United States control of the island and was set up to mirror that of the U.S. The official language of instruction has fluctuated between Spanish and English over the years. In 1901, English was imposed as the language of instruction only to be overturned in 1915 when Spanish became the official language. These changes occurred several more times throughout Puerto Rico's educational history, including the use of both languages during instruction at varying levels depending on grade. In 1949, Spanish was declared the vehicle of instruction by Instruction Commissioner Mariano Villaronga. Since then, English as a second language has been taught as part of the K-12 curriculum every year.

⁵⁶ <http://www.corestandards.org/> - The Common Core State Standards [CCSS] Initiative is a state-led effort that established a single set of clear educational standards for kindergarten through 12th grade in English language arts and mathematics that states voluntarily adopt. The standards are designed to ensure that students graduating from high school are prepared to enter credit bearing entry courses in two- or four-year college programs or enter the workforce. Common core Math and English standards are available in Spanish (<http://commoncore-espanol.com/common-core-state-standards-spanish-language-version>); the "new science standards," which are almost completed, are not yet available in Spanish.

Generation Science Standards [NGSS], or associated online assessments, as existing academic Standards and Expectations are already aligned with CCSS. As is always the case, professional development will be incorporated as PRDE revises any standards (including any planned online assessments).

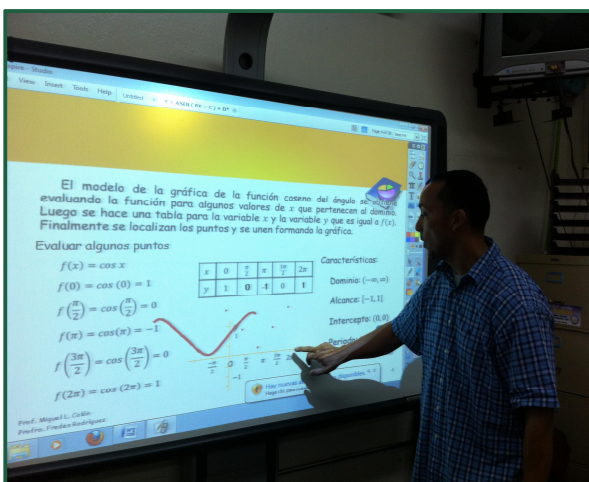
Auxiliary Curriculum Integration Programs

Teachers and schools initiate supplemental projects by submitting proposals for specific curriculum integration projects such as:

- Hand-held spelling assistant for young students
- AV Rover carts with student clickers response unit yielding quick feedback on understanding of the unit just covered
- Technology-specific programs, such as tablets that are managed locally (and might be funded by private corporations or philanthropy)
- Smart Board adoptions for high school mathematics classrooms.



Rafael Quiñes Vidal Elementary uses Vernet Educational Resource



Teacher at Escuela República de Colombia High School uses a smart board to explain a bit of trigonometry. Students are also called to the board to work problems and discuss as a group.

Individual schools can propose programs they would like to pursue, including specifications and suggested vendors. Only Highly Qualified teachers are allowed to propose auxiliary programs. Schools have some local control over their budgets and can opt to invest in such tools.⁵⁷ If approved by the Department, the program is resourced by the corresponding Regional office.⁵⁸ Telecommunications and Internet access services are managed centrally by the Department.

⁵⁷ As documented by Tech Plan survey results, technology implementations for students are initiated at the School level (38%), by the Teachers (36%) and at the Department level (20%).

⁵⁸ Regional Offices handle school procurements, ensuring competitive pricing for given specifications.

Several projects are planned specifically for schools that will have 5 Mbps connections in 2014-2015:

1. Book It! ó Special project with Pizza Hut to motivate K-6th students to read. All elementary schools will be encouraged to participate.⁵⁹
2. Solar Cars ó Integrates occupational courses with Science using projects as a learning strategy.⁶⁰ High schools students will develop and construct a vehicle that works only with solar energy. They will compete in a race sponsored by the University of Turabo.
3. Television as an Effective Education Strategy [TEEE] ó This project includes 12 schools that will use television and Internet as an educational tool on the classroom. A variety of audiovisual resources are available to teachers and students on every subject creating an updated and dynamic learning environment.
4. Technology integration for the Social Studies for the XXI Century ó The project will train over 100 social studies teachers in 199 schools (all levels) to incorporate interactive technology in the learning process using collaboration tools, research and writing. It is focused on schools with a high percentage of failure (Fø) in social studies.
5. CENIT ó Technology Initiative Centers ó Provides mobile intelligent classroom / computer lab to schools where and students take advantage of the technology tools available to improve their academic achievement focusing on the results of the Proficiency Standardized Tests. Currently, there are 55 mobile units, each with different environments (e.g., technology, 3D, microscope, telescope). Teachers have access to the units on Saturdays for professional development where teachers train teachers, working in pairs.
6. On Line courses ó (CeL) ó Online courses includes Sciences, Math, History, English, Biology, Chemistry, Physics and French for High School Students.
7. Educational Touch ó 49 schools working with tablets to develop academic and technology skills.
8. Digital Literacy Virtual Platform [PVAD] ó Project developed to measure, develop and certify 8th grade students on Digital Literacy; all 8th grade students will participate. Additionally, all teachers will participate; 6000 teachers (of 35,000) are now certified in digital literacy, which is more basic than NETS (e.g., open program, create folders, minimize/maximize screen, all Office applications)
9. Enhancing Middle School (PLI) ó for the development of studentsøacademic and technology schools, critical thinking, teamwork, collaboration and independent learning. Every teacher and student will receive a tablet to promote learning anytime, anywhere. Teachers will be able to develop digital content and virtual classes. All the Middle San Juan Schools will be included.
10. Stories of the children of Puerto Rico ó This plan of work integrates technology to reinforce the skills of creative writing in Spanish and English, as well as integrate with Fine Arts given that the stories the students produce will be illustrated by them and later placed in the Internet portal of the Technology and Curriculum Unit.⁶¹

⁵⁹ This project is actually under the auspices of the library group, not UTC.

⁶⁰ Also a library group project, but with collaboration from UTC.

⁶¹ UTC is developing a portal that will be available in January 2014 for all. Temporary URL: <http://utc-azp-spwfe1.cloudapp.net/Pages/Home.aspx> will change once in production.

11. Integration of Technology for Teachers (InTeD) ó Provides continuous and sustained professional development to 84 computer teachers throughout the island. This professional development is founded on the integration of technology into the curriculum. The Centers for Technological Innovations for Teaching ó CITEd has Specialists in Technology Education who are responsible for the process of informing, training, and providing technical assistance to all teaching and non-teaching personnel in the districts and schools.

These types of projects can be included in the Comprehensive School Plans [CSP] discussed in more detail in the Monitoring and Assessment chapter.

2007 Content Standards and Grade Level Expectations

The Puerto Rico Department of Education [PRDE] made a leap forward when we revised our academic content standards in 2007 to support more rigorous academic instruction and alignment with national expectations. We formally approved and adopted new academic content standards in Spanish language arts and mathematics for grades K-12 in 2007. These standards include grade-specific content expectations for all students in each grade level. At all stages of development of the 2007 revised standards, we included:

- Teachers from each of the content areas across all regions
- Curriculum specialists
- Special education teachers
- Professors from a variety of public and private universities
- Stakeholders from community agencies
- Community members who were familiar with the instructional needs of students with disabilities and limited Spanish proficiency speakers.

We also considered feedback from the public by holding public hearings during the development of the new standards and taking public commentary into consideration.

Several studies evidence the success of this revision process and the rigor of our 2007 content standards. The first study was conducted by the National Center for Educational Statistics at the U.S. Department of Education [USDoE] (2009). This study was one of several commissioned by USDoE to investigate possible explanations for the very low performance of Puerto Rico's students on the National Assessment of Educational Progress [NAEP]. It included a review of our previous (2000) and current (2007) academic content standards in mathematics in relation to the NAEP mathematics frameworks. This study revealed that the 2007 standards were ðaligned well with NAEP's content standards and objectivesö and were superior to the 2000 version of our standards. Specifically, the 2007 PRDE content standards were written at the appropriate levels of specificity and met the alignment criteria of categorical concurrence and balance of representation, as well as *range of knowledge* correspondence.

Currently, all Program Directors are undertaking rigorous revisions to align the standards and expectations to the focus of career planning as well as guarantee the integration of technology.

Technology Integration

All curricular materials include consideration of technology integration, which is implemented to the extent that technology resources are available. Additional efforts to integrate technology into the curriculum are described in the Technology Program:⁶²

The Department of Education is currently conducting a curriculum review, which considered the integration of technology as a tool in achieving the skills and academic standards. This review has resulted in the need to train teachers regarding the management of technology as a complementary tool to develop learning activities in the classroom. In turn, generates the demand for a new focus on strategies and teaching methodologies, in which the teacher takes the role of facilitator and the student has the resources to develop their own knowledge.

The use of technology in the classroom challenges the teacher to design different teaching strategies, motivating and relevant to students, according to the current parameters in a highly technological society. At the same time, encourages the teacher to continue preparing and training themselves, continuously, in the use and effective management of emerging educational technology and skills to help you meet the new challenges to design and enhance learning in line with the needs of students in these times.

The UTC supports the teacher in this process through training and support around the effective integration of technology into the classroom. It also promotes the development of technology projects necessary to implement innovative strategies to consider new methodologies and different learning environments.

Projects of UTC - Projects to promote the creation of different learning environments, in tune with the technological demands of the students of our system.

Following is a recap of currently available telecommunications and information technology, its accessibility by various stakeholders (teachers, administrators and students, both during the school day and outside of school hours), how it is typically used (what is produced and with what frequency).

⁶² Previously called Division of Educational Innovation And Technology [ETA], now the responsibility of Unidad de Tecnología y Currículo [UTC] (Technology and Curriculum Unit). This documentation was previously available at: <http://www.de.gobierno.pr/division-de-innovaciones-y-tecnologia-educativa-dite>). Translated by Chrome (with inherent limitations of automatic translation). Path: Teachers/ Academic Programs/ Technology and Computers.

End User	Access to Technology	Use of Technology
Students in general	<p>At school:</p> <ul style="list-style-type: none"> • Most PRDE schools have a library and/or lab with several (mainly Windows) computers and CIPA compliant Internet access; a few schools have student computers in classrooms • Computer time is available to students before and after school and at lunch and during weekly library time • Students are assigned email accounts at 8th grade, with parental consent • 8th grade includes technology literacy focus <p>At home:</p> <ul style="list-style-type: none"> • Most families have computer and Internet, typically with better speed than at school 	<p>WEEKLY, students use:</p> <ul style="list-style-type: none"> • Email account to communicate with staff (turn in homework, homework help and reminders) • Web browsers for research • Word to prepare assignments • PowerPoint for classroom presentations • Educational resources (e.g., Rosetta Stone)
Students in 21 st Century schools	<p>Same as Students in General except:</p> <ul style="list-style-type: none"> • 2 student computers in each classroom 	<p>Same as Students in General</p>
Teachers, Administrators, Technical Support Staff in all schools, all grades	<p>At school:</p> <ul style="list-style-type: none"> • Some teachers have computers in classrooms with projection capability • A few classrooms have smart boards <p>At home:</p> <ul style="list-style-type: none"> • Most have computer and Internet, typically with better speed than at school 	<p>DAILY, PRDE staff use:</p> <ul style="list-style-type: none"> • School provided email account to communicate with staff for collegial sharing, parents for schedules and reminders, students for homework help and reminders • Web browser for research • Word to prepare lesson plans, correspondence • PowerPoint for classroom presentations • PRDE's several instructional and administrative data management systems accessible from PRDE website via secure sign-in

Access to technology is limited for students and teachers alike. Analysis of 2011 data collected for E-Rate reporting (Blocks 2 and 4 of Form 471)⁶³ reveals these data points:

- For 1467 open PK-12 schools, 472,274 students share 25,566 computers for instruction, of which 15,598 have Internet access
- Per open school, the average ratio of students per computer is 18, with the average ratio of students per computer with Internet access at 30
- Per level at open schools, the average ratios of students per computer, and students per computer with Internet access are:
 - Elemental ó 21, 30
 - Intermediate ó 20, 34
 - Secondary ó 16, 26
 - Second unit ó 19, 27
 - Top ó 14, 26

⁶³ Please refer to file, [spreadsheet stats_on_schools_20130712.xlsx](#), for full detail (techplan/2013_2018_plan/tp_supporting/curriculum).

- Students-to-computer ratios vary widely per level:
 - Elemental ó 0 ó 367, with mode of 5 and median of 14
 - Intermediate ó 0 - 575, with mode of 6 and median of 14
 - Secondary ó 0 ó 65, with mode of 13 and median of 13
 - Second unit ó 0 ó 316, with mode of 10 and median of 14
 - Top ó 0 ó 198, with mode of 4 and median of 9.

Consistently, PRDE staff relate that Internet access is generally stable, but too slow; in fact, staff consistently indicate that they have better tools at home (i.e., newer computers and faster Internet access), which is further corroborated by Tech Plan Survey results.

A significant percentage of schools lack technology infrastructure adequate to support educational reform where technology integrated into curriculum is a central theme. All educators require professional development to effectively deploy technology in the classroom, once it becomes readily available. Technology resources per school are inadequate and that which is available needs to be distributed to the classrooms (rather than centralized in a library or lab).

Internet Safety Policy

PRDE's Internet Safety Policy⁶⁴ includes all requisite E-Rate content as described by <http://www.usac.org/sl/applicants/step06/cipa.aspx>, including instructing students regarding Internet safety and Cyberbullying. The Manual for the use of Internet and Technology Resources is accessible from the PRDE website (<http://www.de.gobierno.pr/manual-para-el-uso-de-internet-y-recursos-de-tecnologia-en-las-escuelas-publicas-de-puerto-rico>).⁶⁵ PRDE attempts to obtain a signature each year from every student and every parent/guardian who uses PRDE resources.

Additionally, PRDE provides Standards of Excellence for Effective Use of Information on its website (<http://www.de.gobierno.pr/estandares-de-excelencia-para-el-uso-efectivo-de-la-informacion>):⁶⁶

The proliferation of information and the development of computer technology applied to all aspects of human life make prevailing provide new and better library services that replace the demand for access to information quickly and relevant.

The Program of Library and Information Services has as one of its primary responsibilities the individual providing few learning experiences allow them to develop the essential skills to become an effective user of information, on a lifelong learner and an active member of the learning communities. The individual who has developed information skills will be better positioned to become a productive citizen, working successfully in the world of work and contributing more effectively to improve the quality of life of the society in which he lives.

⁶⁴ <http://www.de.gobierno.pr/sites/de.gobierno.pr/files/Manual%20de%20Uso%20de%20Internet%202012.pdf>

⁶⁵ Path: School/Technology and Computing

⁶⁶ Translated by Chrome (with inherent limitations of automatic translation).

Academic Results

Student achievement is currently measured using PRDE Standardized Testing (Pruebas Puertorriqueñas de Aprovechamiento Académico [PPAA] or Puerto Rican Alternate Assessment Tests [PPEA]). PPAA and PPEA are designed to evaluate academic achievement of students in the subjects of English language, mathematics, Spanish and science. These tests are aligned to the content standards of excellence established by the Department of Education of Puerto Rico and meet the requirements of No Child Left Behind Act [NCLB]. All students enrolled in 3rd through 8th and 11th grades take the PPAA/PPEA, including students with special needs who may require reasonable accommodations in accordance with their Individualized Education Plans [IEP]. Science tests are offered to students in 4th, 8th and 11th grades only.

PPAA scores for every student are compared with established performance levels in the legislation of NCLB. These levels of performance for each subject are the basic, proficient or advanced. The school profile report shows the level of proficiency achieved by each school in each of the materials according to the results of regular testing (PPAA) and alternate assessment tests (PPEA).

Through testing, educators and parents receive valuable information regarding the academic skills to be strengthened to achieve the goals of academic achievement. In addition, managers have better information related to academic performance to plan the teaching and learning process of the school. Also, the information can be used to work on professional development programs for teachers in the education system.

From PRDE's website (<http://www.de.gobierno.pr/tags/progreso-academico>)⁶⁷ the School Profile Report ("Report Card") presents a bleak reality. For 2012-2013,⁶⁸ most schools (91%) were in need of academic improvement⁶⁹ (Mejoramiento) with well over half (66%) of the schools in need of academic improvement at the restructuring (reestructuración) level of consequences.

A comparison between current levels of student academic performance and annual goals in Spanish, Math, English and science, according to the results of the Puerto Rican

Años en Mejoramiento Escolar	
Primer Año	88
Segundo Año	93
Acción Correctiva	267
Reestructuración 1	192
Reestructuración 2	55
Reestructuración 3	90
Reestructuración 4	124
Reestructuración 5	412
Total Escuelas en Mejoramiento:	1,321

Por ciento	91%
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⁶⁷ Authentication is now required to access the 2 most current years of information; prior years are accessible (<http://www.de.gobierno.pr/sites/de.gobierno.pr/files/State%20Report%20Card%202011-2012%20.pdf>)

⁶⁸ PRDE website has been updated since these stats were pulled; this link (http://intraedu.dde.pr/reportcard/Perfil/State_perfil.pdf) is no longer operational.

⁶⁹ The federal No Child Left Behind [NCLB] Act of 2001 aims to bring all students up to the proficient level on state tests by the 2013-2014 school year, and to hold states and schools more accountable for results. NCLB requires all districts and schools receiving Title I funds to meet state "adequate yearly progress" [AYP] goals for their total student populations and for specified demographic subgroups, including major ethnic/racial groups, economically disadvantaged students, limited English proficient (LEP) students, and students with disabilities. If these schools fail to meet AYP goals for two or more years, they are classified as schools "in need of improvement" and face consequences as described below.

Academic Achievement [PPAA] Tests, is consistently disheartening.

For 2011-2012,⁷⁰ PPAA results showed highest percentage of proficient+advanced achievement by 3rd graders and lowest achievement by 7th graders, with Spanish and Math results severely below goals and English results above goal.

Subject	Goal	Average Result	Highest Result	Lowest Result
Spanish	83.18%	46%	58% by 3 rd grade	39% by 7 th grade
English	34%	42%	53% by 3 rd grade	33% by 7 th grade
Math	84.68%	29%	70% by 3 rd grade	8% by 7 th grade
Science	No goal	45%	66% by 4 th grade	27% by 8 th grade

% Proficientes + Avanzados								Proficiencia en Español				
	3ro	4to	5to	6to	7mo	8vo	11mo		Pre-Básico	Básico	Proficiente	Avanzado
2010-2011	54%	44%	44%	48%	37%	45%	38%	2010-2011	18%	37%	21%	24%
2011-2012	58%	50%	45%	50%	39%	43%	40%	2011-2012	18%	35%	21%	25%

Proficiencia en Inglés												
	3ro	4to	5to	6to	7mo	8vo	11mo		Pre-Básico	Básico	Proficiente	Avanzado
2010-2011	53%	36%	40%	50%	32%	37%	41%	2010-2011	23%	36%	23%	19%
2011-2012	53%	37%	42%	50%	33%	37%	41%	2011-2012	23%	36%	22%	20%

Proficiencia en Matemáticas												
	3ro	4to	5to	6to	7mo	8vo	11mo		Pre-Básico	Básico	Proficiente	Avanzado
2010-2011	66%	52%	40%	10%	7%	9%	8%	2010-2011	21%	52%	13%	14%
2011-2012	70%	55%	42%	16%	8%	9%	9%	2011-2012	21%	50%	13%	16%

Proficiencia en Ciencias												
	3ro	4to	5to	6to	7mo	8vo	11mo		Pre-Básico	Básico	Proficiente	Avanzado
2010-2011		68%				27%	46%	2010-2011	19%	34%	27%	20%
2011-2012		66%				27%	44%	2011-2012	19%	35%	26%	19%

PRDE's strategies to overcome these lingering hurdles must precisely target the highest impact opportunities and be ardently implemented so that the adults emerging from the public schools will be successful contributors to Puerto Rico's 21st century world.

⁷⁰ 2012-2013 PPAA results are not yet available.

NCLB, Flexibility Waiver,⁷¹ Common Core State Standards

Because the educational system in Puerto Rico has some significant differences from other states and these differences represent unique challenges to the systemic change that is needed to improve educational outcomes, PR has applied for an NCLB flexibility plan waiver (already approved for 42 states⁷²); **PR’s waiver has been approved.**⁷³ PRDE’s ESEA Flexibility Request was submitted August 31, 2012 by Grisel Muñoz Marrero, Ph.D., Undersecretary of Academic Affairs. In addition to relief from financial penalties,⁷⁴ PRDE requested this set of waivers to empower PRDE to meaningfully improve instruction and increase achievement for all students in Puerto Rico. The provision of NCLB flexibility will better meet the unique needs of students, teachers, schools, and districts island-wide in Puerto Rico.

Excerpts from the Overview of the approved Flexibility Waiver Request:⁷⁵

Implementation of Principle 1 is consistent with PRDE’s ongoing efforts to implement rigorous, approved, and adopted college and career ready academic content standards in Spanish language arts and mathematics in grades K-12. PRDE’s standards include grade-specific content expectations for all students in each grade level. A gap analysis study conducted in September 2011 showed a high correspondence between PRDE’s academic content standards and the Common Core State Standards. In addition, the University of Puerto Rico has conducted an analysis that determined that the PRDE standards are sufficient to ensure student success in college and career. Thus, PRDE’s implementation of Principle 1 is consistent with its current system-wide efforts to improve education across the island.

Principle 2 proposes a differentiated accountability system that sets new ambitious AMOs;⁷⁶ identifies priority, focus, and reward schools; identifies differentiated supports for schools in all categories including the remaining non-categorized Title I schools; and engages the community and other stakeholders to participate in educating Puerto Rico’s school children. PRDE recognizes the need for the public education system to

⁷¹ From <http://www.ed.gov/esea/flexibility/documents/esea-flexibility-acc.doc>, “In order to move forward with State and local reforms designed to improve academic achievement and increase the quality of instruction for all students in a manner that was not originally contemplated by the No Child Left Behind Act of 2001 (NCLB), a State educational agency (SEA) may request flexibility, on its own behalf and on behalf of its local educational agencies (LEAs), through waivers of ten provisions of the Elementary and Secondary Education Act of 1965 (ESEA) and their associated regulatory, administrative, and reporting requirements. In order to receive this flexibility, an SEA must meet the principles described... Principles include:
Principle 1: College- and Career-Ready Expectations for All Students
Principle 2: State-Developed Differentiated Recognition, Accountability, and Support
Principle 3: Supporting Effective Instruction and Leadership
Principle 4: Reducing Duplication and Unnecessary Burden

⁷² <http://www2.ed.gov/policy/elsec/guid/esea-flexibility/index.html>

⁷³ Flexibility Waiver is good for 1 year and must be applied for again each year. PRDE’s Federal Affairs department is responsible for its preparation.

⁷⁴ The Waiver will allow PRDE to still receive Title I federal funding, despite not having met school improvement requirements.

⁷⁵ See <http://www.de.gobierno.pr/sites/de.gobierno.pr/files/Aproved Flexibility Plan.pdf> (request) and http://www.de.gobierno.pr/sites/de.gobierno.pr/files/20130228103742366_0001.pdf and <http://www.de.gobierno.pr/secretario-del-de-se-reune-con-lideres-magisteriales>. Approval letter is not yet available on the PRDE website.

⁷⁶ Annual Measurable Objectives [AMOs] are used to determine adequate yearly progress [AYP] under NCLB.

demonstrate improved student outcomes and is committed to reform activities that result in improved teaching and learning. PRDE’s implementation of Principle 2 is consistent with the Secretary and Governor’s overall goals for education.

Principle 3 requires a commitment to implementing an evaluation process that recognizes and enhances teacher and school director strengths while identifying and supporting their areas of need. PRDE believes that implementation of Principle 3 is necessary in order to make significant improvements in the quality of teaching and learning in its schools.

Principle 4 exhibits PRDE’s determination to reduce the administrative burdens inflicted on our districts and schools.

Puerto Rico welcomes the opportunities created by the Flexibility Waiver and is eager attempt new approaches to improving student achievement. Similarly, PRDE appreciates that fact that the Flexibility Waiver has focused the attention of leaders across the island on key reform areas and created new opportunities for PRDE to engage stakeholders and benefit from new thinking and ideas about strategies to reform the system.

Desired Curriculum Integration Model

PRDE’s curriculum integration objectives are based on the National Education Technology Plan:

All learners will have engaging and empowering learning experiences both in and out of school that prepare them to be active, creative, knowledgeable, and ethical participants in our globally networked society.

Within the framework of other significant educational reform activities, specifically the implementation of NCLB Flexibility Waiver, PRDE’s primary curriculum goal is to improve how technology is integrated into the curriculum, both in quantity and in quality. Using technology as a catalyst to foster learner-centered, project-based learning [PBL] and to help students develop critical thinking skills is the focus.

PRDE Key Concepts Definitions for Educational Technology

To promote common understanding by all stakeholders, we define the following concepts related to educational technology.

Technology Integration into the Curriculum

The PRDE defines effective technology integration into the curriculum as the incorporation of technological resources and processes in the day-to-day work in the classroom (teaching, professional development and assessment). It is a planned and coordinated process that seeks to enrich academic subjects and improve student academic achievement. Technological resources support the achievement of agency goals and the standards and expectations in the academic subjects, and they facilitate the incorporation of a variety of educational resources and varied strategies in teaching, such as collaborative learning, action-research, project-based learning and critical analysis, etc. To guide effective technology integration in the curriculum, the agency has adopted the following principles (itemized in the document entitled, *PRDE Conceptual*

Framework of Technology for Learning):

- Technology integration is a process that requires time and support.
- All technological projects must be based on a sound theoretical framework.
- The use of technology must provide conditions allowing for deep learning.
- A variety of technologies have their place in constructivist learning.
- The use of technology requires planning at the system level.
- Technology integration is developed in a community of practice.

Student Technology Literacy

The PRDE had initially defined technologically literate students as those who demonstrate an understanding of the nature of technology and its proper, creative, legal and ethical operation in dealing with situations that arise in daily life. This takes into account skills such as accessing, using, evaluating, analyzing, integrating, synthesizing and communicating information, so as to improve academic achievement in all academic subjects, develop into life-long learners and perfect the skills necessary to be effective in the 21st century. Performance includes the use of the following:

- Applications such as productivity tools, the Internet, applications, programs, games, libraries, etc. (software).
- Peripherals such as compact disk players, storage devices, printers, the mouse, keyboards, digital tablets, etc. (hardware).

Recent PRDE commitment to adopt the National Educational Technology Standards for Students [NETS-S] (<http://www.iste.org/docs/pdfs/nets-s-standards.pdf?sfvrsn=2>)⁷⁷ enhances this initial definition and provides succinct Profiles for Technology Literate Students by grade and age (<http://www.iste.org/docs/pdfs/nets-s-2007-student-profiles-en.pdf?sfvrsn=4>). NETS-S skills include: Creativity and Innovation; Communication and Collaboration; Research and Information Fluency; Critical Thinking, Problem Solving and Decision Making; Digital Citizenship; Technology Operations and Concepts.

Teacher / Educator Technology Literacy

The PRDE had initially defined technologically literate teachers based on eMINTS National Center instructional model⁷⁸ as able to use multiple and varied strategies that promote authentic project-based learning opportunities, student teamwork, collaboration, and communication using technology in the classroom curriculum.

Recent PRDE commitment to adopt the National Educational Technology Standards for Teachers [NETS-T] (<http://www.iste.org/docs/pdfs/nets-t-standards.pdf?sfvrsn=2>) enhances this initial definition with effective teachers model and apply the NETS-S as they design,

⁷⁷ The International Society for Technology in Education [ISTE] developed the NETS with input from the field and pioneered their use among educators. The National Educational Technology Standards [NETS] are the standards for learning, teaching, and leading in the digital age and are widely recognized and adopted worldwide. The family of NETS: NETS for Students (NETS[®]S), NETS for Teachers (NETS[®]T), NETS for Administrators (NETS[®]A), NETS for Coaches (NETS[®]C), and NETS for Computer Science Teachers (NETS[®]CSE) work together to transform education.

⁷⁸ <http://www.emints.org/professional-development/instructional-model/>

implement, and assess learning experiences to engage students and improve learning; enrich professional practice; and provide positive models for students, colleagues, and the community. Teachers should meet these standards and performance indicators: Facilitate and Inspire Student Learning and Creativity; Design and Develop Digital Age Learning Experiences and Assessments; Model Digital Age Work and Learning; Promote and Model Digital Citizenship and Responsibility; Engage in Professional Growth and Leadership.

Ongoing Initiatives

The following PRDE ongoing initiatives are helping the department continue in the best direction:

- Computerized student grading has been mandatory for about 5 years; now, few teachers resist technology changes, rather they express enthusiasm for technology integration
- NETS for Students
- NETS for Teachers
- Microsoft grant to provide software licensing and consulting to students and teachers in the middle grades,⁷⁹ where "statistics show í high dropout rates and low academic achievement."
- Specific auxiliary projects initiated by teachers and schools
- Implementation of NCLB Flexibility Waiver
- Comprehensive curriculum standards review considering the integration of technology as a tool in achieving the skills and academic standards
- Each Program Director is rewriting by subject across all grades (target completion is Feb 2014)
- PRDE has several instructional and administrative data management systems to collect various types of data. A longitudinal database project (i.e., data warehouse) is in development will consolidate and aid in analysis of these data. This comprehensive tool will support well-founded decisions to guide the development of the curriculum, the integration of technology and professional development adapted to the needs that are identified.

In October 2012, USDoE officially certified PRDE's standards and assessment system as being in compliance with ESEA standards and assessment requirements. Thus, Puerto Rico complies with all statutory and regulatory requirements. In addition, Puerto Rico is fully engaged in implementing a plan for the continuous increase in rigor of PRDE's current assessment to prepare all students to thrive in their transition to higher studies or work and to meet the requirements of a "high-quality" assessment, as defined in the ESEA Flexibility policy document, by 2014-2015. PRDE has initiated a revision of both its content standards ("beginning in 2013-2014") as well as development of High Quality Assessments [HQAs]. The new high quality assessments are scheduled to be completed and administered in the 2014-2015 school

⁷⁹ From DE AND MICROSOFT RENEW COMMITMENT TO INTEGRATE TECHNOLOGY INTO THE CLASSROOM (<http://www.de.gobierno.pr/de-y-microsoft-renuevan-compromiso-para-integrar-la-tecnologia-al-salon-de-clases>), Strengthening the Middle "í promotes digital inclusion strategy that will provide a personal device (laptop or electronic tablet) to each teacher and middle school students in order to promote learning at any time and from anywhere."

year, although PRDE will continue to build upon the high quality of its current system in subsequent years, as well.

New Initiatives

Recently, a dramatic strategic decision was made by PRDE to allow, and encourage, Bring Your Own Device [BYOD]. Students will be allowed to bring their own devices to schools, provided they meet the minimum technical specifications to effectively interface with curricular applications, as well as conform to BYOD policies and procedures to be developed and deployed in the course of the next year. This decision facilitates the availability of devices for student use, relieving the Department of a large portion of a significant financial burden. Per a survey conducted in 2012, 80% of students have a device they could bring to school. Our Tech Plan survey results (conducted in 2013) confirm that most students already have access to better devices and Internet at home.

BYOD introduces additional challenges:

- Professional development for teachers and staff
- Development, testing and documentation of curriculum applications for mobile devices
- CIPA compliance
- Technical support.

Future Academic Results will be reported based on individual student growth vs. overall school growth. Details of how the new results will be managed are still being developed. One certainty is that a longitudinal data warehouse will retain all student information year to year.

Plan Objectives

In support of the PRDE's curricular goals, we have established the following objectives and strategies for using technology to improve teaching and learning.

Element	Goal/Objective
Curriculum Goals	Improve student academic achievement in mathematics, language arts and science; ensure that graduating students meet the ISTE NETS for Students standards for information fluency; adopt data-driven, online assessments; improve productivity for educators and administrators.
Curriculum Objective	Increase student achievement in math , as measured by standardized tests (using various strategies such as 1:1 learner-centric models, "flipped classroom" with Khan Academy, transitioning technology from labs to classrooms, etc.). Use technology activities to help ensure that students acquire 21 st century skills such as critical thinking, meta-cognition and problem solving, with less emphasis on rote memorization.
Curriculum Objective	Increase student achievement in Spanish and English language arts , as measured by standardized test scores (using various strategies such as 1:1 learner-centric models, simulation tools, transitioning technology from labs to classrooms, etc.). Use technology activities to help ensure that students acquire 21 st century skills such as critical thinking, meta-cognition and problem solving, with less emphasis on rote memorization.
Curriculum Objective	Increase student achievement in science , as measured by standardized test scores (using various strategies such as 1:1 learner-centric models, simulation tools, transitioning technology from labs to classrooms, etc.). Use technology activities to help ensure that students acquire 21 st century skills such as critical thinking, meta-cognition and problem solving, with less emphasis on rote memorization.

Element	Goal/Objective
Curriculum Objective	Improve student information fluency , as measured by ISTE's NETS for Students, through such action steps as increasing the ratio of devices to students and transitioning technology usage from labs to classrooms.
Curriculum Objective	Adopt online, testing tools that foster data-driven decision-making. Phase out offline, summative assessments in favor of online tools that also support ongoing formative assessments to guide instruction.
Curriculum Objective	Improve productivity for educators and administrators via rollout of PRDE data warehouse.

During the 5 years of this plan, PRDE will focus on the objectives presented in the following tables with the specific activities, timeframes, monitoring and responsible parties.⁸⁰

⁸⁰ The various PRDE Offices and their responsibilities are described in Element 4.

Curriculum Goals	Improve student academic achievement in mathematics, language arts and science; ensure that graduating students meet the ISTE NETS for Students standards for information fluency; adopt data-driven, online assessments; improve productivity for educators and administrators.
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<p>Objective 1.1: Increase student achievement in math, as measured by standardized tests.</p> <p>Benchmarks:</p> <ol style="list-style-type: none"> a. By June 2015, achieve 2% increase over global 2011-2012 results. b. By June 2016, achieve 5% increase over global 2011-2012 results. c. By June 2017, achieve 7% increase over global 2011-2012 results. d. By June 2018, achieve 10% increase over global 2011-2012 results. e. By June 2019, achieve 12% increase over global 2011-2012 results.
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Implementation Plan Activities (Math)	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
<p><u>Projects for All Grades</u></p> <ol style="list-style-type: none"> 1. Virtual communities for teaching and learning of mathematics (MATHCLOUD) 2. Mathematical educating for the 21st century (edum @ t s21) 3. Mathlabs 			Math Academic Director
<p><u>Conditions for Learning</u></p> <p>Provide additional teacher technological tools that offer greater flexibility and variety, maximizing the use of technology and expanding educational resource in presenting issues and lessons in the classroom, improving the physical infrastructure of schools, and providing safety and support in the community schools.</p> <p><u>Resources</u></p> <p>Ensure that all teachers have access to appropriate materials and equipment, including technological resources, which have been identified as essential to the teaching and learning of high quality, according to educational level and according to the individual needs of students</p>	<p>During the 2013-2014 school year resource use has been encouraged, and will continue through 2014-2015 and forward.</p> <p>Technological tools that allow differentiation and individualization in the teaching and learning of mathematics.</p>	<p>Formative assessment/Test per Cycle October, December, March and May, during academic year</p> <p>% Participating schools</p> <p>Pre and Post tests</p>	Math Academic Director

Implementation Plan Activities (Math)	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
<p><u>Projects for All Grades</u></p> <ol style="list-style-type: none"> 1. Virtual communities for teaching and learning of mathematics (MATHCLOUD) 2. Mathematical educating for the 21st century (edum @ t s21) 3. Mathlabs 			Math Academic Director
Information infrastructure	<p>During the 2013-2014 school year have expanded the technological means to contribute to establishing learning communities in mathematics from a virtual approach to contribute to increased academic achievement and improving teaching.</p> <p>These efforts will continue through 2014-2015 and forward.</p>	<p>Formative assessment/Test per Cycle October, December, March and May, during academic year</p> <p>% Participating schools</p> <p>Pre and Post tests</p>	Math Academic Director
<p><u>ACADEMIC ACHIEVEMENT: Virtual Component Differentiated Instruction</u></p> <p>Providing challenging and relevant educational experiences that promote academic achievement, through a techno-learning platform based on the use of a programmed Internet and complementary technological options to individualize learning the various skills and concepts in mathematics, to improve teaching, keeping students on task and encourage formative assessment continuously.</p>	<p>During the 2013-2014 school year offered professional development, and will continue through 2014-2015 and forward.</p> <p>High quality teaching strategies and learning mathematics in context to strengthen effective educational practices in the teaching staff.</p>	<p>Pre and post test</p> <p>% Participating in mentor programs</p>	Math Academic Director MATHCLOUD Project
<p>New innovative teaching strategies for the teaching and learning of teacher and student of the XXI century</p> <ul style="list-style-type: none"> • Integrates technology to the materials in your classroom • Integrates tablets in your classroom • Integrates graphing calculators in your classroom • Math Tools for Internet • Math games on the net 	<p>During the 2013-2014 school year offered professional development and will continue through 2014-2015 and forward.</p>	<p>Pre and post test % participating in mentor programs</p>	Math Academic Director EduM @ t S21 Project

Implementation Plan Activities (Math)	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
<u>Projects for All Grades</u> 1. Virtual communities for teaching and learning of mathematics (MATHCLOUD) 2. Mathematical educating for the 21st century (edum @ t s21) 3. Mathlabs			Math Academic Director
PROFESSIONAL DEVELOPMENT At the end of the 2013-2014 school year, will have implemented the project Virtual Communities for Teaching and Learning of Mathematics (MATHCLOUD) Mathematics Program of the Department of Education, through the creation of a Web page that includes but is not merely providing virtual tools such as Moodle, virtual lounge and open meetings, to use and supplement classroom education.	Periodically, reminders and tips will be provided. By June 2015, then annually thereafter, refresher information will be provided.	Dates of reminder/tip and refresher distributions.	Math Academic Director MATHCLOUD Project
Literacy workshops (technological literacy) for parents, families and community members in order to help them become partners in the education of their children. Some of the issues are but not limited to: <ul style="list-style-type: none"> • How do I help my children to do their school projects with technology? • Safe way to surf the internet • Social networks and bullying • Internet security reserve • Learning about computers 	By June 2015, and repeated annually, advertise and conduct at least 1 event (live meeting or communication sent home with students.	Dates of advertising and event.	Math Academic Director EduM @ t S21 Project

Implementation Plan Activities (Math)	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
<u>Projects for Kindergarten to Grade 3</u> 1. Active Learning		Formative assessment/Test per Cycle October, December, March and May, during academic year	Early Childhood Director DE

Implementation Plan Activities (Math)	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
<p><u>Projects for Kindergarten to Grade 3</u></p> <p>1. Active Learning</p>		<p>Formative assessment/Test per Cycle October, December, March and May, during academic year</p>	<p>Early Childhood Director DE</p>
<p><u>Conditions for Learning</u> Provide additional teacher technological tools that offer greater flexibility and variety, maximizing the use of technology and expanding educational resource in presenting issues and lessons in the classroom, improving the physical infrastructure of schools, and providing safety and support in the community schools.</p> <p><u>Resources</u> Ensure that all teachers have access to appropriate materials and equipment, including technological resources, which have been identified as essential to the teaching and learning of high quality, according to educational level and according to the individual needs of students</p>	<p>During the 2013-2014 school year resource use has been encouraged, and will continue through 2014-2015 and forward.</p> <p>Technological tools that allow differentiation and individualization in the teaching and learning of mathematics using the STEM for early childhood.</p>	<p>Formative assessment/Test per Cycle October, December, March and May, during academic year</p> <p>% Participating schools</p> <p>Pre and Post tests</p>	<p>Early Childhood Director DE</p>
<p>Information infrastructure</p>	<p>During the 2013-2014 school year have expanded the technological means contribute to establishing learning communities in kindergarten from a virtual approach to contribute to increased academic achievement and improving teaching.</p> <p>These efforts will continue through 2014-2015 and forward.</p>	<p>Formative assessment/Test per Cycle October, December, March and May, during academic year</p> <p>% Participating schools</p> <p>Pre and Post tests</p>	<p>Early Childhood Director DE</p>

Implementation Plan Activities (Math)	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
<p><u>Projects for Kindergarten to Grade 3</u></p> <p>1. Active Learning</p>		<p>Formative assessment/Test per Cycle October, December, March and May, during academic year</p>	<p>Early Childhood Director DE</p>
<p><u>ACADEMIC ACHIEVEMENT: Virtual Component Differentiated Instruction</u></p> <p>Providing challenging and relevant educational experiences that promote academic achievement, using programs in math to individualize learning the various skills and concepts in mathematics, to improve teaching, keeping students on task and encourage formative assessment continuous, during the early first years.</p>	<p>During the 2013-2014 school year offered professional development, and will continue through 2014-2015 and forward.</p> <p>High quality teaching strategies and learning mathematics in context to strengthen effective educational practices in the teaching staff. (Summer Academy) STEM for Kindergarten</p>	<p>Pre and post test % Participating in mentor programs</p>	<p>Early Childhood Director DE</p>
<p>Teaching strategies for the teaching and learning of teacher and student of the XXI century</p> <ul style="list-style-type: none"> • Integrates technology to the materials in your classroom • E- blocks • Active Learning • Learning programs in math • Math games for early years 	<p>During the 2013-2014 school year offered professional development and will continue through 2014-2015 and forward.</p> <p>High quality teaching strategies and learning mathematics in context to strengthen effective educational practices in the teaching staff. (Summer Academy) STEM for Kindergarten</p>	<p>Pre and post test % Participating in mentor programs</p>	<p>Early Childhood Director</p>
<p>Continued implementation of ongoing initiatives (E- Blocks, Aula Interactiva, technology integration in curriculum review)</p>	<p>By June 2014, and annually thereafter</p>	<p>Formative assessment/Test per Cycle October, December, March and May, during academic year</p>	<p>Teachers Principals</p>

Implementation Plan Activities (Math)	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
Where new bandwidth and technology upgrades have been implemented, implement Khan Academy (all grades)	2015-2016	Formative assessment/Test per Cycle October, December, March and May, during academic year % Participating schools Pre and Post tests	Math Academic Director
Continued use of Kahn Academy (all grades) where already implemented. Where new bandwidth and technology upgrades have been implemented, implement Khan Academy (all grades)	2016-2017	Formative assessment/Test per Cycle October, December, March and May, during academic year % Participating schools Pre and Post tests	Math Academic Director
Continued use of Kahn Academy (all grades) where already implemented. Where bandwidth and technology upgrades have been implemented, implement Khan Academy (all grades)	2017-2018	Formative assessment/Test per Cycle October, December, March and May, during academic year % Participating schools Pre and Post tests	Math Academic Director
Continued use of Kahn Academy (all grades) where already implemented. Where new bandwidth and technology upgrades have been implemented, implement Khan Academy (all grades)	2018-2019	Formative assessment/Test per Cycle October, December, March and May, during academic year % Participating schools Pre and Post tests	Math Academic Director

Curriculum Goals	Improve student academic achievement in mathematics, language arts and science; ensure that graduating students meet the ISTE NETS for Students standards for information fluency; adopt data-driven, online assessments; improve productivity for educators and administrators.
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<p>Objective 1.2: Increase student achievement in Spanish and English language arts, as measured by standardized test scores.</p> <p>Benchmarks:</p> <ol style="list-style-type: none"> a. By June 2015, achieve 2% increase over 2011-2012 results. b. By June 2016, achieve 5% increase over 2011-2012 results. c. By June 2017, achieve 7% increase over 2011-2012 results. d. By June 2018, achieve 10% increase over 2011-2012 results. e. By June 2019, achieve 12% increase over 2011-2012 results.
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Implementation Plan Activities (Spanish)	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
<p>Reading and writing digitally in Spanish in Secondary Schools (LEDESe) ó Through this lesson plan it is expected that a 5% improvement will be made by students in grades 7-12 on the PPAA and report cards. This will occur by bringing to the classroom the Saturday trainings teachers receive in the seven education regions. The materials they receive will give them online access to the texts (BIVECAS) and exercises that are available there for student use. Teachers will receive training and coaching; also through a webpage they will receive assistance, technical support, and methodology.</p>	<p>In progress since funds were approved until June 2014.</p> <p>To be continued into 2014-2015, assuming funding reconfirmation.</p>	<p>Pre-testing and post-testing, satisfaction questionnaires, quality monitoring, öcoaching logs,ö PPAA results</p>	<p>Spanish Program Director</p> <p>Spanish Program Teachings Aids</p> <p>School Directors</p> <p>Participating Teachers</p>
<p>Free access to videos of famous Puerto Ricans through the Internet (Autografo) ó Through this lesson plan 100% of students, teachers, and the general public will have free access to the website www.autografo.tv through which the biographies of 47 famous people from Puerto Rican history are available. On this page there are also guides for teachers, blogs for students, etc. Apart from emphasizing the development of the mother tongue through the Standards of Teaching Content and Expectations by grade, it is sought that free access to biographic videos of famous Puerto Ricans via the Internet to the rest of the World is integrated with other subjects, such as social studies, sciences, mathematics, and English. Videos can be accessed from cell phones, tablets, laptops, computers, and similar resources with Internet access. It is hoped that 75% of our students access the page and that the academic improvement is raised 4% as evidenced by the PPAA</p>	<p>August 2013 to June 2014, continuing through 2015.</p>	<p>Student writing, pre-testing and post-testing, entrances or visits to the portal, PPAA results, increase in student achievement according to the grade distribution report.</p>	<p>Program Director</p> <p>Superintendent</p> <p>Spanish Program Teaching Aids</p>

Implementation Plan Activities (Spanish)	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
Kids and Young people in action 6 This lesson plan will attend to the need to develop educational activities to improve student achievement through language arts based on the scientifically based strategy of service learning. Around 2000 students and directors of elementary, intermediate, and upper-level schools will be trained to develop along with their students the implementation of a program in their school; foster language arts through this strategy; make use of the weekly supplement in the newspapers, among other related activities. The students will be groups of curious and effectively communicative kids and young people that will be trained in the art of journalism (art, painting, photography, music) with the goal of developing a school newspaper and talking groups to foster the development of language arts using technology and the Internet. It is of vital importance that the school have sufficient Internet access to be able to effectively develop the program.	In progress since funds were approved until June 2014. To be continued into 2014-2015, assuming funding reconfirmation.	Pre-testing, post-testing, implementation monitoring, questionnaires, coaching, completed requests, list of registered participants, offerings and notification calendar, quarterly fiscal reports, completed work reports, attendance records	Spanish Program Director Administrative teacher in charge of the Project Superintendent Teaching Aids School Directors Teachers
Continued implementation of ongoing initiatives: <ul style="list-style-type: none"> Curriculum differential Research and information management Communication and collaboration Operation and concepts TIC 	By June 2014, and annually thereafter	Formative assessment/ Using LAS LINKS TEXT	Teachers Principals

Implementation Plan Activities (English)	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
4,000 students will register and have access to the Ebook platform	Jan.- June 2014 To be continued into 2014-2015, assuming funding reconfirmation.	Student registrations Visits to the Ebook platform PPAA results	Teachers Students Facilitators
4,300 student in 49 schools will be impacted by the tablet program	Dec. 2013-May 2014 To be continued into 2014-2015, assuming funding reconfirmation	Tablet assignments PPAA results	UPR Rio Piedras, Education Investigation Department.

Implementation Plan Activities (Spanish and English)	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
<p><u>Projects for Language instruction for those with limited Spanish proficiency and English</u></p> <ol style="list-style-type: none"> 1. PACTA Project (Technology Concept Framework Project for the acquisition of a second language) 2. Use of Technology Equipment and Programs in the Differentiated Curriculum 3. Use of programs for immigrant students with the goal of them achieving greater cultural adaptation 		Formative assessment/ Using LAS LINKS TEXT	Tittle III Director
<p><u>Conditions for Learning</u> Provide additional teacher technological tools that offer greater flexibility and variety, maximizing the use of technology and expanding educational resource in presenting issues and lessons in the classroom, improving the physical infrastructure of schools, and providing safety and support in the community schools.</p> <p><u>Resources</u> Ensure that all teachers have access to appropriate materials and equipment, including technological resources, which have been identified as essential to the teaching and learning of high quality, according to educational level and according to the individual needs of students</p>	<p>During the 2013-2014 school year resource use has been encouraged, and will continue through 2014-2015 and forward.</p> <p>Technological tools that allow differentiated curriculum and individualization using Programs and technology in the teaching and learning of Spanish</p>	Formative assessment/ Using LAS LINKS TEXT	Tittle III Director
Information infrastructure	<p>During the 2013-2014 school year have expanded the technological means to contribute to increase proficiency in Spanish in students. And help the teacher to offer differentiated Curriculum.</p> <p>These efforts will continue through 2014-2015 and forward.</p>	Formative assessment/ Using LAS LINKS TEXT	Tittle III Director

Implementation Plan Activities (Spanish and English)	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
<p><u>Projects for Language instruction for those with limited Spanish proficiency and English</u></p> <ol style="list-style-type: none"> 1. PACTA Project (Technology Concept Framework Project for the acquisition of a second language) 2. Use of Technology Equipment and Programs in the Differentiated Curriculum 3. Use of programs for immigrant students with the goal of them achieving greater cultural adaptation 		<p>Formative assessment/ Using LAS LINKS TEXT</p>	<p>Title III Director</p>
<p><u>ACADEMIC ACHIEVEMENT: Virtual Component Differentiated Instruction</u> Provide a variety of strategies in the process of learning to enable students to acquire the Spanish language, the domain of Spanish Standards as a second language and the Puerto Rico standards.</p>	<p>During the 2013-2014 school year offered professional development, and will continue through 2014-2015 and forward.</p> <p>High quality teaching strategies and learning Spanish</p> <p>As a second language in context to strengthen effective educational practices in the teaching staff.</p> <p>Mentoring and Coaching</p>	<p>Pre and post test % Participating in mentor programs</p>	<p>Teachers and school administrators</p> <p>Title III Director</p>

Implementation Plan Activities (Spanish and English)	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
<p><u>Projects for Language instruction for those with limited Spanish proficiency and English</u></p> <ol style="list-style-type: none"> 1. PACTA Project (Technology Concept Framework Project for the acquisition of a second language) 2. Use of Technology Equipment and Programs in the Differentiated Curriculum 3. Use of programs for immigrant students with the goal of them achieving greater cultural adaptation 		<p>Formative assessment/ Using LAS LINKS TEXT</p>	<p>Title III Director</p>
<p>Strategies for the teaching and learning of teacher and student of the XXI century</p> <ul style="list-style-type: none"> • Integrate technology into course materials for the classroom • Curriculum differential • Research and information management • Communication and collaboration <ul style="list-style-type: none"> • Operation and concepts TIC 	<p>During the 2013-2014 school year offered professional development, and will continue through 2014-2015 and forward.</p> <p>High quality teaching strategies and learning Spanish</p> <p>As a second language in context to strengthen effective educational practices in the teaching staff.</p> <p>Mentoring and Coaching</p>	<p>Pre and post test % Participating in mentor programs</p>	<p>Title III Director</p>

Implementation Plan Activities (Spanish and English)	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
<p><u>Projects for Kindergarten to Grade 3</u></p> <p>1. Active Learning</p>		<p>Formative assessment/Test per Cycle October, December, March and May, during academic year</p>	<p>Early Childhood Director DE</p>
<p><u>Conditions for Learning</u> Provide additional teacher technological tools that offer greater flexibility and variety, maximizing the use of technology and expanding educational resource in presenting issues and lessons in the classroom, improving the physical infrastructure of schools, and providing safety and support in the community schools.</p> <p><u>Resources</u> Ensure that all teachers have access to appropriate materials and equipment, including technological resources, which have been identified as essential to the teaching and learning of high quality, according to educational level and according to the individual needs of students</p>	<p>During the 2013-2014 school year resource use has been encouraged, and will continue through 2014-2015 and forward.</p> <p>Technological tools that allow differentiation and individualization in the teaching and learning of Spanish and English for early childhood.</p>	<p>Formative assessment/Test per Cycle October, December, March and May, during academic year</p> <p>% Participating schools</p> <p>Pre and Post tests</p>	<p>Early Childhood Director DE</p>
<p>Information infrastructure</p>	<p>During the 2013-2014 school year have expanded the technological means contribute to establishing learning communities in kindergarten from a virtual approach to contribute to increased academic achievement and improving teaching.</p> <p>These efforts will continue through 2014-2015 and forward.</p>	<p>Formative assessment/Test per Cycle October, December, March and May, during academic year</p> <p>% Participating schools</p> <p>Pre and Post tests</p>	<p>Early Childhood Director DE</p>

Implementation Plan Activities (Spanish and English)	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
<p><u>Projects for Kindergarten to Grade 3</u> 1. Active Learning</p>		<p>Formative assessment/Test per Cycle October, December, March and May, during academic year</p>	<p>Early Childhood Director DE</p>
<p><u>ACADEMIC ACHIEVEMENT: Virtual Component Differentiated Instruction</u> Providing challenging and relevant educational experiences that promote academic achievement, using programs in Spanish and English as a second language to individualize learning the various skills and to improve teaching, keeping students on task and encourage formative assessment continuous, during the early first years.</p>	<p>During the 2013-2014 school year offered professional development, and will continue through 2014-2015 and forward.</p> <p>High quality teaching strategies and learning Spanish and English as a second language in context to strengthen effective educational practices in the teaching staff. (Summer Academy)</p>	<p>Pre and post test % Participating in mentor programs</p>	<p>Teachers and school administrators Early Childhood Director DE</p>
Implementation Plan Activities (Spanish and English)	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
<p>Implementation of student blogging program where personal editing and critique by other students further enhance storyline organization and grammar</p>	<p>By June 2016, and ongoing thereafter</p>	<p>Formative assessment Pre and post tests Number of blogs posted</p>	<p>Spanish Program Director English Program Director Teachers Principals</p>

Curriculum Goals	Improve student academic achievement in mathematics, language arts and science; ensure that graduating students meet the ISTE NETS for Students standards for information fluency; adopt data-driven, online assessments; improve productivity for educators and administrators.
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<p>Objective 1.3: Increase student achievement in science, as measured by standardized tests.</p> <p>Benchmarks:</p> <ul style="list-style-type: none"> a. By June 2015, achieve 2% increase over global 2011-2012 results. b. By June 2016, achieve 5% increase over global 2011-2012 results. c. By June 2017, achieve 7% increase over global 2011-2012 results. d. By June 2018, achieve 10% increase over global 2011-2012 results. e. By June 2010, achieve 12% increase over global 2011-2012 results.

Implementation Plan Activities (Science)	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
Through the use of iPads, with programs about Earth Sciences, it is expected that 70% of students improve their academic achievement and can thrive in the classroom, thanks to their teachers.	Until June 2014 To be continued into 2014-2015, assuming funding reconfirmation	Standardized tests	Teachers
Introduce additional new programs such as geo-caching	By June 2016, then annually thereafter	Standardized tests	Science Program Director

Curriculum Goals	Improve student academic achievement in mathematics, language arts and science; ensure that graduating students meet the ISTE NETS for Students standards for information fluency; adopt data-driven, online assessments; improve productivity for educators and administrators.
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<p>Objective 1.4: Improve student information fluency, as measured by ISTE’s NETS for Students.</p> <p>Benchmarks:</p> <ul style="list-style-type: none"> a. By June 2015, achieve 2% improvement over 2011-2012 results. b. By June 2016, achieve 5% improvement over 2011-2012 results. c. By June 2017, achieve 7% improvement over 2011-2012 results. d. By June 2018, achieve 10% increase over 2011-2012 results. e. By June 2019, achieve 12% increase over 2011-2012 results.

Implementation Plan Activities (Student Information Fluency)	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
Through BYOD opportunities and classroom sharing, students build information fluency skill by daily use of relevant devices and applications	2016-2019	NETS evaluation	PRDE IT School Principals

Implementation Plan Activities (Student Information Fluency)	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
UTC			
1. Creativity and Innovation			
Use of WACOM drawing tablets to illustrate stories	From January 2014 until December 2016	Illustrations done by students, illustrations uplodaded to UTC's virtual gallery	Teachers of Spanish, English, Special Education, Fine Arts, specialists in educational technology, graphic illustrator
Use of Serif software for the artistic creation and addition of graphics illustrated by students	From January 2014 until December 2016	Illustrations done by students, illustrations uplodaded to UTC's virtual gallery	Teachers of Spanish, English, Special Education, Fine Arts, specialists in educational technology, graphic illustrator
Use of the the program MS Word to streamline the redaction of stories	From January 2014 until December 2016	Illustrations done by students, illustrations uplodaded to UTC's virtual gallery in E-book Format	Teachers of Spanish, English, Special Education, Fine Arts, specialists in educational technology, graphic illustrator
Use of the Internet to do search that contribute to the awakening of creativity	From January 2014 to December 2016	Creation of a collection of directionsô reference links	Techers of Spanish, English, Special Education, Fine Arts, Specialist in Technology Education
Use of labs to encourage the learning of students K-3	From January 2014 to December 2016	Planned activities using the lab	Techers of Spanish, English, Sciences, Math, Specialist in Educational Technology
Video taping of students narrating stories that they wrote	From January 2014 to December 2016	Narrations written by students and then uploaded to the UTC portal	Techers of Spanish, English, Special Education, Fine Arts, Specialist in Technology Education, Graphic Illustrator
2. Communication and collaboration			
Within the UTC's electronic portalô creation of a section where students will upload videos of the narration of their stories	From January 2014 to December 2016	Productions made by students and then uploaded to the UTC portal	Techers of Spanish, English, Special Education, Fine Arts, Specialist in Technology Education, Graphic Illustrator
Repository of learning objects of all basic materials so that students, teachers, and parents can access them 24/7	From January 2014 to December 2016	Quantity of elements or objects in each academic area	Teachers and the Community in general
In the Unit portal, the creation of an forum-type area where teahcers and students exchange themes of interest.	From January 2014 to December 2016	Visits made to the site	Teachers
Use of the tools <i>Hangout</i> and <i>Lync</i> for communications and video conferences	From January 2014 to December 2016	Monthly meetings	Teachers

Implementation Plan Activities (Student Information Fluency)	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
UTC			
Fifty inch screens in 7 regions, 7 schools, and one at the Central Level to make direct transmissions, send announcements, and videos of interest to students and the community in general	From January 2014 to December 2016	Quantity of productions made and displayed on the closed circuit	Teachers of English, Spanish, Librarian, Special Education, Fine Arts, Specialist in Education Technology, Graphic Illustrator
Online course for students in upper-level grades (10th, 11th, and 12th), offering all basic materials of the curriculum	From January 2014 to May 2014	Formal and informal tests, assessment instruments	Maestros, Facilitadores y Especialistas en Tecnología Teachers, Aids, and Specialists in Technology
Creation of portals to spread district information and establish learning communities	From January 2014 to December 2016	Number of monthly visits	Teachers and Community
3. Investigation and information management			
Use of curricular materials in video format to integrate into the academic materials	From January 2014 to December 2016	Quantity of materials and audiovisual resources available for students	Teachers
Use of the Internet to undertake research that will eventually be turned into cinematographic productions	From January 2014 to December 2016	Annotated bibliographies	Teachers
3D laboratories to encourage research in the area of natural sciences	From January 2014 to December 2016	Use of resources of software brought by the laboratory as well as the use of the microscopes	Teachers of Spanish, English, Sciences, Math

Implementation Plan Activities (Student Information Fluency)	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
UTC			
Use of online resources to learn history	From January 2014 to December 2016	Annotated bibliographies	Teachers
Use of Google Maps to make virtual visits to different parts of the world.	From January 2014 to December 2016	Reference URLs	Teachers
4. Critical thinking, problem solving, and decision-making			
Use of WEBQUEST to develop critical thinking schools in diverse academic subjects	From January 2014 to December 2016	What-if situations, Role Play, digital reports	Teachers
Use of visuals so that students write short compositions using technology about what they appreciate of the visual	From January 2014 to December 2016	Quantity of WEBQUEST, at least 2 a semester	Teachers
5. Digital Citizenry			
Process of creating e-mail accounts for all public school students under the domain @miescuela.pr	From January 2014 to December 2016	Form for permission to create accounts	OSIATD personnel, Parents, Teachers, Directors
Access to Office 365 through @miescuela.pr	From January 2014 to December 2016	Form for permission to create accounts	OSIATD personnel, Parents, Teachers, Directors
Creation of a single mans of authentication for all DOE digital platforms	From January 2014 to December 2016	Form for permission to create account	OSIATD personnel, Parents, Teachers, Directors
Online access to curriculum content	From January 2014 to December 2016	Form for permission to create account	Students, OSIATD personnel, Parents, Teachers, Directors
Online access to technical material to be able to take current industry certifications in an area and in technology	Form for permission to create an account	Form for permission to create accounts	Students, OSIATD personnel, Parents, Teachers, Directors
6. Operations and TICs Concepts			
Teaching of digital literacy in the schools that have a computer teacher	From January 2014 to December 2016	Form for permission to create accounts	Students, OSIATD personnel, Parents, Teachers, Directors
Online access to technical materials to be able to take current industry certifications in an area and in technology	From January 2014 to December 2016	Form for permission to create accounts	Students, OSIATD personnel, Parents, Teachers, Directors
Pilot plan with students to learn computer programming	From January 2014 to December 2016	Form for permission to create accounts	Students, OSIATD personnel, Parents, Teachers, Directors

Implementation Plan Activities (Student Information Fluency)	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
LIBRARY			

Implementation Plan Activities (Student Information Fluency)	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
LIBRARY			
1. Creativity and Innovation <ul style="list-style-type: none"> a. Comic strips (Toon Doo, Strip Generator, etc.) b. Multimedia posters (Glogster) c. Word clouds (Wordle, Tagxedo) d. Concept maps (Inspiration, bubbl.us, Word) e. Presentations (Google Docs, Prezi, PowerPoint) f. Videos (MovieMaker, iMovie) g. Publications (Publisher, Isuu) h. Exploration and presentation of study concepts by means of multimedia resources such as: electronic data bases, DVDs, specialized web pages (National Geographic Videos, Medline, NASA) 			Library and Information Services Program Director School Librarians
2. Communication and Collaboration <ul style="list-style-type: none"> a. Workshops on the creation of Blogs b. Workshops on how to write comments in blogs c. Workshops in the creation of documents using Google Drive d. Workshops on how to share documents using Dropbox e. Workshops in the creation of Web Pages f. e-Pals projects with students of other countries using e-Pals g. Creation of multimedia products using cooperative group strategies 			Library and Information Services Program Director School Librarians
3. Research and Information Fluency <ul style="list-style-type: none"> a. Information research using electronic databases b. Evaluation of information in different web pages c. Skill practice in previously evaluated web educational games d. Information products using diverse digital tools e. Use of Virtual Reference 			Library and Information Services Program Director School Librarians
4. Critical Thinking, Problem Solving and Decision Making <ul style="list-style-type: none"> a. Documental research done from the library b. Integration of PBL projects with the classroom c. Creation of data tables and statistical graphics using Excel 			Library and Information Services Program Director School Librarians

Implementation Plan Activities (Student Information Fluency)	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
LIBRARY			
5. Digital Citizenship <ul style="list-style-type: none"> a. Bibliographic references using the APA or any other Style Manual b. Fair use of copyright stipulations applied to education purposes. c. Identification of behavior that constitutes cyberbullying 			Library and Information Services Program Director School Librarians
6. Technology Operations and Concepts <ul style="list-style-type: none"> a. Workshops in the use of computers b. Workshops in information research c. Activities to promote digital alphabetization d. Use of productivity tools such as, word processor, presentations and calculus sheets to create information products 			Library and Information Services Program Director School Librarians

Curriculum Goals	Improve student academic achievement in mathematics, language arts and science; ensure that graduating students meet the ISTE NETS for Students standards for information fluency; adopt data-driven, online assessments; improve productivity for educators and administrators.
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<p>Objective 1.5: Adopt online testing tools that foster data-driven decision-making.</p> <p>Benchmarks:</p> <ul style="list-style-type: none"> a. By June 2015, implement online testing in 25% of middle grades. b. By June 2016, implement online testing in 50% of middle grades and 25% of upper and lower grades. c. By June 2017, implement online testing in 75% of middle grades and 50% of upper and lower grades. d. By June 2018, implement online testing in 100% of middle grades and 75% of upper and lower grades. e. By June 2019, implement online testing in 100% of all grades.

Implementation Plan Activities (Student Information Fluency)	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
UTC			
Students taking online courses take 100% of the evaluation instruments online	From January 2014 to May 2014	Formal and informal testing with evaluation or assessment instruments	Students, OSIATD Personnel, Parents, Teachers, Directors
Exams leading to certifications such as MOS, A+, Digital Literacy 100% online	From January 2014 to May 2014	Formal and informal testing with evaluation or assessment instruments	Students, OSIATD Personnel, Parents, Teachers, Directors

Implementation Plan Activities (Student Information Fluency)	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
Math testing for middle grades available online	By June 2016, then ongoing	Online test results	Math Program Director Middle grades teachers
Math testing for all grades available online	By June 2017, then ongoing	Online test results	Math Program Director Teachers
Science testing for middle grades available online	By June 2018, then ongoing	Online test results	Science Program Director Middle grades teachers
Science testing for middle grades available online	By June 2019, then ongoing	Online test results	Science Program Director Teachers

Curriculum Goals	Improve student academic achievement in mathematics, language arts and science; ensure that graduating students meet the ISTE NETS for Students standards for information fluency; adopt data-driven, online assessments; improve productivity for educators and administrators.
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<p>Objective 1.6: Improve productivity for educators and administrators via rollout of PRDE data warehouse.</p> <p>Benchmarks:</p> <ul style="list-style-type: none"> a. By June 2015, 25% of middle grade educators and administrators have access to and associated professional development for the data warehouse. b. By June 2016, 50% of middle grade and 25% of upper and lower grade educators and administrators have access to and associated professional development for the data warehouse. c. By June 2017, 75% of middle grade and 50% of upper and lower grade educators and administrators have access to and associated professional development for the data warehouse. d. By June 2018, 100% of middle grade and 75% of upper and lower grade educators and administrators have access to and associated professional development for the data warehouse. e. By June 2019, 100% of all grade educators and administrators have access to and associated professional development for the data warehouse.
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Implementation Plan Activities (Staff Productivity)	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
UTC			

Implementation Plan Activities (Staff Productivity)	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
UTC			
<ol style="list-style-type: none"> 24/7 access to curriculum materials through the UTC Virtual Portal 	<p>From January 2014 to May 2014</p> <p>Materials updated by June 2015, then annually thereafter</p>	Virtual Platform	Students, OSIATD Personnel, Parents, Teachers, Directors
<ol style="list-style-type: none"> Access to the Longitudinal Database of the DoE 	<p>From January 2014 to May 2014</p> <p>Materials updated by June 2015, then annually thereafter</p>	Virtual Platform	Students, OSIATD Personnel, Parents, Teachers, Directors
<ol style="list-style-type: none"> Creation of a Virtual Platform to spread and display professional development in all academic areas 	<p>From January 2014 to May 2014</p> <p>Materials updated by June 2015, then annually thereafter</p>	Virtual Platform	Students, OSIATD Personnel, Parents, Teachers, Directors
<ol style="list-style-type: none"> Creation of a Virtual Platform to request professional development in all areas 	<p>From January 2014 to May 2014</p> <p>Materials updated by June 2015, then annually thereafter</p>	Virtual Platform	Students, OSIATD Personnel, Parents, Teachers, Directors

ELEMENT 2 – PROFESSIONAL DEVELOPMENT

Professional Development strategy to ensure staff know how to use new technologies

The plan must have a professional development strategy to ensure that staff understands how to use these new technologies to improve education

The starting point for Professional Development [PD] planning is to review available data about current proficiency levels of Puerto Rico’s teachers and administrators. The focus should be not only on basic skills to use technology but also on concepts and approaches for integrating technology into teaching and learning. The professional development opportunities currently available to staff, and how those might be enhanced, are then examined. These considerations, along with the curriculum integration goals identified in the Curriculum Element, drive the strategy for professional development for Puerto Rico’s future.

Current Professional Development Model

Annually, each school develops a Comprehensive School Plan [CSP] in which the school outlines school-wide professional development needs and specifies additional professional development necessary to meet the needs of specific subgroups of students within the school.⁸¹ Each year, teachers notify their school directors of their professional development needs; once approved, requests are forwarded to district superintendents, then to the PRDE. School directors may use school improvements funds (10%) to contract with outside firms for professional development. In addition, PRDE supports staff professional development through the Regional and District offices.⁸²

District Office Support

Professional Development, including requisition, assessment and monitoring, is the responsibility of PRDE’s 28 Districts. Districts are responsible for coordinating professional development activities for teachers and other support personnel, as well as running the professional development centers established by the Secretary of Education. Districts have academic auxiliary superintendents who oversee all academic activities within the schools. Under the academic auxiliary superintendents are academic facilitators who serve as instructional leaders, coaches for teachers, and facilitate professional development on curriculum and instructional strategies. All school districts also have a coordinator that oversees the Committee for Parents, whose role is to provide technical assistance to parents, coordinate workshops, and encourage parental involvement in the school community.

⁸¹ Presently, all PRDE schools have a requirement that 10% of their school budget be devoted to professional development. This professional development is documented through the Comprehensive School Plan process and is aligned to school-specific needs.

⁸² Sometimes this results in duplication of professional development efforts due to lack of coordination between entities.

All PRDE's professional development activities and initiatives are guided by two documents, *Puerto Rico's Professional Standards for Teachers*⁸³ and the *Profile of the School Director in the Puerto Rico Department of Education*. These documents consist of the standards for effective teaching and leading that promote student learning and enhance professional practices. They define what high quality teaching and leading should look like in all PRDE's K-12 schools. As a rule, all professional development activities are planned, designed and structured to provide continuous opportunities to master content, strategies and the methodologies needed to improve student achievement as well as follow up and evaluation of the application of the acquired knowledge.

Regional Office Support

While the Regional Centers primarily handle administrative responsibilities such as Human Resources management and purchasing (for both routine supplies and for *project requests* from individual teachers/schools), there are about 67 educational technology teachers distributed among the 7 Regional Centers who provide technology PD for other teachers. In particular, they have the following responsibilities:

- Train and promote educational research, through the effective use of the basic tools of a virtual community, for example "Moodle, Blackboard," MS Office, among others
- Assist in the evaluation of Center teams and schools to identify computers that need to be updated and/or forfeited
- Maintain a current inventory of technology equipment and educational materials available at the center
- Collaborate with the Office of Information Systems and Technological Support for Teaching [OSIATD] in providing support and technical assistance in various information systems
- Coordinate and provide training to teachers, management and administrative staff on all modules of the application used to maintain and manage the information of students, teachers and schools
- Collaborate with the Office of Academic Affairs in the evaluation process of the Comprehensive School online
- Provide technical assistance and support digital literacy and technology standards for school personnel.

⁸³ The *Professional Standards for Teachers in Puerto Rico* was developed in 2008 by PRDE's Teacher's Professional Development Institute (InDePM). The professional standards for teachers in Puerto Rico include: 1) Knowledge of the academic subject, 2) Teaching knowledge, 3) Instructional strategies, 4) Learning environment, 5) Diversity and special needs, 6) Evaluation and assessment, **7) Integration of technology**, 8) Communication and language, 9) Family and community, 10) Information gathering, 11) Professional development.

Department Support

The Department has already implemented the following programs to provide professional development for highly qualified teachers,⁸⁴ as established by both PRDE's Academic Agenda and NCLB. Effective PD for teachers and administrators should result in ideal conditions for learners to prepare themselves for tomorrow's challenges.

Specific professional development opportunities for teachers, for using technology and integrating it into the curriculum, include:

- Skill assessments for Teachers, Directors and IT staff, based on ISTE's NETS standards
- Microsoft Office Specialist certification training and testing
- A variety of sustained, and intensive professional development offerings including university coursework
- Follow-up *on site* support
- Incentives to motivate:
 - Teachers to learn to use technology and integrate it into the curriculum
 - Technologically literate educators teaching in rural⁸⁵ or urban areas to remain in those areas.

All PRDE teachers and directors are required to attend mandatory system-wide professional development activities.

Quarterly, PRDE reports to the U.S. Department of Education on the number of teachers employed, their classification (e.g., Highly Qualified, Para-professional), the number of hours of professional development they have received, what professional development programs they have participated in, etc.

Professional Development Results

In recent general session offerings, about 7500 educators were formally certified for Microsoft Office basic skills.⁸⁶ Efforts are continuing to certify all 35,000 educators. In Spring 2013, Technology curriculum group conducted an assessment⁸⁷ that revealed the following:

⁸⁴ Technology-focused PD does not, in itself, create highly qualified teachers. Rather, PD enhances teachers who are already highly qualified. Teachers of core academic subjects in the classroom are required by law to be highly qualified. Per NCLB, there are three criteria that must be met for a teacher to be *highly qualified*: (1) attaining a bachelor's degree or better in the subject taught; (2) obtaining full state teacher certification; and (3) demonstrating knowledge of the subjects taught.

⁸⁵ Interviews of PRDE personnel native to the mountainous regions indicated that there is actually stronger interest in technology adoption for education in the rural areas, toward the center of the island, than in urban areas.

⁸⁶ From http://www.ehow.com/list_7207458_ms-office-skills_.html, Microsoft Office skills, or MS Office skills, are skills that pertain to the use of software such as Microsoft Word, Access, Outlook, Excel and PowerPoint. These programs are normally found in business and educational settings. Having MS Office skills means you have enough knowledge of these programs to complete basic tasks.

⁸⁷ From *technology_needs_assessment_results.xlsx*, 3386 responses were received to these questions:

- What technology productivity PD do you need?
- What technology technical PD do you need?
- What technology educational PD do you need?

- Teachers, Directors and IT support personnel are technologically literate in:
 - Common productivity applications (e.g., Word, email)
 - PRDE systems⁸⁸ (i.e., SIE, TAL, financial, special education and other administrative tools)
- Teachers, Directors and IT support personnel would like to learn about Web 2.0,⁸⁹ cloud computing, social media
- Teachers would like to learn about/integrate grade level specific educational resources (e.g., Geometerø Sketchpad⁹⁰ or iCivics⁹¹).
- Staff universally want to integrate additional tools to increase math and reading scores.

In Fall 2013, all PRDE educators were invited to participate in an online assessment of Technology Integration into Curriculum, initiated in support of development of this Technology Plan. This survey⁹² solicited stakeholdersø experience and opinions regarding the integration of technology in curriculum and provides a vehicle to get broad input for the plan. Results of this survey additionally confirmed:

- Greatest use of computing devices by staff is desktops or laptops (58% daily)
- Greatest use of productivity software by staff is Word (69% daily/weekly) and presentations (62% daily/weekly)
- Greatest use of productivity software to support administration by staff is student information system (81% daily/weekly) and Time and Attendance (74% daily/weekly)
- Greatest use of Internet technologies by staff is for research to support lesson plans, etc. (80% daily/weekly) and email (67% daily/weekly)
- Interest in learning to use analytical system to assess student achievement
- The preferred format for technology professional development is 1 on 1 (59%) or peer training (41%); few want to ðfigure it out on my ownö (12%).

⁸⁸ PRDE systems include:

- Sistema de Información Estudiantil [SIE], the student information system for students in the regular program
- SEAS for special education, vocational education and adult education
- Time, Attendance and Leave system [TAL]
- PRDE Financial System (SIFDE)
- PRDE Human Resource system (STAFF)
- PRDE Information Portal (PIDE)

⁸⁹ From Wikipedia: A Web 2.0 site may allow users to interact and collaborate with each other in a social media dialogue as creators of user-generated content in a virtual community, in contrast to websites where people are limited to the passive viewing of content. Examples of Web 2.0 include social networking sites, blogs, wikis, video sharing sites, hosted services, web applications, mashups and folksonomies.

⁹⁰ <http://www.dynamicgeometry.com/>

⁹¹ <http://www.icivics.org/user/register?gclid=COXN7ceyn7gCFaU5QgodPA8AfA>

⁹² Survey available at: <https://www.surveymonkey.com/s/JKGYX9T>; see also Appendix 6 Tech Plan Survey.

Desired Professional Development Model

PRDE's professional development objectives for educational technology are aligned with the National Education Technology Plan:

*Professional educators will be supported individually and in teams by technology that connects them to data, content, resources, expertise, and learning experiences that can empower and inspire them to provide more effective teaching for all learners.*⁹³

Within the framework of other significant educational reform activities, specifically the implementation of revised curriculum standards and online assessments, **PRDE's primary educational goal is to improve how technology is integrated into the curriculum**, both in quality and in quantity. To achieve this goal, educators must first be prepared.

Today's education system requires highly qualified personnel who are capable of using technology effectively in all aspects their jobs. Professional development is essential to help educators understand, not only how to *operate* the technology, but how to *integrate* it most effectively to increase student achievement. Teachers need technical skills, but they also need insight into how technology can catalyze a role change, from *stage* to *guide on the side*. Understanding how appropriate technology, used well, empowers teachers to become *intellectual coaches* and not merely more entertaining presenters will also help to ensure that the most appropriate technologies and instructional strategies are chosen.

With proper PD and support, teachers can use technology to find content-based resources, support and enhance curriculum, and deliver traditional instruction in a more compelling manner; but, through technology, teachers can also stimulate student curiosity, innovation and creativity. To be most effective, PD should be designed as an ongoing *process*, focused on reflection about and transformation of current teaching practices. PD as an isolated *event* or with little project-based learning opportunity for the educators-in-training (such as creating a lesson plan that uses technology, that will actually be deployed in their classroom) or has limited impact. Teachers do not want to be *in-serviced* or a transitive verb with the teacher as the direct object! The most effective use of technology is to support and facilitate student-centered learning rather than teacher-centered instruction; this remains at least as true when the learner is an adult teacher.

The design of professional development programs should consider:

- Connected teaching⁹⁴
- Hands-on technology use by students
- A variety of learning experiences, for flexibility (including observation, evaluation and coaching)
- Specific applications appropriate to each job assignment

⁹³ Transforming American Education, Learning Powered by Technology, National Education Technology Plan 2010, U.S. Department of Education, Office of Educational Technology (<http://www.ed.gov/sites/default/files/netp2010.pdf>)

⁹⁴ In *connected teaching*, classroom educators are fully instrumented, with 24/7 access to data about student learning and analytic tools that help them act on the insights the data provide. They are connected to their students and to professional content, resources, and systems that empower them to create, manage, and assess engaging and relevant learning experiences for students both in and out of school. (National Education Technology Plan 2010).

- Curriculum-specific applications
- Definition of new roles as needed
- The development of virtual (online) learning communities
- Promotion of active participation (versus passive attendance)
- Providing strong follow-up technical assistance and support
- Regular monitoring and evaluation
- Sustainability
- Fostering individualized approaches (i.e., train the trainer, webex, one on one, self taught) that take into consideration the participant's technology proficiency, collegial support and other needs
- Being geared to all participants including reluctant learners
- Promoting reflection on current practices
- Promote immersion and transformation of practices.

The above criteria will be captured in PD assessments to gauge the effectiveness of the Professional Development activity and will be used for ongoing reflection and improvement.

PRDE Key Concepts Definitions for Educational Technology

To promote common understanding by all stakeholders, we define the following concepts related to educational technology.

Technology Integration into the Curriculum

The PRDE defines effective technology integration into the curriculum as the incorporation of technological resources and processes in the day-to-day work in the classroom (teaching, professional development and assessment). It is a planned and coordinated process that seeks to enrich academic subjects and improve student academic achievement. Technological resources support the achievement of agency goals and the standards and expectations in the academic subjects, and they facilitate the incorporation of a variety of educational resources and varied strategies in teaching, such as collaborative learning, action-research, project-based learning and critical analysis, etc. To guide effective technology integration in the curriculum, the agency has adopted the following principles (itemized in the document entitled, *PRDE Conceptual Framework of Technology for Learning*):

- Technology integration is a process that requires time and support
- All technological projects must be based on a sound theoretical framework
- The use of technology must provide conditions allowing for deep learning
- A variety of technologies have their place in constructivist learning
- The use of technology requires planning at the system level
- Technology integration is developed in a community of practice.

Student Technology Literacy

Recent PRDE commitment to adopt the National Educational Technology Standards for Students [NETS-S] (<http://www.iste.org/docs/pdfs/nets-s-standards.pdf?sfvrsn=2>)⁹⁵ provides succinct Profiles for Technology Literate Students by grade and age (<http://www.iste.org/docs/pdfs/nets-s-2007-student-profiles-en.pdf?sfvrsn=4>). NETS-S skills include: Creativity and Innovation; Communication and Collaboration; Research and Information Fluency; Critical Thinking, Problem Solving and Decision Making; Digital Citizenship; Technology Operations and Concepts.

Teacher / Educator Technology Literacy

Recent PRDE commitment to adopt the National Educational Technology Standards for Teachers [NETS-T] (<http://www.iste.org/docs/pdfs/nets-t-standards.pdf?sfvrsn=2>) notes that effective teachers model and apply the NETS-S as they design, implement, and assess learning experiences to engage students and improve learning; enrich professional practice; and provide positive models for students, colleagues, and the community. Teachers should meet these standards and performance indicators: Facilitate and Inspire Student Learning and Creativity; Design and Develop Digital Age Learning Experiences and Assessments; Model Digital Age Work and Learning; Promote and Model Digital Citizenship and Responsibility; Engage in Professional Growth and Leadership.

Ongoing Initiatives

The following PRDE ongoing initiatives are helping the department continue in the best direction:

- NETS for Students
- NETS for Teachers
- Microsoft grant to provide software licensing and consulting to students and teachers in the middle grades,⁹⁶ where "statistics show a high dropout rates and low academic achievement."
- Specific auxiliary projects initiated by teachers and schools
- Implementation of NCLB Flexibility Waiver
- Integration of Technology for Teachers (InTeD), providing continuous and sustained professional development to 84 computer teachers throughout the island.

⁹⁵ The International Society for Technology in Education [ISTE] developed the NETS with input from the field and pioneered their use among educators. The National Educational Technology Standards [NETS] are the standards for learning, teaching, and leading in the digital age and are widely recognized and adopted worldwide. The family of NETS includes NETS for Students (NETS-S), NETS for Teachers (NETS-T), NETS for Administrators (NETS-A), NETS for Coaches (NETS-C), and NETS for Computer Science Teachers (NETS-CSE) work together to transform education.

⁹⁶ From DE AND MICROSOFT RENEW COMMITMENT TO INTEGRATE TECHNOLOGY INTO THE CLASSROOM (<http://www.de.gobierno.pr/de-y-microsoft-renuevan-compromiso-para-integrar-la-tecnologia-al-salon-de-clases>), Strengthening the Middle School promotes digital inclusion strategy that will provide a personal device (laptop or electronic tablet) to each teacher and middle school students in order to promote learning at any time and from anywhere.

- The Centers for Technological Innovations for Teaching ó CITEd has Specialists in Technology Education who are responsible for the process of informing, training, and providing technical assistance to all teaching and non-teaching personnel in the districts and schools.
- Technology Program, Division of Educational Innovation And Technology [ETA] curriculum review considering the integration of technology as a tool in achieving the skills and academic standards
- PRDE has several instructional and administrative data management systems to collect various types of data. A longitudinal database project (i.e., data warehouse) is in development will consolidate and aid in analysis of these data. This comprehensive tool will support well-founded decisions to guide the development of the curriculum, the integration of technology and professional development adapted to the needs that are identified
- Among the training strategies promoted are:
 - Development of effective learning communities, which allows teachers to share their experiences, lesson learned and successful practices with other schools within their districts
 - Demo classes and the use of educational videos to support the training of the curricular materials
 - Web technology as a collaboration tool to answer frequently asked questions from all members of the educational community
- Via general session offering, continue certifying educators for Microsoft basic skills.

Plan Objectives

In support of the PRDE’s curricular goals, we have established the following objectives and strategies for using technology to improve teaching and learning.

Element	Goal/Objective
Professional Development Goal	Provide comprehensive and continuous professional development to encourage effective integration of both new and existing technologies in teaching and learning, thereby improving academic achievement, consistent with adopted standards and assessments. As new standards are adopted, integrate technology-related PD with curricular PD around new standards and new assessments.
Professional Development Objective	Increase percentage of educators certified on Digital Literacy Virtual Platform, which includes MS Office basic skills, from 20% (about 7,000) to 99%.
Professional Development Objective	Move to a focus on <i>integration of information technology into the curriculum</i> (from a focus on basic skills) including newly adopted standards with greater emphasis on learner-centric, project-based learning. Offer modules on use of technology in all disciplines (e.g., how to integrate Office or scientific calculator into the curriculum).
Professional Development Objective	Implement PRDE Guidelines for Personnel Technology Skills (based on ISTE NETS-T) and Technology Integration in Classroom Instruction Assessment. Establish a norm that every teacher has a web site/blog/wiki and participates in online virtual communities of practice.

During the 5 years of this plan, PRDE will focus on the objectives presented in the following tables with the specific activities, timeframes, monitoring and responsible parties.⁹⁷

⁹⁷ The various PRDE Offices and their responsibilities are described in Element 4.

Professional Development Goal	Provide comprehensive and continuous professional development to encourage effective integration of both new and existing technologies in teaching and learning, thereby improving academic achievement, consistent with adopted standards and assessments. As new standards are adopted, integrate technology-related PD with curricular PD around new standards and new assessments.
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<p>Objective 2.1: Increase percentage of educators certified on Digital Literacy Virtual Platform, which includes MS Office basic skills from 20% (about 7,000) to 99%.</p> <p>Benchmarks:</p> <ul style="list-style-type: none"> f. By June 2015, 35% of educators certified. g. By June 2016, 50% of educators certified. h. By June 2017, 65% of educators certified. i. By June 2018, 80% of educators certified. j. By June 2019, 99% of educators certified.
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Implementation Plan Activities	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
Continue offering general sessions for MS Office basic skills certification	At least quarterly ongoing	Attendance sign-ins	District Offices
Annually, assess staff on basic computer skills	By June 2015, then annually thereafter	Proficiency assessment as part of personnel record	District Offices
Based on successful pilot with 2000 teachers during 2012-2013, continue the implementation of the PD activities tracking tool that integrates with the Human Resources system so that courses taken, proficiency, etc. can be retained in staff personnel records.	By June 2016, then maintained thereafter	Proficiency	District Offices
Establish and maintain partnerships with institutions that offer professional development activities for teachers, principals and superintendents of the PRDE ⁹⁸	By June 2016, then updated annually thereafter	List of Partnering Professional Development organizations	District Offices
Evaluate and adjust the number of contact hours in the technological area necessary to renew the regular teacher certification and the certification for school directors and school superintendents	By June 2015, then annually	Current certifications in personnel records	Principals District Offices
Monitor teachers to ensure knowledge is being utilized in classroom	Once annually per teacher	Classroom observation	Principals

⁹⁸ Partnering Professional Development organizations are listed on the PRDE website (<http://www.de.gobierno.pr/sdp>).

Professional Development Goal	Provide comprehensive and continuous professional development to encourage effective integration of both new and existing technologies in teaching and learning, thereby improving academic achievement, consistent with adopted standards and assessments. As new standards are adopted, integrate technology-related PD with curricular PD around new standards and new assessments.
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<p>Objective 2.2: Move to a focus on <i>integration</i> of information technology into the curriculum (from a focus on basic skills) including newly adopted standards with greater emphasis on learner-centric, project-based learning. Offer modules on use of technology for all disciplines (e.g., how to integrate Office or scientific calculator into the curriculum).</p> <p>Benchmarks:</p> <ol style="list-style-type: none"> a. By June 2015, 30% of educators are focused on integration (versus basic skills). b. By June 2016, 40% of educators are focused on integration (versus basic skills). c. By June 2017, 50% of educators are focused on integration (versus basic skills). d. By June 2018, 60% of educators are focused on integration (versus basic skills). e. By June 2019, 70% of educators are focused on integration (versus basic skills).

Implementation Plan Activities	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
Perform needs assessments to identify PD priorities of teachers, school directors and superintendents of schools	Summer 2014, then annually	Publication of results Incorporation of results into tech plan	District Offices
Provide PD for teaching personnel in the integration of information technology in the regular and special education curriculum	At least one session annually	Sign-ins (retained in personnel records) Reduced requests for support	District Offices
Teachers and principals receive professional development on technologies available in the classrooms, particularly as BYOD is launched	Year 2 of plan, then annually as more technology is available per school	Sign-ins (retained in personnel records)	District Offices
Once available, provide PD on PRDE longitudinal database project (i.e., data warehouse)	By June 2016, then annually with refresher courses	Sign-ins (retained in personnel records)	District Offices
Provide and promote continuing education among the personnel of the Technology and Curriculum Unit for their professional development, with an emphasis on the most recent advances in technology, theories of learning and strategies to become agents of change	Annually	Programs recorded in personnel records	Department UTC
Include representatives from all content areas, grade levels, administrators, outside experts and technicians in designing effective professional development activities for technology integration	Ongoing	Discussion group sign-ins	UTC District Offices

Implementation Plan Activities	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
Utilize industry specialists from partner institutions to provide additional capabilities of new technologies via meetings, webinars or workshops	1 new technology opportunity annually for each Program Director	Recorded in personnel records	UTC District Offices
Disseminate Tech Plan to all staff by allocating time in meetings (e.g., by District Facilitators and Program Directors) to share the Tech Plan highlights.	By June 2015, then annually thereafter	Session sign-ins	UTC District Offices

Professional Development Goal	Provide comprehensive and continuous professional development to encourage effective integration of both new and existing technologies in teaching and learning, thereby improving academic achievement, consistent with adopted standards and assessments. As new standards are adopted, integrate technology-related PD with curricular PD around new standards and new assessments.
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<p>Objective 2.3: Implement PRDE Guidelines for Personnel Technology Skills (based on ISTE NETS-T) and Technology Integration in Classroom Instruction Assessment. Establish a norm that every teacher has a web site/blog/wiki and participates in online virtual communities of practice.</p> <p>Benchmarks:</p> <ul style="list-style-type: none"> a. By June 2015, 10% of educators have web site. b. By June 2016, 20% of educators have web site. c. By June 2017, 65% of educators have web site. d. By June 2018, 80% of educators have web site. e. By June 2019, 99% of educators have web site.
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Implementation Plan Activities	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
Mandate NETS standards for all PRDE educators	By Dec 2014	Circular letter	CIO
Continued implementation efforts for NET-S and NET-T	Coordinated with student NETS activities	Recorded in personnel records	District Offices School Principals
Provide professional development and support to teachers and administrators in the adoption and implementation of curriculum standards and aligned testing as revised	By June 2015, then annually thereafter	Session sign-ins	District Offices
Research and assess teachers, administrators and support personnel, technology skills and current level of technology integration in the curriculum	By June 2015, then annually thereafter	Self assessment survey and observation	School Principals
Employ technology for communication and collaboration among administrators and support personnel, colleagues, staff, parents, students and the community.	By June 2015, then ongoing thereafter	All PRDE staff have access and are able to participate in online meetings with screen sharing	District Offices
Through BYOD opportunities and classroom sharing, teachers build information fluency skill by daily use of relevant devices and applications	2016-2019	NETS evaluation	PRDE IT School Principals

ELEMENT 3 – INFRASTRUCTURE

Assessment of infrastructure needed to improve education

The plan must include an assessment of the telecommunication services, hardware, software, and other services that will be needed to improve education

This section of the plan is written to be consistent with PRDE’s 2013-2016 General Goals and Objectives,⁹⁹ including the relevant sub-goals of Goal 2, “Conditions for Learning” (here summarized):

- É *Make sure teachers have everything they need, including technology, to provide a quality education to every child.*
- É *Working with the community and business, improve school infrastructure and maintenance.*
- É *Improve community access to technology that increases student achievement.*

This technology plan will be revised, if necessary, to conform with the Plan Decenal, when that document is completed and approved.

To support significant improvements in student achievement, PRDE is establishing the following specific technology goals and objectives.

Element	Goal/Objective
Infrastructure Goals	Improve access to current information technologies and technology usage by all PRDE stakeholders and provide appropriate system support.
Infrastructure Objective	Every school will have adequate electrical capacity and power distribution to support the technology described in this plan.
Infrastructure Objective	Every school will have fast, reliable Internet , initially 10 Mbps per 1000 students, 100 Mbps per 1000 students within the scope of this plan, (eventually 1 Gbps per 1000 students), using fiber or other 99.9% reliable technology.
Infrastructure Objective	Every school will have a modern, local area network [LAN] to distribute access to each classroom. Technologies such as high capacity wireless access points, load balancing access point controllers and power over Ethernet [PoE] switches will minimize the required count of electrical outlets and data drops per classroom: 2 to 3 PoE-enabled gigabit drops to each room from the nearest Intermediate Distribution Frame [IDF] will suffice to meet all power and data distribution requirements. Larger high schools may also want a lab (or rolling cart concept), such as for professional development events or classes in business administration.
Infrastructure Objective	Every teacher will have dedicated use of a modern laptop computer or tablet; every student will have dedicated use of a wireless computing device such as a tablet. Devices will have long battery life, minimizing need for additional A/C power outlets in the classrooms; devices can be charged overnight in a locked data closet.

Achieving these aggressive goals will require a major initiative, with investment by both PRDE and federal funding mechanisms such as E-Rate.¹⁰⁰ PRDE also recognizes that Federal funding will first require facilities improvements to many older schools, including electrical upgrades and improved building security.

⁹⁹ “Metas y objetivos generales: Una agenda de país para transformar la educación. PRDE document dated 6/20/2013, retrieved 6/26/2013 from <http://intraedu.dde.pr/Comunicados%20Oficiales/Metas%20del%20Departamento%20de%20Educaci%C3%B3n.pdf>.

¹⁰⁰ All or nearly all PRDE schools are eligible for 90% discounts on Internet access through E-Rate.

E-Rate Readiness

According to a 2009 ruling, USAC requires the following for each school to be deemed eligible to receive E-Rate funding (E-Rate Ready):¹⁰¹

- School has computers
- Computers have Internet service
- School has trained teachers in technology integration into the curriculum
- School has teachers who integrate technology with the curriculum (specific application in use must be cited)
- Electrical power in the classroom where the computers are located is stable
- Classroom where computers are located has security measures (bars, alarm, camera)
- Classroom where computers are located has air conditioning.

Presently, about 300 schools (20% of all schools) are not E-Rate Ready; the detailed list of which schools and what is lacking is maintained by OSIATD.¹⁰² To move from the *not ready* list to the *ready* list Eligibility Source Documentation for each school must be submitted to USAC for approval. This has been accomplished previously via E-Rate Program Integrity Assurance response, which included certification from the schools that these requirements have been met (see APPENDIX 6 E-RATE READINESS CERTIFICATION).

For the future, PRDE plans to:

- *Adopt closer coordination between the PRDE departments (i.e., OMEP,¹⁰³ Public Buildings Authority, Information Technology) to ensure continued increase in the number of schools deemed “E-Rate Ready”*
- *Within 1 year, ensure 90% of schools meet the E-Rate Ready criteria*
- *Within 2 years, ensure every school meets the E-Rate Ready criteria*

Current and Planned Infrastructure

The following discussions summarize existing technology infrastructure at Puerto Rico public schools, and describes future goals (in *blue, italicized* text) for each category of such services. Electrical capacity and power requirements will be discussed last because these requirements depend on both the nature and the quantity of technology deployed.

End User Hardware and Software (not E-Rate Eligible)

Hardware

¹⁰¹ Since this PRDE Technology Plan calls for the adoption of modern end-user technologies such as tablets, USAC’s 2009 guidelines might now be considered too stringent. For example, since tablets can operate for hours on battery power and do not dissipate significant heat, overnight storage and charging of tablets in a locked, air-conditioned data closet meeting electrical power requirements might suffice for E-Rate readiness (with less stringent requirements on the classrooms where the tablets are to be used during the school day).

¹⁰² Oficina de Sistemas de Información y Apoyo Tecnológico a la Docencia [OSIATD] is PRDE’s Information Technology unit.

¹⁰³ Office for the Improvement of Public Schools of Puerto Rico [OMEP].

Each of PRDE's schools has some computers for staff and student use. However, there is a tremendous disparity in makes, models, age and number of devices at each school. At most schools, computers are currently centralized in a library or lab; few schools have computers in classrooms. Some teachers bring their personal computers to school. As noted in our survey results,¹⁰⁴ many teachers and students have better computing devices at home than are available at school. Educationally, PRDE notes that mobile technology (e.g., carts of Chromebooks) in the classrooms is better than labs full of desktops that require much more power and are not accessible for routine classwork.

PRDE uses predominantly Windows computers, though some non-Windows devices (e.g., iPads) are in use. Some school labs have terminal servers with N-Computing configurations.¹⁰⁵

All schools have at least one printer/copier, some networked, some standalone. There is tremendous disparity per school in makes, models, age and number of devices. A small number of miscellaneous offline devices (e.g., a spelling computer) are also in use. Going forward, all devices need to be cloud-print friendly.

On a statistical basis, as noted earlier, access to end-user hardware is currently limited, both for teachers and for students. Data collected in 2011 for E-Rate reporting (Blocks 2 and 4 of Form 471)¹⁰⁶ reveals these data points:

- For 1467 PK-12 schools, 472,274 students share 25,566 computers for instruction, of which devices 15,598 have Internet access
- Per open school, the average ratio of students per computer is 18, with the average ratio of students per computer with Internet access at 30
- Per level at open schools, the average ratios of students per computer, and students per computer with Internet access are:
 - Elemental ó 21, 30
 - Intermediate ó 20, 34
 - Secondary ó 16, 26
 - Second unit ó 19, 27
 - Top ó 14, 26
- Students-to-computer ratios vary widely per level:
 - Elemental ó 0 ó 367, with mode of 5 and median of 14
 - Intermediate ó 0 - 575, with mode of 6 and median of 14
 - Secondary ó 0 ó 65, with mode of 13 and median of 13
 - Second unit ó 0 ó 316, with mode of 10 and median of 14
 - Top ó 0 ó 198, with mode of 4 and median of 9.

Data collected for FY2013 E-Rate reporting (Blocks 2 and 4 of Form 471 # 919592) shows:

- For 1260 E-Rate Ready PK-12 schools, 354,075 students share 36,022 devices with Internet access

¹⁰⁴ See APPENDIX ó TECH PLAN SURVEY

¹⁰⁵ Although specific types of terminal servers are conditionally eligible for E-Rate discounts, terminal servers used to provide applications, such as MS Office, to students on a shared basis are *not* eligible.

¹⁰⁶ Please refer to attached file, **stats_on_schools_20130712.xlsx**, for full details (techplan/2014_2019_plan/tp_supporting/curriculum).

- The average ratio of students per computer with Internet access is 9.8.

PRDE has implemented policies and procedures regarding the acquisition of systems and technology.¹⁰⁷ *Carta Circular 7-2011-2012* specifies the request and approval process for ordering computer systems. The PRDE document *Especificaciones para la Compra de Equipo, Año 2012/2013 Version 1.2* describes the acceptable configurations for desktop computers, laptops, netbooks, servers, mobile carts and related peripherals. Annually, the Office of Information Systems and Teaching Support publishes the specifications that should be considered when purchasing equipment, parts and supplies related to information technology. All equipment purchased by the agencies of the Department of Education (DE) must meet these specifications in order to join the digital communications network.¹⁰⁸

BYOD

To reach our objective that “Every teacher will have assigned for his or her dedicated use a modern laptop computer or tablet; every student will have assigned for his or her dedicated use a wireless computing device such as a tablet,” PRDE has decided to adopt a Bring Your Own Device [BYOD] strategy, since:

- Many teachers and students already have home access to better computing devices than are available at school
- The financial impact for the Department to purchase half a million devices is prohibitive.

BYOD introduces additional challenges: CIPA compliance, support, technical requirements consistent with curriculum software, equitable access for all. While not fully solved yet, initial thoughts on addressing these challenges include:

- CIPA compliance can be achieved if Internet access is centralized, such that all network traffic is controlled and monitored by a service provide.¹⁰⁹ If all access is wireless, this is easier; otherwise we need a way to prevent students from using 3G/4G/LTE network. CIPA compliance makes the case for a policy about “adequate” technical solutions.
- Supporting a large variety of devices will require updates to use policies and minimum specifications. These should be initially established, then updated each year.¹¹⁰
- To ensure students are able to access curriculum tools, *cross platform* technical requirements must be instituted consistent with curriculum software.
- To address equitable access, the Department expects to have to provide about 20% of needed devices, perhaps via lending carts of devices per school, or via Department established leasing plan (e.g., families use a device with a 3-year payment plan). Equipment leasing has the advantage of always having modern devices.

¹⁰⁷ From GUIDELINES AND POLICY ON THE ACQUISITION AND DEVELOPMENT of SYSTEMS, EQUIPMENT TECHNOLOGICAL AND USE OF TECHNOLOGY COMPUTER IN THE DEPARTMENT OF EDUCATION (07_2011_2012.pdf)

¹⁰⁸ See <http://www.de.gobierno.pr/especificaciones-para-la-compra-de-equipos-tecnologicos> for Specifications for equipment procurement and information technology 2013-2014.

¹⁰⁹ Note that content filtering services are not eligible for E-Rate discounts.

¹¹⁰ Smarter Balanced specs are a good start for minimum requirements.

To meet student achievement goals, PRDE requires:

- *BYOD policy to be implemented*
- *Within 2 years, every teacher to a dedicated use of a modern laptop computer or tablet*
- *Within 5 years, every student to have dedicated use of a wireless computing device such as a tablet. As textbooks transition to digital format and as more and more instructional tools are available over the Internet, it will become imperative for each student to have access to such a dedicated portable device*
- *All devices to have long battery life, reducing the need for additional A/C power outlets in the classrooms; devices should be charged overnight in a locked data closet; end users will be responsible for charging their own devices*
- *PRDE has recently entered into a Memorandum of Understand with Microsoft; hence, end user devices to be connected to the PRDE network should be capable of Active Directory registration.¹¹¹*

A current initiative to integrate administrative computers into the PRDE network domain is underway. Next, student computers will be integrated. This project will require 1-2 year to complete.

Software

The predominant operating system software is Windows 7 with less than 35% of schools still using XP.¹¹² The Microsoft Office suite is the primary productivity software. Virus protection is achieved through Microsoft Forefront End Point Protection 2010 (FEP 2010).

PRDE has several administrative systems used by all teachers and administrators (e.g., Time and Attendance, Grading, Student information system).

Student software and electronic learning resources include:¹¹³

- Cenit
- Centro de Aprendizaja de Escde la Comunidad
- Ciencia
- Cienia de la familia
- Documentsles Est.Sociales
- Enciclopedias electronic programados
- G to BE
- I.T.E.H
- Ingles - Proyecto LE
- Internet

¹¹¹ At least two tablet computing devices have been announced to date with support for both Windows 8 and Android operating systems. Since the Apple iPad and Android currently dominate the tablet space, selection of a standard student tablet that supports both Windows 8 and Android would seem prudent, reducing proprietary lock-in and ensuring a wide range of educational content and applications.

¹¹² Windows 7, or lesser operating system software, is no longer supported. Verify percent of computers with each type of operating system.

¹¹³ This list was captured from the 11/18/2011 PIA response for Form 471: FY2009 - 651373, 678552; FY2010 - 750468, 749683, 753629.

- La integran en las diferentes asignaturas
- Laboratories Espanol
- Laboratorios math
- Mathematicas
- Modulos Ciencia
- Office programs ó Excel, Word, PowerPoint
- Proyecto LSK
- Read 180
- Rosetta Stone language applications
- Tecnologia Education
- Tee Math
- Various programs - English and Math
- Windows XP
- Others: _____

Networking and Telecommunications Infrastructure (potentially E-Rate Eligible)

The following sub-sections are intended to align with the categories of eligible services established by the FCC for E-Rate funding:

1. Priority One
2. Priority Two: Internal Connections
3. Priority Two: Basic Maintenance Of Internal Connections

PRIORITY ONE¹¹⁴

Voice Services

Currently, most schools have 1 to 3 POTS lines in offices and no phones in classrooms. Few schools have sophisticated PBX systems with modern features such as routing voicemail to email,¹¹⁵ but most have an older, Nortel ICS Multi-Line Telephony System. Each of the eighty-three (83) 21st Century schools has its own VoIP PBX, about 12 VoIP phones per school for administrative offices (see 21st Century School Network Layout diagram). About half of the 21st Century schools have one PRI line, with implementation of remaining half pending. All schools have a single VoIP connection to PRDE headquarters, though these are largely not in active use at the present time. PRDE central office has 3 PBXs (see DOE CENTRAL SITE BASIC PBX Diagram).

For the next few years, PRDE will continue to require voice services in types and quantities comparable to current services, with modest growth. Over time, fewer POTS lines will be needed and more VoIP technology will be deployed. Eventually, though not necessarily within 5 years, PRDE intends for every classroom to have either wired or cellular (to eliminate need for wiring)

¹¹⁴ Priority One services include: telecommunications services, telecommunications, and Internet access. Telecommunications Services are services that are used to communicate information electronically between sites. The services must be provided by a "telecommunications carrier" - i.e., an organization that provides telecommunications services on a "common carriage" basis. Examples of these services include basic telephone service and digital transmission services such as T-1 lines.

¹¹⁵ There may be some variability from site to site.

telephone access, to allow teachers to accept inbound calls and to report emergencies. E911 services, to ensure that first responders have accurate location data, would be required and might influence the types of services selected. In the same time frame, PRDE will migrate existing analog voice services toward VoIP solutions, either via a unified, full-featured, PRDE-wide VoIP system (eligible for E-Rate as Priority 2), or via Interconnected VoIP services (eligible for E-Rate as Priority 1), at least including all non-classroom venues. Once high-bandwidth Internet is ubiquitous, PRDE will be better prepared to implement VoIP within and across all of Puerto Rico's public schools.

Eventually, PRDE may decide for every classroom to have either wired or cellular (to eliminate need for wiring) telephone access to accept inbound calls and to report emergencies.

The following initiatives are currently underway:

- *For E-Rate funding year 2013-2014, PRDE has contracted with PRTC, through E-Rate-compliant competitive bidding, to provide standard telecommunication services for the 1,162 public schools and Administrative Offices. The services include:¹¹⁶*
 - *9,000 lines (BMS, BML, and trunks) to access local calls*
 - *Long distance services to USA and international locations (2,000,000 minutes for 9,000 lines and 37 PRI Services)*
 - *800, 911 and 411 services for 9000 lines*
 - *ISDN PRI services (37)*
 - *Installation of 350 new POTS lines*
 - *DID services (75 blocks of 40 numbers)*

For the future, PRDE requires:

- *Every year, continue E-Rate-supported telephone services*
- *Eventually, though not necessarily within 5 years, migrate existing phone services to a full-featured, PRDE-wide VoIP system, at least including all non-classroom personnel. Once high-bandwidth Internet is ubiquitous, PRDE will be better prepared to implement VoIP across all of Puerto Rico's public schools.*

Cellular Service

Currently, PRDE does not, in general, issue cellular phones to its personnel. During the E-Rate funding year 2013-2014, however, PRDE contracted with PRTC for cellular service for approximately 85 devices to be used for eligible purposes. Current thinking is that these administrative staff handheld devices need Internet connectivity, but no voice services.

For the future, PRDE plans to:

- *Every year, continue E-Rate-supported cellular services for up to 100.*
- *Evaluate pros and cons of deploying of cellular telephones to each classroom (in lieu of additional phone wiring).*

The following table shows likely services sought for telecommunications on the Form 470,¹¹⁷ for the next E-Rate cycle.

¹¹⁶ From Item 21 attachment FY2013_Item 21_Telco.pdf for FRN 2514232.

Item 8. Telecommunications Services¹¹⁸

Service or Function:	Quantity and/or Capacity:
Telephone service for all PRDE facilities: local voice, fax, alarm, elevator with 411, 800, 911 or 911e service access. At least 2 lines per school, up to 12 lines per site. Any reliable technology.	About 10,000 lines.
Telephone Service: Dedicated TTY Lines, one line per facility	About 1600 lines
Digital Transmission Service: PRI, ISDN or SIP T-1, or comparable technology	About 100 lines
Telephone Service Components: Direct Inward Dialing (DID), Blocks of 40 Numbers	About 100 DID blocks of 40 numbers each
Long Distance Service: to USA and international locations, pooled minutes for all lines	About 2,200,000 minutes

Internet Access¹¹⁹

PRDE's plan for Internet access is to track President Obama's ConnectED initiative: within five years, 99% of public schools should provide 1 megabit per second [1 Mbps] per student. Assuming a 1:1 ratio of devices to students, also a five-year goal for PRDE, a typical school with 1,000 students would be connected at 1 gigabit per second [1 Gbps], readily achievable with current-generation fiber-optic technology.¹²⁰

Realistically, for the island of Puerto Rico, this ultimate goal may take longer than five years to achieve. An interim goal is for each school to have a minimum 10 Mbps connection, increasing over time as enrollment and usage increases, and based on grade level, with 99% of typically-sized schools to be connected at 100 Mbps within 5 years, providing 0.1 Mbps to each student. Every school will have fast, reliable Internet, initially 10 Mbps per 1000 students, 100 Mbps per 1000 students within the scope of this plan, (eventually 1 Gbps per 1000 students), using fiber or other 99.9% reliable technology.

The Internet speeds currently available to PRDE schools fall far below these goals. Every individual interviewed during the development of this tech plan indicated that slow Internet was hampering progress in student achievement and staff productivity.

PRDE also operates a *21st Century Schools* initiative, an attempt to create model schools based on the latest technology. This program has modernized almost 100 schools to meet higher standards of infrastructure. Additional school modernizations are underway or planned, both as part of the *21st Century Schools* initiative and more generally as part of this plan.

¹¹⁷ Y17 (2014-2015) RFPs available at: <http://intraedu.dde.pr/Erate2014/Forms/AllItems.aspx>

¹¹⁸ See draft PRDE RFP NO: TELCORFOSIATD2014-002 for more details.

¹¹⁹ Internet access or "basic conduit access" to the Internet including e-mail is eligible for discount and can be provided by a telecommunications carrier or a commercial Internet service provider.

¹²⁰ Other technologies such as gigabit line-of-sight radios could also meet this requirement in some cases.

PRDE IT provides DNS and DHCP services for all of PRDE. Additionally, the PRDE data center manages and provides backup for over 70 terabytes of data on PRDE servers. Individual schools are responsible for local site backups using a variety of locally available technologies.

For the future, PRDE plans to:

- *Every year, continue E-Rate program supported Internet access at central location(s).*

CIPA Compliance

PRDE's current Internet service provider owns and manages the routers¹²¹ (meeting the E-Rate Tennessee test for Priority 1 Customer Premise Equipment). This provider also manages CIPA compliance (a service ineligible for E-Rate support, and billed separately from the eligible services).

For the future, PRDE plans to:

- *Establish policies and procedures for BYOD computing*

Wide Area Network [WAN]

All schools, district offices and regional offices connect to the Internet using a hub and spokes topology, with PRDE headquarters at the center. There are no separate, direct connections among schools, but Wide Area Network [WAN] capabilities are achievable through routers residing at PRDE's main data center, as shown in the logical network diagram below. Each school has one router with two interfaces, one to the WAN one to its LAN.

PRDE IT provides DNS and DHCP services for all of PRDE. CIPA compliance is handled centrally via three Fortigate Firewalls, with filtering capabilities, housed at the PRDE IT Data Center. Currently the Department owns the Fortigates and the Internet service provider manages it. Going forward, an upgraded filtering solution is needed, which may be leased new equipment.

PRDE operates an integrated Internet/WAN solution.¹²² While mainland school districts often contract separately for Internet service and data transport (linking schools both to the Internet and to each other through wide-area networks), PRDE has engaged a single vendor to provide both services as an integrated, centralized network. The online status of every school is constantly monitored by IT Department personnel at headquarters, so that outages can be noticed and responded to quickly.

PRDE maintains one general-purpose, high-capacity connection to the outside Internet (currently 1 Gbps, expandable) and one secondary, lower-capacity connection (currently 100 Mbps) for certain administrative functions. Traffic is routed according to function as shown in the network

¹²¹ A consideration might be to replace the 2 routers with a single larger router. Note that allocations have been made for 2nd router across demarc.

¹²² A more distributed topology, such as a ring with intermediate aggregation points, might offer greater robustness, improved flexibility in inter-school WAN connectivity and possible economies of scale by allowing long-haul uplinks to be shared. However, the existing hub and spokes approach may be viewed as preferable in supporting centralized directory services, enforcement of CIPA filtering, uniform traffic shaping or potentially tighter security.

diagrams. PRDE distributes the primary Internet bandwidth to individual schools using various technologies: most are copper-based asynchronous digital subscriber loop [ADSL] or frame relay links. Currently, most schools have at least 3 Mbps download speeds (via DSL) and some have 5 or 10 Mbps download speeds from PRDE. On the DSL links, uploads are slower, typically in the 768 Kbps range. The 83 21st Century schools have long haul, single mode fiber and/or microwave connections to PRDE. The following table summarizes link speed information by numbers of schools as gleaned from various PRDE databases.¹²³

Bandwidth ¹²⁴	# of Schools	E-Rate Ready	FY2012 Cost
DSL	84	No	\$2220
DSL	360	Yes	\$5580
DSL at 3Mbps	81	No	\$4380
DSL at 3Mbps	346	Yes	\$5580
3 Mbps	47	No	\$4380
3 Mbps	180	Yes	\$5580
3 Mbps NIFs	18	No	\$4380
Frame Relay	73	No	\$3396
Frame Relay	205	Yes	\$5580
10 Mbps	1	No	\$4380
10 Mbps	71	Yes	\$8400
	1466 total connections ¹²⁵ 1448 school connections 1162 E-Rate Ready connections 304 Not E-Rate Ready connections		

The school-side Customer Premise Equipment [CPE] to support these Internet connections includes the following:¹²⁶

Equipment	# of Schools	E-Rate Ready
Avaya/ Avaya/Nortel Secure Router 1001	1	No
Avaya/Nortel Secure Router 1001	52	No
Avaya/Nortel Secure Router 1001	231	Yes
Avaya/Nortel Secure Router 1004	12	No
Avaya/Nortel Secure Router 1004	47	Yes
Router Thomson ST 608	48	No
Router Thomson ST 608	197	Yes
SR1002	0	No
SR1002	1	Yes
21 st Century schools have Cisco Routers & HP Routers	83	Yes

¹²³ Primary source: 2012_3mb_elig_inelig_20120429.xlsx.

¹²⁴ Another spreadsheet (2012_bandwidth_changes) indicates: 305 Frame Relay T-1 connections to be upgraded to 3 Mbps (\$283/mo becoming \$365/mo, each with \$540 1-time fees), 541 ADSL connections to be upgraded to 3 Mbps (\$185/mo becoming \$365/mo, each with \$540 1-time fees), 679 3 Mbps connections to be upgraded to 5 Mbps (\$365/mo becoming \$465/mo, each with \$540 1-time fees), and 44 10 Mbps connections and no changes. These details are inherently a moving target; this is a reasonable snapshot.

¹²⁵ Another spreadsheet (2012_school_directory) indicates 1622 connections: 126 of unknown bandwidth, 957 DSL, 530 Frame Relay.

¹²⁶ Primary source: 2012_3mb_elig_inelig_20120429.xlsx. CPE device information was not available for all locations.

PRDE uses the following policy to manage Internet service upgrades for schools: when peak utilization exceeds 75% of available bandwidth, a school is permitted to upgrade to the next bandwidth level. This creates a dilemma in that school personnel are reluctant to add end-user devices, due to limited bandwidth and unreliable connectivity, thus making demand / utilization seem artificially low. This conservative policy may need to be modified in the future to allow for a more pro-active model (increasing bandwidth first, in anticipation of planned equipment acquisitions and greater integration into the curriculum).

The following bandwidth upgrade initiatives are currently underway:

- *For E-Rate funding year 2013-2014, PRDE has contracted with PRTC to provide Internet Services for the District's E-Rate Ready schools and administrative facilities, to include:¹²⁷*
 - *10 Mbps Internet service for 101 sites*
 - *5Mbps Internet service for 1109 sites*
 - *Cellular data service for 50 devices*
 - *T-1 Internet service for 2 sites*
 - *100 Mbps Internet service for 1 site*

For the future, PRDE plans to:

- *Every year, continue E-Rate-supported WAN/Internet services*
- *Every year, increase bandwidth to schools based on the 75% utilization model*
- *Within 1 year, all schools to be connected such that .010 Mbps is available per student (e.g., typically-sized¹²⁸ schools to be connected at about 3 Mbps)*
- *Within 2 years, all schools to be connected such that .017 Mbps is available per student (e.g., typically-sized schools to be connected at about 5 Mbps)*
- *Within 3 years, all schools to be connected such that .033 Mbps is available per student (e.g., typically-sized schools to be connected at about 10 Mbps)*
- *Within 4 years, all schools to be connected such that .083 Mbps is available per student (e.g., typically-sized schools to be connected at about 25 Mbps)*
- *Within 5 years, most schools to be connected such that .100 Mbps is available per student (e.g., typically-sized schools to be connected at about 30 Mbps)*
- *Within 10 years, fiber connection to every school, with bandwidth scalable to at least 1 Gbps at each site.*

Web Hosting and Email

PRDE email and web hosting are managed internally by PRDE IT for administrative staff; teachers email is hosted by Microsoft (free), integrates with HotMail. Servers for these functions are 1 ó 2 years old; they are relatively new and can run Windows 2008.¹²⁹ These servers may need replacement during the life of this plan. No Priority 1 E-Rate funding has been requested for these services (though both are eligible for E-Rate funding).

¹²⁷ From Item 21 attachment FY2013_Item 21_IA.pdf for FRN 2513542, application # 918308.

¹²⁸ Typical enrollment is about 300 students per school; about 90 smaller schools have less than 100 students enrolled and about 90 larger schools have more than 650 students enrolled.

¹²⁹ The Department does have some servers running Windows 2000, which is no longer supported.

To meet student achievement goals, PRDE requires:

- *Every year, continue internal PRDE support of web hosting and email or free.*

The following table is suggested as a starting point for preparation of FCC Form 470 for the next E-Rate cycle.¹³⁰

Item 9. Internet Access¹³¹

Service or Function:	Quantity and/or Capacity:
Reliable high-speed Internet service; 2 connections: 1 to Data Center, 1 to Department Administrative Complex	2 connections with minimum 1 Gbps scalable to 60 Gbps over time
Reliable high-speed WAN	Approximately 1,500 sites with Gigabit-capable pathways to data center(s) supplying reliable Internet access scalable to 1 Gbps per site over about five years with 99.9% reliability.
Cellular hotspots	About 100

PRIORITY TWO: INTERNAL CONNECTIONS¹³²

Overview

Through site surveys of each E-Rate Ready school, the incumbent provider for *Basic Maintenance of Internal Connections* has developed and shared with PRDE a comprehensive database of network equipment located at each school.¹³³ Each school in the database is constantly monitored for down switches or other active elements. Technicians are dispatched based on the severity of the problem. Schools have been categorized based on the number of data cabinets (small = 1 or 2 cabinets, medium = 3 to 5 cabinets,¹³⁴ large = 6+ cabinets).

Typically the Internet main point of entry [MPOE] is in a cabinet in the library or lab or Admin Office, which is generally locked, air-conditioned and neatly organized. Currently, only 21st Century schools have a formal data closet.

Ultimately, PRDE would like to have a telecom/data room in each school to house MPOE, MDF, telecom and rack-mounted components. Minimum space requirement is 6ø x 6ø (10ø x 10ø is more ideal, if space is available), with sufficient space behind rack(s) to do maintenance. A transition plan being considered is to make the current cabinet an IDF and create a new MDF. One idea is to build a room around the existing MPOE.

¹³⁰ It is acknowledged that the proposed speeds are significantly higher than those presently available. A number of factors argue that a very aggressive approach to increasing bandwidth is warranted, including changes in the format and delivery of educational content, migration to online testing, Moore’s Law (doubling every 18 months) and U.S. national expectations (not to mention the positive economic stimulus that would result from encouraging Puerto Rican ISPs to build out their networks).

¹³¹ See draft PRDE RFP NO: WAN/INTERNET-OSIATD-2014-001.

¹³² Internal Connections consist of the wiring and components that expand data access within a school or library, such as to individual classrooms in a school or public areas of a library. Internal connections can be provided by any qualified commercial organization that complies with E-Rate program rules.

¹³³ Schools deemed not yet ready for E-Rate were not included in the database.

¹³⁴ Please see the previous E-Rate RFP for additional details regarding categorization of school size.

Our focus is on reliability (including UPS equipment, which is partially, conditionally eligible) and capacity at the data closet (vs. putting more outlets in the classrooms). With all PoE switches and WAPs, and mobile devices that can be charged overnight, classroom outlets become a nonissue, one that has been needlessly holding back progress. The PoE switches and WAPs are eligible (Priority 2, so there is inherent uncertainty of course) and could go a long way toward making the electrical issues less challenging.

Local Area Network (LAN)

Each school has one router with two interfaces, one to the WAN one to its LAN. Schools typically operate 2 local area networks [LANs]:¹³⁵

- 1) Juniper switch for administrative services (e.g., SIS, TAL)
- 2) Juniper switch for classroom/curricular work.

No proprietary protocols or features are in use; all TCP/IP.

Distribution of Internet access from the MPOE is often limited to just a few rooms due to a small number of data cabling drops and limited or zero wireless access points. The 21st Century Schools are an exception, mostly having 100% wireless coverage, although interviews suggested some lack of standardization in the selection and configuration of wireless equipment.

AC power was reported as a significant barrier to technology adoption for many schools. Power is both inadequate and intermittent at many sites. Even schools with adequate electrical capacity and reliability reported too few outlets¹³⁶ to support the number of devices that educators wanted to deploy in many classrooms.

With so many schools, PRDE must pursue its ambitious goals systematically but gradually, upgrading some sites each year based on specific criteria, such as the “Strengthening the Middle”¹³⁷ project. Similarly, the following Internal Connections initiative, currently underway, illustrates this approach.

- **Networking Equipment:** *For E-Rate funding year 2012-2013, PRDE contracted with IBM for “Installation, configuration, design and testing of internal connections (network electronics, UPS systems, cabling, access points, and terminal servers) at the Department’s schools and eligible non-instructional facilities.”¹³⁸ This contract includes 4650 48-port switches, 4520 UPS devices, 2250 servers, 750 CAT-6 drops, and 10*

¹³⁵ Where not already in place, school networks could be consolidated, using a single standard for switching equipment, through the use of Virtual LANs [VLANs].

¹³⁶ Increased emphasis on mobile computing, rather than traditional desktops, should ameliorate concerns about installation of additional outlets. Similarly, use of Power over Ethernet [PoE] switching technology at IDFs, backed up by eligible, uninterruptible power supplies [UPSs] should greatly reduce power consumption and reliability considerations, enabling widespread deployment of wireless network access. Reliable power to data closets and modern, wired LAN backbones to bring wireless access to classrooms remain essential.

¹³⁷ From DE AND MICROSOFT RENEW COMMITMENT TO INTEGRATE TECHNOLOGY INTO THE CLASSROOM (<http://www.de.gobierno.pr/de-y-microsoft-renuevan-compromiso-para-integrar-la-tecnologia-al-salon-de-clases>), Strengthening the Middle “ promotes digital inclusion strategy that will provide a personal device (laptop or electronic tablet) to each teacher and middle school students in order to promote learning at any time and from anywhere.”

¹³⁸ From FY2012_Item21_IC_IBM_471 #869610 for FRN 2372753.

wireless access points. Though the project has not yet been funded by E-Rate, PRDE has authorized pilot implementation at 75 schools. The pilot helped PRDE to refine its guidelines as to the number of drops needed in different types of rooms at small, medium or large schools.

One of the recommendations of this plan is to move away from a LAN wiring model that brings a large number of drops to a central computer laboratory or library, instead distributing a smaller number of drops out to classrooms. Two to three drops per classroom of PoE-enabled modern cabling, terminating at an IDF with UPS-protected power, could provide modern wireless access to every teacher with 1-2 drops available for future expansion, including additional access points as student device numbers increase, a wired printer, teacher station or a VoIP telephone. What matters is not just the number of drops per school but also how they are distributed to encourage greater integration of technology use, including Internet access, into the curriculum.

Our objective that “Every school will have fast, reliable Internet up to 1 Gbps per 1000 students” is currently constrained by the larger Department hub and spokes network design. Redesigning the network to include intermediate aggregation points, which in turn aggregate into the PRDE Data Center, may be required.

For future, PRDE will require:

- *A strategic rollout plan needs to be developed (e.g., by grade, region) during the 1st year of this plan*
- *Every year, continue to rely on E-Rate program support for rollout of Internal Connections at additional sites, compliant with 2-in-5 rule*
- *Support the capability to supply, as recommended by the ConnectED initiative, 1 Mbps bandwidth to each student in 99% of PRDE schools*
- *To supply each student a share of the school’s aggregate bandwidth through their portable devices, it is necessary to provide high-speed wireless access throughout the school. With today’s technology, this generally requires installing a Wireless Access Point [WAP] in each classroom (or small cluster of classrooms) and connecting each to a central switch within the school. Use of Power over Ethernet [POE] switches and WAPs will reduce the need for additional electrical upgrades in each classroom.¹³⁹*
- *Electrical distribution modification to support MDF, ID design platform and wireless initiatives.*

¹³⁹ Wireless infrastructure moving forward and an active approach to reduce energy consumption via certain green initiatives will free up electrical capacity to support wireless infrastructure.

The following table suggests draft language for a Priority 2 FCC Form 470 for the next cycle:

Item 10. Internal Connections

Service or Function:	Quantity and/or Capacity:
Wireless access points) 802.11n or ac with dual radios	Approximately 20,000 units supporting 802.11N or better, dual radios, about 500 Mbps throughput per radio
Wireless access point controllers or equivalent solutions	Sufficient units to manage 20,000 wireless access points at up to 1500 schools. Controller-based and non-controller based solutions may be considered.
Fiber wiring from MDF to IDFs	50micron multimode rated at 10 Gbps
Wiring from IDFs to classroom to be copper which provides PoE, all new Cat6, but if school is mostly Cat5e, stick with it	2-3 drops per classroom at up to 1500 schools, each with about 15 classrooms
Switches layer 3, managed PoE and Gbps on every port, VLAN capable, number of ports based on fan-out per school, min 24 ports	Sufficient ports to activate all drops, with 20% spare. Ports should support PoE and 1 Gbps operation
Uninterruptible Power Supplies [UPS]	
Racks	

As needed, proposals for specific components/technologies (e.g., wireless bridges for connecting buildings, concentrators) will be solicited.

PRIORITY TWO: BASIC MAINTENANCE OF INTERNAL CONNECTIONS [BMIC]¹⁴⁰

Equipment Maintenance

For equipment eligible for E-Rate in the BMIC category, PRDE’s primary service provider works closely with PRDE’s IT Unit to constantly monitor¹⁴¹ each school in the E-Rate Ready database for “down” circuits, switches and other active elements.¹⁴² Repair/replace work is driven by this monitoring system; work order tickets can be generated either by the school or the service provider (usually the monitoring system “notifies” outages before the users) and technicians are dispatched based on the nature and severity of the problem.

Preventive maintenance procedures and schedules have also been established:

- There is a 24 hour pause on failures, then a support ticket is generated
- PRDE Technician (33 techs on staff) goes to school to verify equipment status
- System generates ticket to vendor to replace/repair switch, etc.

As components eligible for E-Rate support are added to PRDE’s assets, the inventory will be updated including: make, model, serial number, purchase date, and any E-Rate support details (e.g., funding year acquired, Funding Request Number, installation date). Assets will be similarly tagged with this information for easy identification and inventory control.

¹⁴⁰ Basic Maintenance of Internal Connections consists of services "necessary to enable the continued operation of the eligible equipment." It includes: repair and upkeep of eligible hardware, wire and cable maintenance, basic technical support, and configuration changes. BMIC services may be sought for equipment that would have been eligible, even if not originally funded by E-Rate.

¹⁴¹ This monitoring service is not E-Rate eligible.

¹⁴² For schools not deemed E-Rate Ready, only the most essential maintenance is performed, due to budget limitations. The primary emphasis for these sites is to bring them up to E-Rate Readiness before the next funding cycle.

End-of-life equipment acquired with E-Rate funding will be disposed of according to E-Rate guidelines (<http://www.usac.org/sl/applicants/before-youre-done/equipment-disposal.aspx>).

Local PRDE personnel repair or replace equipment that fails but is ineligible for E-Rate BMIC. With older equipment, sometimes the resolution is to take the equipment out of service and replace with new.

The following BMIC initiatives are currently underway:

- *For E-Rate funding year 2013-2014, PRDE has contracted for BMIC with:*
 - *PRTC, for: Basic Maintenance of routing switches, firewalls, load balancing switches, and firewall quarantine system¹⁴³*
 - *Truenorth, for: Basic maintenance of internal connections in PRDE schools and data center, including:¹⁴⁴*
 - *Central routers, switches, firewalls, UPS, and servers (and tape backup systems) for DNS, DHCP, email, and web hosting (preventive and break-fix)*
 - *School site switches, routers (Internet and VoIP), and wireless access points (preventive and break-fix)*
 - *Cabling drops at both data center and schools (break-fix only)*

For future, PRDE will require:

- *Every year, continue E-Rate-supported BMIC services*

Anticipating a continuing need for these types of services, the following table suggests draft language for future FCC Form 470s, as required based on expiration dates for multi-year contracts.

Item 11. Basic Maintenance of Internal Connections

Service or Function:	Quantity and/or Capacity:
Basic maintenance of internal connections for eligible telecommunications infrastructure	PRDE data center and up to approximately 1500 schools (see RFP)
Basic maintenance of internal connections for networking equipment and eligible networking software	PRDE data center and up to approximately 1500 schools (see RFP)

Application Support

IT staff additionally support these PRDE management systems:

- Sistema de Información Estudiantil [SIE], the student information system
- Xxx.

¹⁴³ From Item 21 attachment FY2013_Item 21_BM.pdf for application 919475, FRN 2516519. When conditionally or partially eligible, service provider cost-allocates. All efforts are for internal traffic, firewalls, content filtering, antivirus ó no equipment.

¹⁴⁴ From Item 21 attachment FY2013_Item 21_BM.pdf for application 919475, FRN 2516471. Includes replacements, fix, clean and replace data drops.

Due to the vast scope of PRDE’s jurisdiction, any document of this sort will inherently lack precise detailed information about individual school populations, infrastructure and needs. One of the monitoring objectives is to actively maintain detailed databases including equipment inventories, connection speeds, reliability statistics, demographic data and similar information. Implementation of these types of databases as well as tools to merge data across the databases is well underway. Completion is anticipated within the scope of this technology plan.

Technical Support

Technical support is provided throughout PRDE by OSIATD (Oficina de Sistemas de Información y Apoyo Tecnológico a la Docencia). Specifically, OSIATD’s staff of 33 technicians in field and 4 in the Data Center provides technical assistance regarding the access, usage and technical aspects of networking and computer technology, cabling infrastructure, applications and systems.

The PRDE data center manages and provides backup for over 70 terabytes of data on PRDE servers; individual schools are responsible for local site backups.

Security and Safety Measures

Outlined in the following are additionally necessary Security and Safety Issues. Currently, PRDE security and safety measures include:

- Desktop security managed through password login to PRDE’s Active Directory
- Virus protection through Fortigate web and email filtering at data center
- Microsoft best practices in network and server security
- Backups and disaster recovery through centralized backup management at data center (PRDE data center manages and provides backup for over 70 terabytes of data on PRDE servers; this is exclusive of individual school site data)
- Individual schools are responsible for their own local backup management per school site¹⁴⁵
- Child Internet Protection Act compliance through Fortigate web filtering at Data Center
- Appropriate Use Policies including updates for child safety and cyberbullying.

Electrical Capacity and Power Requirements (not E-Rate eligible)

Ubiquitous deployment of advanced technology inevitably requires widespread adequate and reliable electrical service. Fortunately, continued advances in technology, are reducing both capacity requirements and the reliability requirements for electrical power at the classroom, end-user level.

Not long ago, in a time of CRT monitors and less efficient computers, a desktop computer would use approximately 500 watts of power. More recently, solid-state monitors and more efficient computers have reduced those requirements to approximately half that. Today’s laptop computers require less than 60 watts even when charging, and today’s tablet computers require only 10 watts during charging. The 30 tablets needed for a one-to-one classroom environment would require only 300 watts for simultaneous charging, half that if using a smart-charger that

¹⁴⁵ There is some concern that local backups are not getting done. Some new policies may need to be established. As the Department network is more centralized, these might be done at the Data Center.

alternates between two groups on overnight charging. Add a laptop for the teacher and a wireless access point, and the total power requirements for a classroom fleet remain well below 500 watts.

Desktop computers must be continuously plugged in, requiring the provision of an electrical outlet in a convenient and safe location for each computer. Laptops and tablets, however, may be charged in bulk in a central location, and then used for hours without being plugged in. Since charging can occur at night when other building loads are off, the existing electrical systems can easily support the load without a need for service upgrades. Laptops and tablets are invulnerable to momentary power outages, and even wireless networks may be protected by battery backup during power interruptions lasting 30 minutes or less.

With the modern technology of tablets and wireless networks, the capacity and reliability requirements for electrical power are not nearly as burdensome as in years past. The total power requirements are approximately 500 watts or less than the amount provided by a typical power outlet or with tolerated interruptions of up to 30 minutes. These power requirements necessitate a relatively modest investment compared to just a few years ago.

Other Physical Plant Concerns

Air conditioning in rooms housing computer equipment was noted as an E-Rate readiness factor, assuming many desktop/laptop computers are in the same classroom and generating a large heat load. With tablets or smaller BYO devices, there will be minimal impact on classroom temperatures¹⁴⁶ even in high-density applications.

Air conditioning is still required in MDFs and IDF.

Recap of Yearly Milestones

Looking at our goals and objectives on a yearly basis, we recap as follows:

1st year:

- Baseline infrastructure in place to support forward goals or per school, establish foundations for electricity, minimum Internet speeds (90% of schools are E-Rate Ready)
- Develop strategic LAN upgrade rollout plan for upgrading each school's LAN for wireless distribution of more bandwidth
- Upgrade Internet bandwidth to next level at schools with 75+% peak utilization
- Establish BYOD policies and procedures in pilot mode
- BYOD pilot classrooms have ubiquitous wireless access
- Modern laptop computer or tablet available to teachers and principals in 2:1 ratio
- Technology available to students in 9:1 ratio

¹⁴⁶ Heat load details:

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- 2nd year:
 - Baseline infrastructure in place to support forward goals ó per school, establish foundations for electricity, minimum Internet speeds (100% of schools are E-Rate Ready)
 - Upgrade Internet bandwidth to next level at schools with 75+% peak utilization
 - Fully launch BYOD strategy
 - 25% of the classrooms have ubiquitous access for BYOD
 - Modern laptop computer or tablet available to teachers and principals in 1:1 ratio
 - Technology available to students in 5:1 ratio
- 3rd year:
 - Upgrade Internet bandwidth to next level at schools with 75+% peak utilization
 - 50% of the classrooms have ubiquitous access for BYOD
 - Modern laptop computer or tablet available to teachers and principals in 1:1 ratio
 - Technology available to students in 4:1 ratio
- 4th year:
 - Upgrade Internet bandwidth to next level at schools with 75+% peak utilization
 - 75% of the classrooms have ubiquitous access for BYOD
 - Modern laptop computer or tablet available to teachers and principals in 1:1 ratio
 - Technology available to students in 3:1 ratio
- 5th year:
 - Upgrade Internet bandwidth to next level at schools with 75+% peak utilization
 - 100% of the classrooms have ubiquitous access for BYOD
 - Modern laptop computer or tablet available to teachers and principals in 1:1 ratio
 - Technology available to students in 1:1 ratio.

Infrastructure Goals	Improve access to current information technologies and technology usage by all PRDE stakeholders and provide appropriate system support
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<p>Objective 3.1: Every school will have adequate electrical capacity and power distribution to support the technology described in this plan.</p> <p>Benchmarks:</p> <ul style="list-style-type: none"> a. By June 2015, 90% of schools will have adequate electrical capacity and power distribution to support the technology described in this plan. b. By June 2016, 100% of schools will have adequate electrical capacity and power distribution to support the technology described in this plan.
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Implementation Plan Activities	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
Compile inventory of electrical capacity and power distribution per school to determine what upgrades are needed at which school	Oct 2014	List that can become an appendix to this tech plan	PRDE IT
Coordinating with OMEP and individual schools, determine which schools will have what upgrades during current school year. Include the upgrade plans in Comprehensive School Plans.	Dec 2014	List of schools to be upgraded and what will be upgraded	PRDE IT OMEP School Principals
Schedule and complete electrical capacity and power distribution upgrades for 2014-2015 school year	June 2015	80% of schools have adequate electrical capacity and power distribution	OMEP
Update inventory of electrical capacity and power distribution per school and what upgrades are needed at which school	Oct 2015	Update tech plan appendix	PRDE IT
Schedule and complete electrical capacity and power distribution upgrades for 2015-2016 school year	June 2016	100% of schools have adequate electrical capacity and power distribution	OMEP
Update inventory of electrical capacity and power distribution per school, outlining annual maintenance program, as needed	Oct 2016, then annually each Oct	Update tech plan appendix	PRDE IT
Schedule and complete electrical capacity and power distribution maintenance projects for the school year. Include the upgrade plans in Comprehensive School Plans.	June 2017, then annually each June	100% of schools have adequate and well-maintained electrical capacity and power distribution	OMEP School Principals

Infrastructure Goals	Improve access to current information technologies and technology usage by all PRDE stakeholders and provide appropriate system support
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<p>Objective 3.2: Every school will have fast, reliable Internet, initially 10 Mbps per 1000 students, 100 Mbps per 1000 students within the scope of this plan (eventually 1 Gbps per 1000 students), using fiber or other 99.9% reliable technology.</p> <p>Benchmarks:</p> <ul style="list-style-type: none"> a. By June 2015, every school will have fast, reliable Internet with 10 Mbps per 1000 students. b. By June 2016, every school will have fast, reliable Internet with 17 Mbps per 1000 students. c. By June 2017, every school will have fast, reliable Internet with 33 Mbps per 1000 students. d. By June 2018, every school will have fast, reliable Internet with 83 Mbps per 1000 students. e. By June 2019, every school will have fast, reliable Internet with 100 Mbps per 1000 students.

Implementation Plan Activities	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
At least annually review Internet utilization stats per school, approving bandwidth upgrades for schools reaching 75% utilization. Include upgrade plans in Comprehensive School Plans.	June 2015, then annually each June	Report of schools approved for bandwidth upgrade	PRDE IT School Principals
Beginning July 2014, implement sufficient bandwidth to meet minimum requirements per school enrollment	June 2015	Speedtest ¹⁴⁷ evidence per school of .010 Mbps/student	PRDE IT School Principals
Beginning July 2015, implement sufficient bandwidth to meet minimum requirements per school enrollment	June 2016	Speedtest evidence per school of .017 Mbps/student	PRDE IT School Principals
Beginning July 2016, implement sufficient bandwidth to meet minimum requirements per school enrollment	June 2017	Speedtest evidence per school of .033 Mbps/student	PRDE IT School Principals
Beginning July 2017, implement sufficient bandwidth to meet minimum requirements per school enrollment	June 2018	Speedtest evidence per school of .083 Mbps/student	PRDE IT School Principals
Beginning July 2018, implement sufficient bandwidth to meet minimum requirements per school enrollment	June 2019	Speedtest evidence per school of .100 Mbps/student	PRDE IT School Principals

¹⁴⁷ For example: <http://www.speedtest.net/> or <http://www.speakeasy.net/speedtest/> download results divided by number of students enrolled.

Infrastructure Goals	Improve access to current information technologies and technology usage by all PRDE stakeholders and provide appropriate system support
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<p>Objective 3.3: Every school will have a modern, local area network [LAN] to distribute access to each classroom.</p> <p>Benchmarks:</p> <ul style="list-style-type: none"> a. By June 2015, develop strategic plan for rollout of LAN upgrades across District b. By June 2016, 25% of schools will have modern LAN to distribute access to each classroom. c. By June 2017, 50% of schools will have modern LAN to distribute access to each classroom. d. By June 2018, 75% of schools will have modern LAN to distribute access to each classroom. e. By June 2019, 100% of schools will have modern LAN to distribute access to each classroom.
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Implementation Plan Activities	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
Coordinate BYOD pilot with LAN upgrade rollout plan	Jan 2015	BYOD pilots get 1 st preference in LAN rollout	PRDE IT
<p>Develop a strategic LAN upgrade rollout plan (e.g., by grade, region) for upgrading each school's LAN for wireless distribution of more bandwidth.</p> <p>Plan to include technologies such as high capacity wireless access points, load balancing access point controllers, PoE switches, 2 to 3 PoE-enabled gigabit drops to each room from the nearest IDF, with consideration of additional labs for some sites (e.g., larger high schools, for professional development events or classes in business administration)</p> <p>Include upgrade plans in Comprehensive School Plans.</p>	June 2015	CIO approval of LAN rollout plan	PRDE IT School Principals
Implement LAN upgrades per strategic rollout plan	June 2016	25% of schools have modern LAN to wirelessly distribute Internet access to classrooms	PRDE IT
Implement LAN upgrades per strategic rollout plan	June 2017	50% of schools have modern LAN to wirelessly distribute Internet access to classrooms	PRDE IT
Implement LAN upgrades per strategic rollout plan	June 2018	75% of schools have modern LAN to wirelessly distribute Internet access to classrooms	PRDE IT

Implementation Plan Activities	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
Implement LAN upgrades per strategic rollout plan	June 2019	100% of schools have modern LAN to wirelessly distribute Internet access to classrooms	PRDE IT
Evaluate alternate topology options for the Department There is some concern that the Department is currently constrained by the larger hub and spokes network design. Redesigning the network to include intermediate aggregation points, which in turn aggregate into the PRDE Data Center, may be required in future.	June 2016	Report to CIO	PRDE IT

Infrastructure Goals	Improve access to current information technologies and technology usage by all PRDE stakeholders and provide appropriate system support

<p>Objective 3.4: Every teacher will have dedicated use of a modern laptop computer or tablet; every student will have dedicated use of a wireless computing device such as a tablet.</p> <p>Benchmarks:</p> <ul style="list-style-type: none"> a. By June 2015, teachers will have use of a modern laptop computer or tablet in 2:1 ratio and students will have use of a wireless computing device in 5:1 ratio b. By June 2016, teachers will have dedicated use of a modern laptop computer or tablet in 1:1 ratio and students will have use of a wireless computing device in 4:1 ratio c. By June 2017, all teachers will have dedicated use of a modern laptop computer or tablet in 1:1 ratio and students will have use of a wireless computing device in 3:1 ratio d. By June 2018, all teachers will have dedicated use of a modern laptop computer or tablet in 1:1 ratio and students will have use of a wireless computing device in 2:1 ratio e. By June 2019, all teachers will have dedicated use of a modern laptop computer or tablet in 1:1 ratio and students will have use of a wireless computing device in 1:1 ratio

Implementation Plan Activities	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
Create draft BYOD policy and procedures including: testing and documentation of curriculum applications, minimum technical specifications to interface with curricular applications, professional development coordination, CIPA compliance and technical support	Dec 2014	CIO approval of draft BYOD policy for pilot	PRDE IT
Design and schedule BYOD pilot program ensuring adequate Internet bandwidth is available and appropriate wireless infrastructure is in place to distribute Internet access. Include pilot plans in Comprehensive School Plans for selected schools.	Jan 2015	Agreement to participate in pilot from Principal(s)	PRDE IT School Principals
Pilot BYOD program, policy and procedures	May 2015	Weekly update of issues and resolutions during initial 2 months Monthly update of issues and resolutions during last 2 months	PRDE IT School Principals

Implementation Plan Activities	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
Modify BYOD policy and procedures as appropriate based on pilot and publish	June 2015	Post Circular Letter of BYOD policy and procedures	PRDE IT
Fully launch BYOD policy Include BYOD plans in Comprehensive School Plans	August 2015 ó June 2016	Monthly update of issues and resolutions	PRDE IT School Principals
Annually update BYOD policy and procedures as needed	June 2017, then annually each June	Post Circular Letter of annual updates to BYOD policy and procedures	PRDE IT

General DOE Network Layout

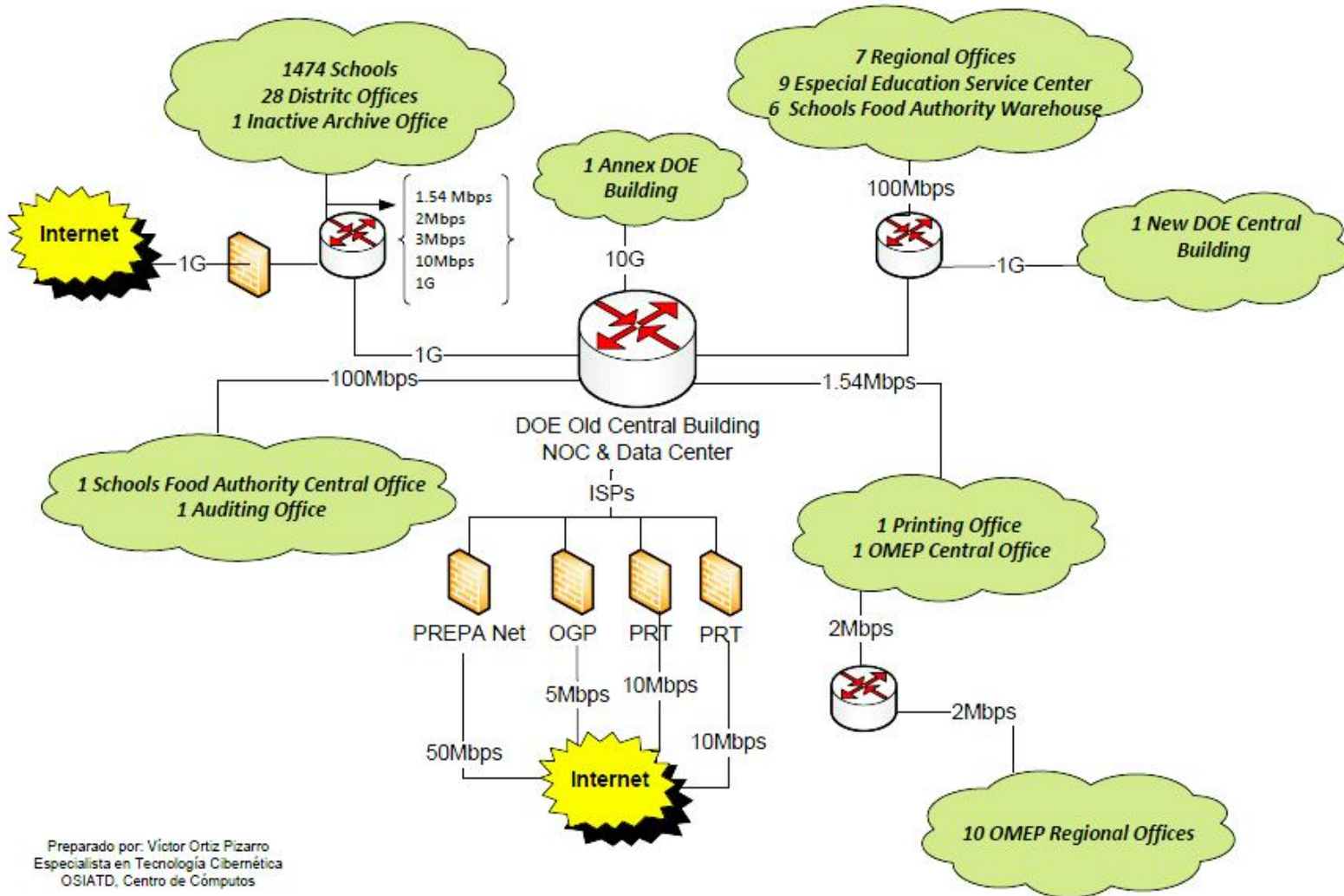
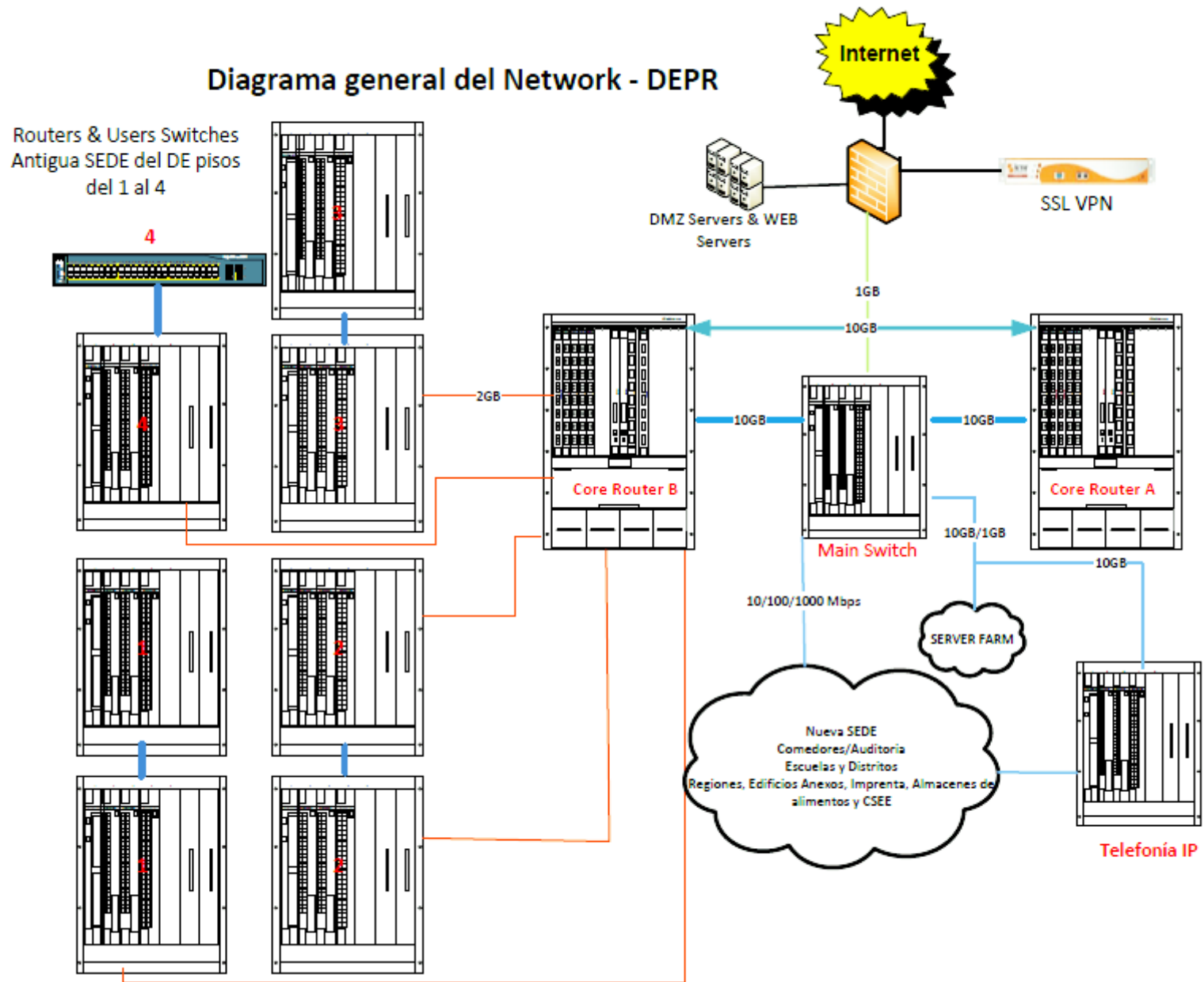


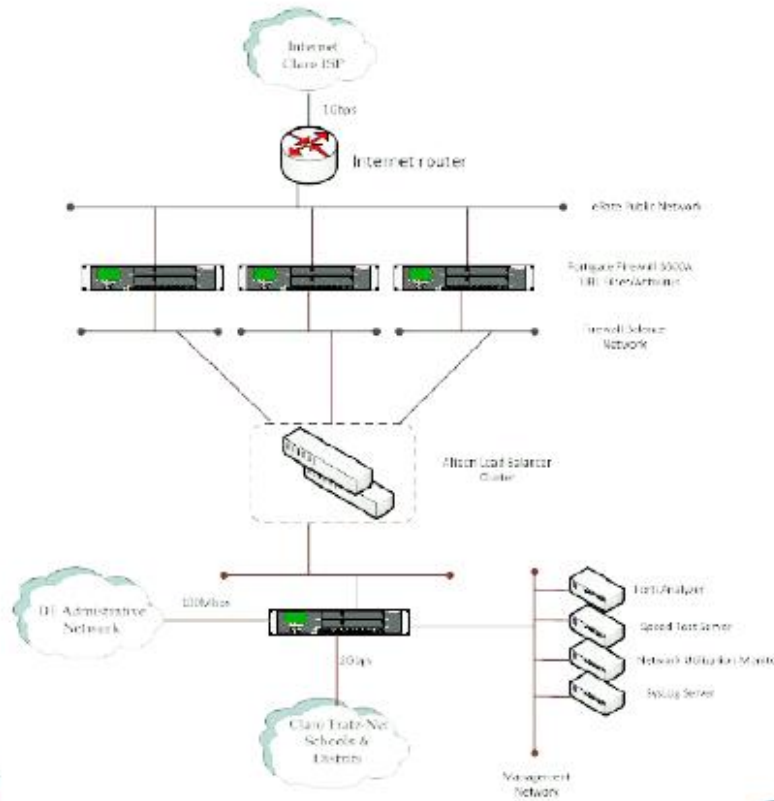
Diagrama general del Network - DEPR



Data Center Current Network Layout ó E-Rate Schools



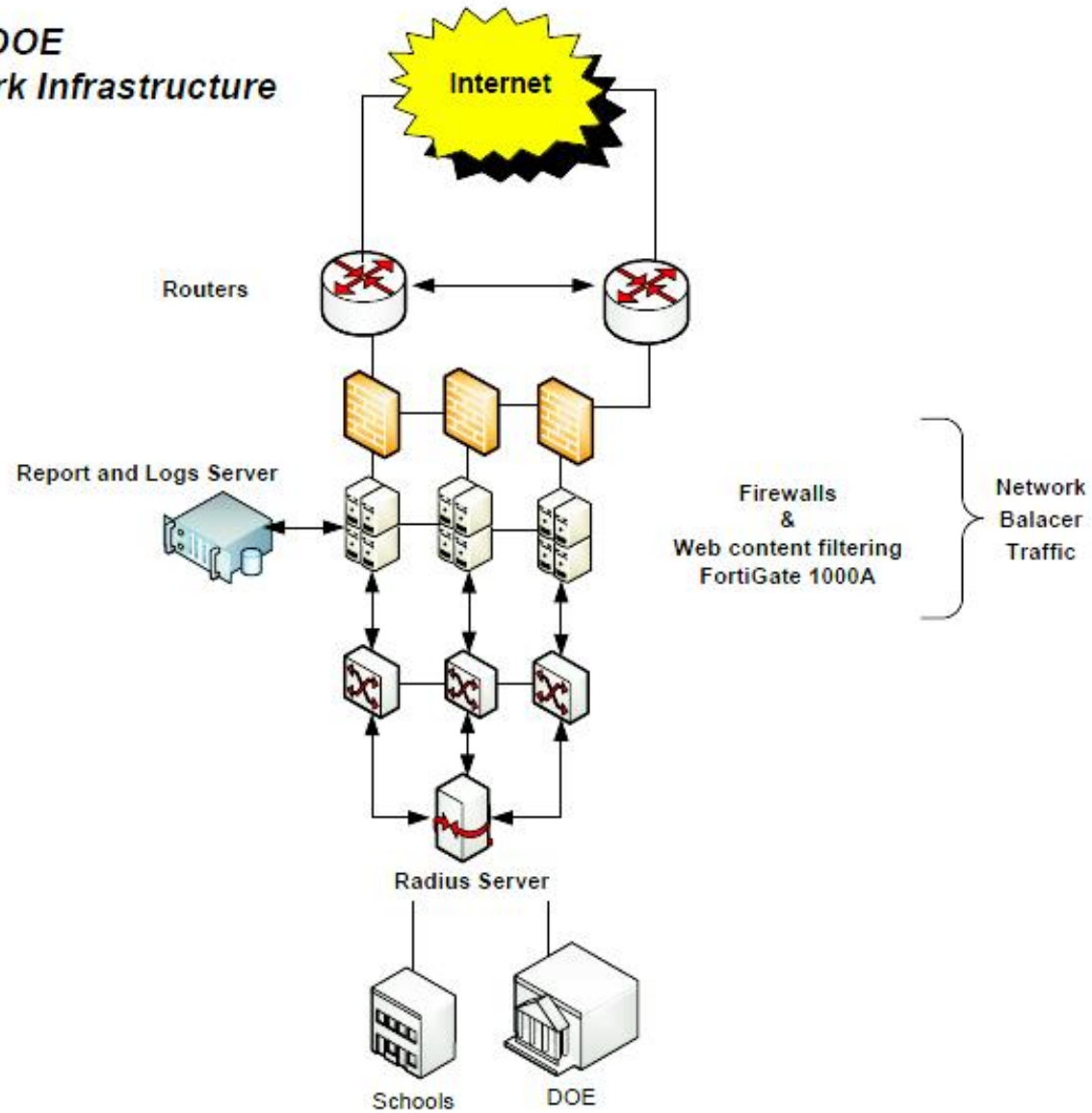
Configuración actual



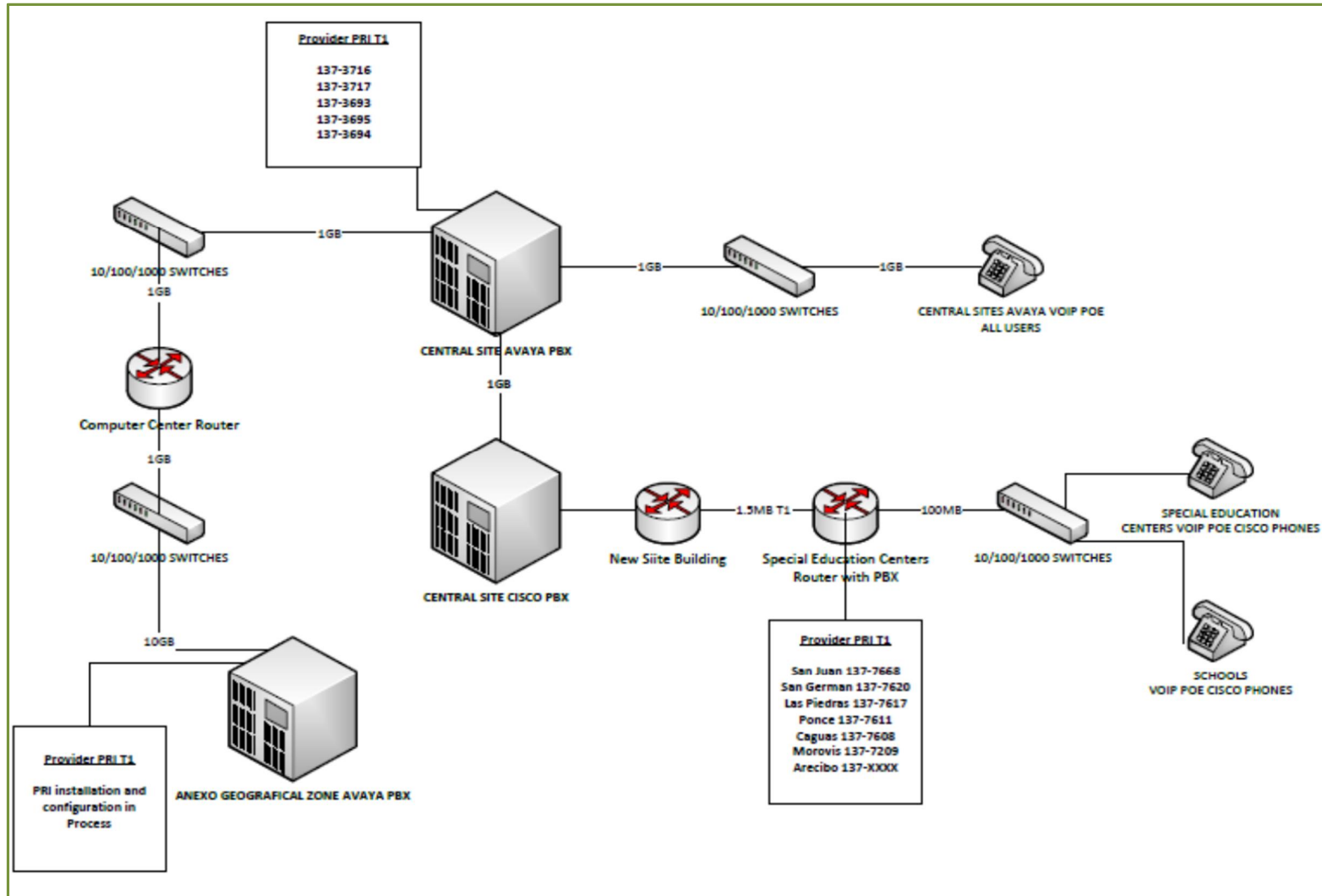
Service is Our Technology
iTech Confidential and Proprietary Information



DOE eRate Network Infrastructure



PRDE Regional and District Office PBX System



21ST Century School Network Layout

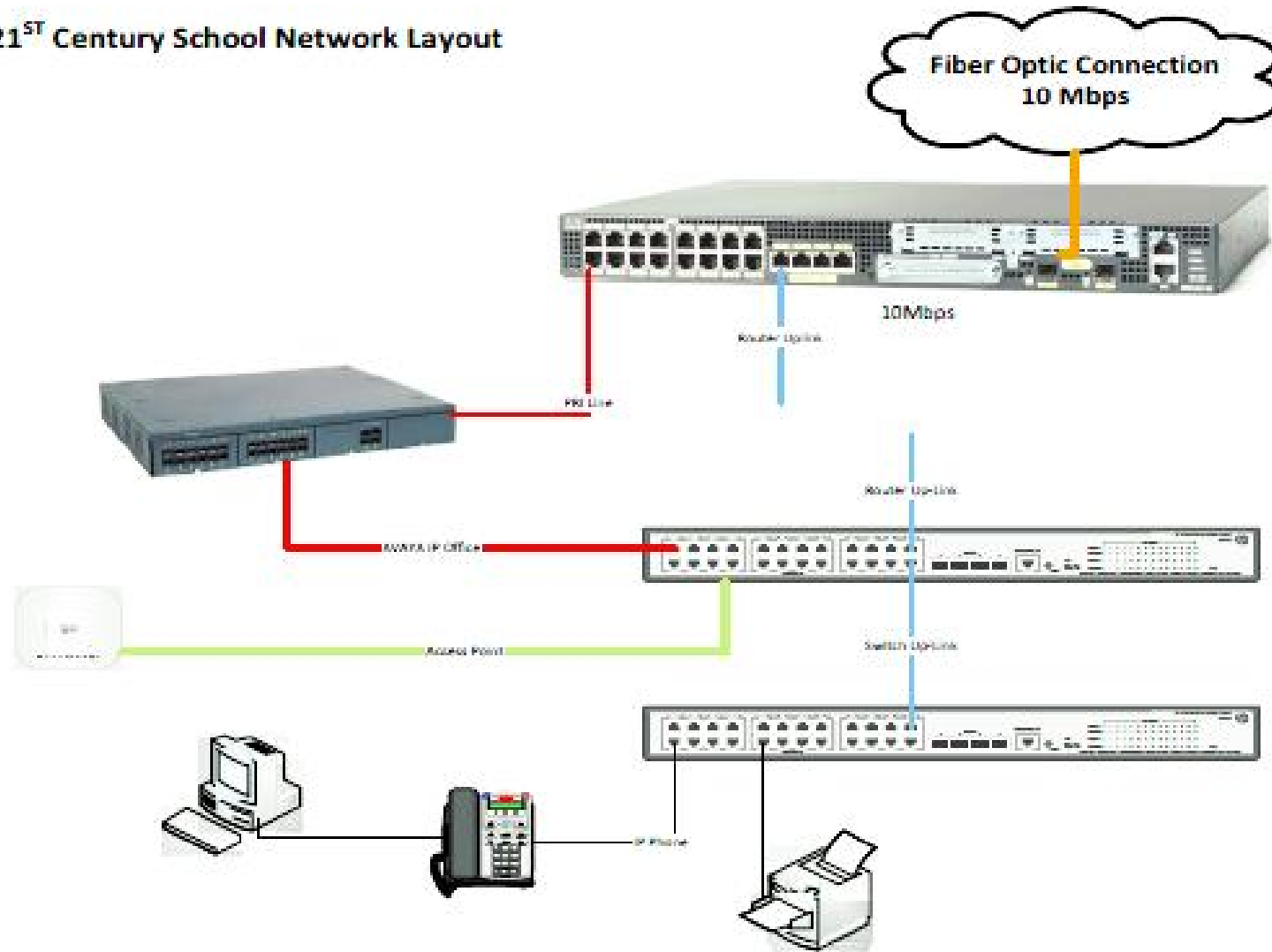
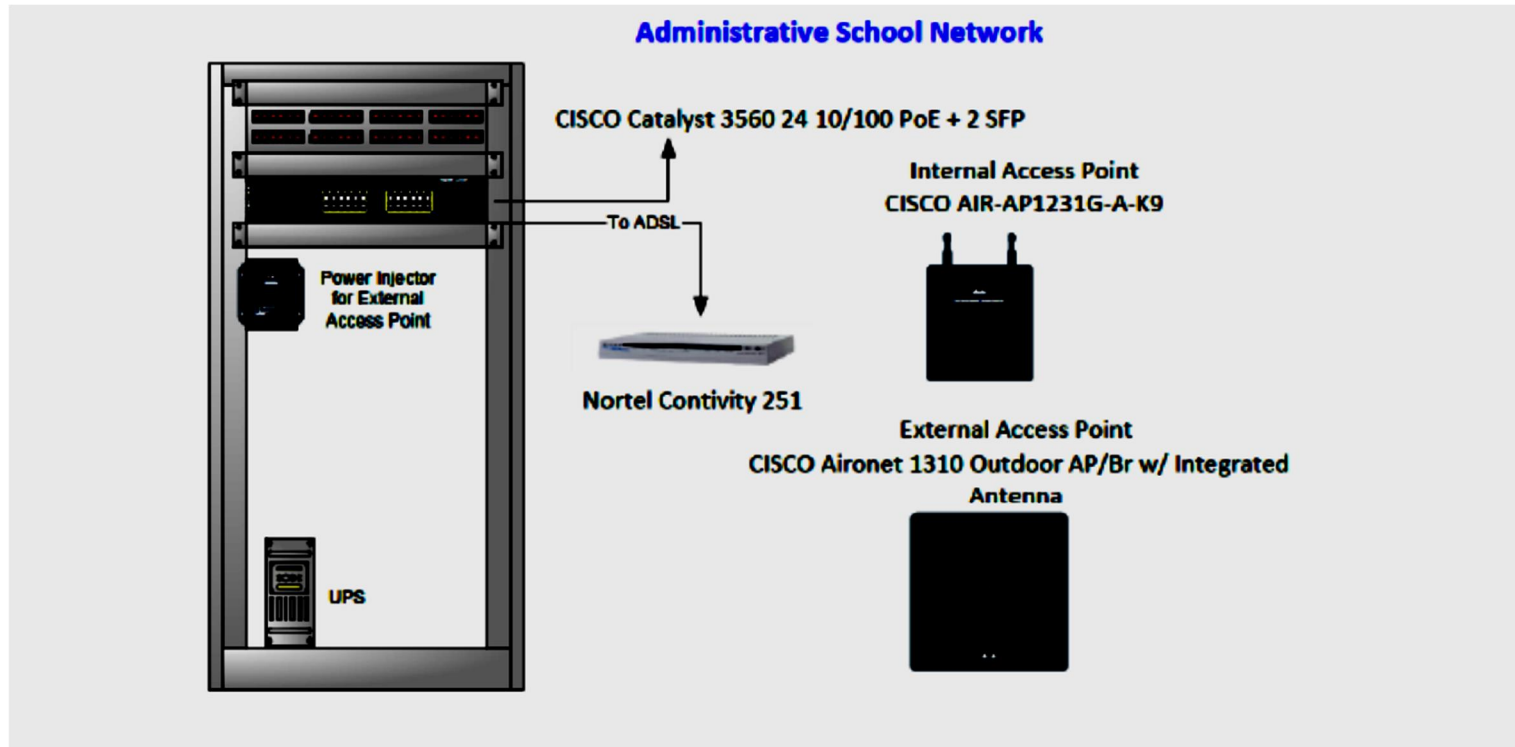


Diagram of typical PRDE school LAN



ELEMENT 4 – MONITORING AND EVALUATION

Evaluation process to monitor progress toward goals and make mid-course corrections

The plan must include an evaluation process that enables the school or library to monitor progress toward the specified goals and make mid-course corrections in response to new developments and opportunities as they arise [EETT 7a, 7b]

Current Plan Monitoring, Evaluation and Revision Model

Comprehensive School Plans [CSP]

Each school in Puerto Rico is required to develop (or modify) annually either an action plan for continuous improvement or a school improvement plan. These plans are one element within the Comprehensive School Plans [CSP] that every school develops every year.¹⁴⁸ The CSP allows each school to:

- Document student achievement, staffing, and available resources for the current year using data available through the PRDE central data system
- Document the analysis of trends in student achievement, identify root causes for poor student performance, and propose strategies for improving student achieving
- Outline school-wide professional development needs and specify additional professional development necessary to meet the needs of specific subgroups of students within the school
- Plan activities that reflect the interests and needs of parents, plan initiatives to engage parents in the school's educational processes and promote strong and effective family-school relationships
- Plan for the use of local and federal funds for the current school year CSP's contain addition detail regarding a school's academic plan and this detail varies by school.

PRDE uses integrated technology tools to guide the development of these plans (CSP, school improvement plans and action plans) and collect the data for easy monitoring by PRDE, which can then be presented in graphic summaries (currently in validation phase). It is PRDE's intention to assist districts and schools with technology that results in increased use and analysis of data that will inform instruction. PRDE is working towards creating a culture of decision making based on data coordinating workshops for teachers and administrators, presenting information at conferences, and disseminating relevant literature.

To evaluate the progress toward goals, PRDE uses data from student assessments, recorded data from PRDE systems, surveys, observations and anecdotal reports.

Student Assessments

PRDE participates in several student assessment programs:

- The Puerto Rican Tests of Academic Achievement (Pruebas Puertorriqueñas de Aprovechamiento Académico [PPAA], and associated Puerto Rican Alternate Assessment [PPEA] for students with disabilities, cover English Language, Mathematics, Spanish Language, and Science. The tests are aligned with the content standards of

¹⁴⁸ <http://www.de.gobierno.pr/tags/plan-comprensivo-escolar>

excellence established in 2000 by the Department of Education of Puerto Rico and meet the requirements of NCLB. All students enrolled in grades 3, 4, 5, 6, 7, 8 and 11 take the PPAA/PPEA.

- The National Assessment of Educational Progress¹⁴⁹ [NAEP], the largest nationally representative and continuing assessment of what America's students know and can do in various subject areas. Assessments are conducted periodically in mathematics, reading, science, writing, the arts, civics, economics, geography, U.S. history, and beginning in 2014, in Technology and Engineering Literacy (TEL). As NAEP moves into computer-based assessments, the assessment administration will remain uniform, continuing the importance of NAEP as a common metric.
- The Program for International Student Assessment [PISA] is an international assessment that measures 15-year-old students' reading, mathematics, and science literacy. PISA also includes measures of general or cross-curricular competencies, such as problem solving. PISA emphasizes functional skills that students have acquired as they near the end of compulsory schooling. PISA is coordinated by the Organization for Economic Cooperation and Development [OECD], an intergovernmental organization of industrialized countries and is conducted in the United States by NCES. PISA was first administered in 2000 and is conducted every three years. The most recent assessment was in 2012.¹⁵⁰ PISA 2012 assessed students' mathematics, reading, and science literacy. PISA 2012 also included computer-based assessments in mathematics literacy, reading literacy, and general problem solving, and an assessment of students' financial literacy. Results for the 2012 mathematics, reading and science assessments are now available. Problem-solving and financial literacy results will be available in 2014.

PRDE Systems Data

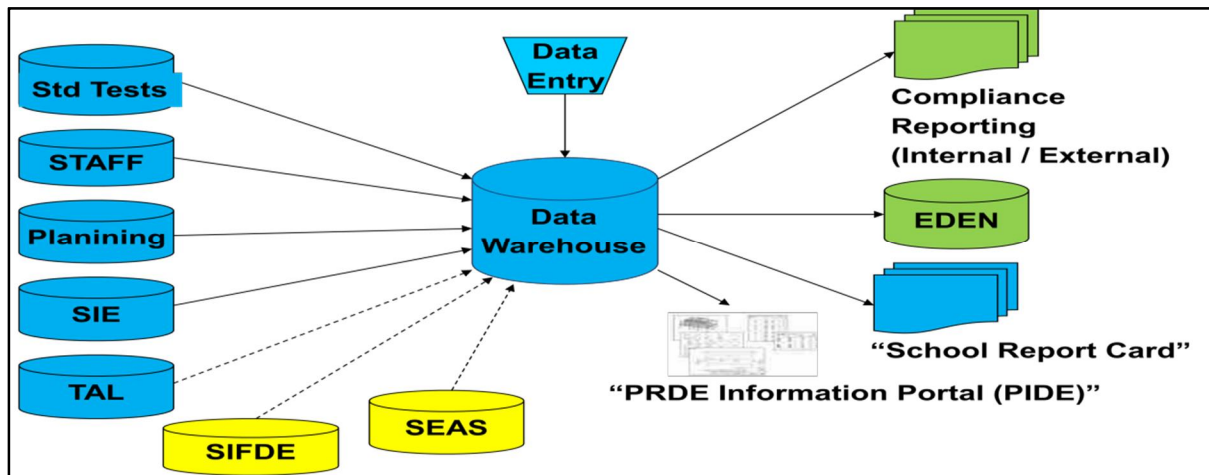
PRDE has several instructional and administrative data management systems to collect various types of data. These systems are available to staff from PRDE's comprehensive website (<http://www.de.gobierno.pr/>) via secure log-in and include:

INTERNAL APPLICATIONS	
Directory of Schools	National Assessment of Student Progress (NAEP)
School Profile (School Report Card)	Registration Fee educators
AS System	SIFDE
Web Mail	Work Plans Unit (UPT)
@ Miescuela.pr	School Comprehensive Plan (SCP)
Online Courses	Occupational Comprehensive Plan (OCP)
Student Information System (SIS)	System verification demographics PPAA
Parent Portal - SIE	How to appeal AYP determination
My Special Portal (IPM)	System for managing purchasing card
Referrals for Therapy System EE	EE Appointment System (CRM)
MICEN	System of School Assessment

¹⁴⁹ NAEP results are designed to provide data on student achievement in various subjects, and are released as The Nation's Report Card. NAEP results serve as a common metric for all states and selected urban districts.

¹⁵⁰ <http://nces.ed.gov/surveys/pisa/>

Analysis of this data is will be possible through PRDE’s work-in-progress data warehouse. This comprehensive tool will support well-founded decisions to guide the development of the curriculum, the integration of technology and professional development adapted to the needs that are identified.



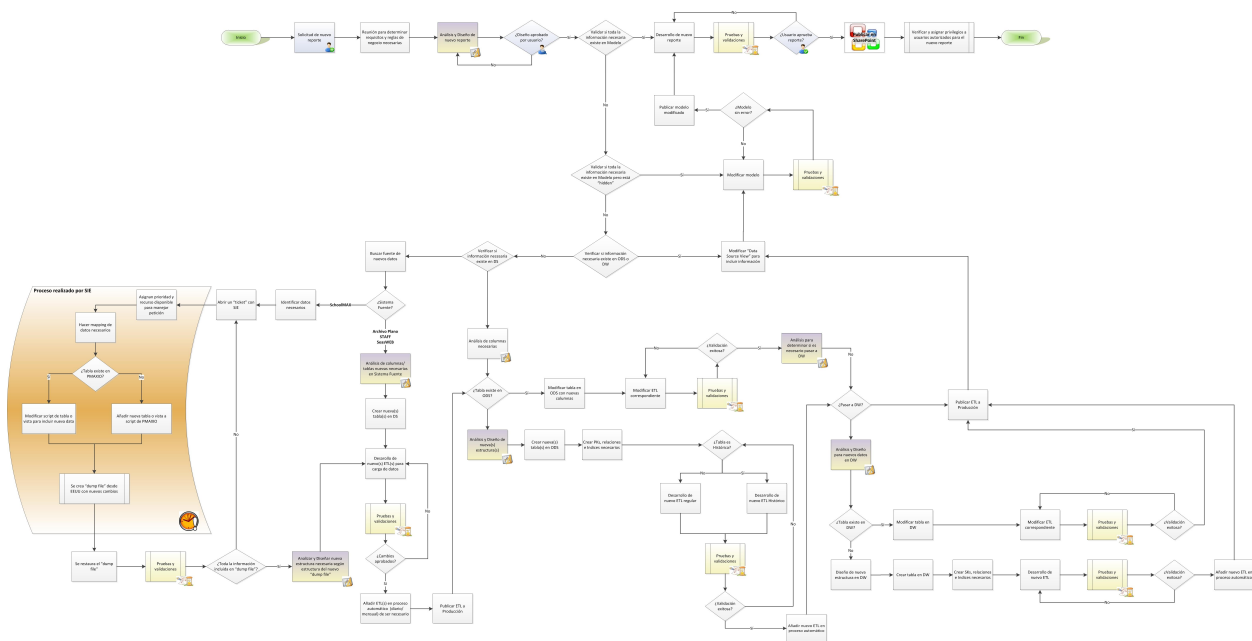
Plan Longitudinal

Broader analysis of PRDE’s Systems Data will be possible through PRDE’s work-in-progress data warehouse, more formally known as the Puerto Rico K-12 Statewide Longitudinal Data System Initiative.¹⁵¹ This critical project spans the design, development and implementation of a K-12 Statewide Longitudinal Data System [SLDS], with the ultimate objective of enhancing education policy and operational decisions with hard data pertaining to student achievement over time. It also aims to establish the necessary organizational, political, procedural, systemic and human resource mechanisms necessary to perpetuate its use by education stakeholders at all levels. It is funded via U.S. Department of Education, Institute of Education Sciences grant.

PRDE’s Assistant Secretary of Planning and Educational Development is responsible for Data Quality and communicating analyzed findings. Extensively documented protocols control development and management of new data elements and reports as represented by this flow diagram for new requirements in the data warehouse.¹⁵²

¹⁵¹ <https://nces.ed.gov/programs/slds/state.asp?stateabbr=PR>. Overall, the project is expected to transgress over a period of approximately 33 months, and cost \$4,737,680.

¹⁵² 20111222_diagrama_de_proceso_para_requerimientos_nuevos_en_data_warehouse.jpg



Additionally PRDE’s Assistant Secretary of Planning and Educational Development develops and maintains the Calendar of Documentation for Reporting Compliance,¹⁵³ a working tool to help PRDE staff in the process of collecting student data through the Sistema de Información Estudiantil [SIE], PRDE’s student information system, which in turn supports PRDE’s required Education Facts reporting to USDOE.¹⁵⁴

PRDE Service Provider Data

PRDE’s current service providers have collected data (via onsite visits, photo documentation, system logs and active element öpingö) and actively maintain a wealth of information about technology access in each of PRDE’s 1500+ schools. This irrefutable data allows for analysis of: what is, how many exist in what configuration and budgeting for what is needed.

Technology offers a great range of tools to facilitate the gathering, analyzing and disseminating of information related to the teaching-learning process, providing a basis to guide well-informed educational decision making.

Even so, agile data collection alone is not sufficient; this must stimulate thinking about pedagogical practices and their impact on student performance, academic achievement, development of re-teaching opportunities, individualized help to address particular student needs and comparison of data obtained from a variety of sources. It is through thinking about the collected data on formative and summative evaluations that creation of study and work groups can be promoted among educators, who will share concerns, experiences, ideas, educational materials and any other resource that will strengthen educational efforts and lead to ongoing improvement in student academic achievement. It is essential that the potential of these technological tools be exploited, so that all instructional personnel will weigh the available

¹⁵³ Calendario_sie_2013_2014.docx

¹⁵⁴ Ed_facts_submission_plan_sy_2012_2013_20130529.xlsx

information from these and act to promote student learning. To achieve this, it is necessary to provide training onsite about how to use the technology in support of decisions that are pedagogical in nature.

Accountability Measures

Demonstrating that technology is having an impact on student achievement is a complex issue. Isolating its effects in an educational system requires sophisticated statistical analyses. Many impact indicators influence student achievement, such as: measures of stakeholder involvement, technology competency, equity, student and teacher roles and characteristics, the climate of learning, technology integration in curriculum activities, teacher collaboration, school-agency collaboration, improved attendance, increased excitement and motivation, engagement in problem solving, improved self-esteem, style of student presentations, increased student acceptance of responsibility for their own learning. Although standardized assessments are also reported as impact indicators, there are researchers (Dede, 1998) who state that they may be inappropriate because they do not measure the full impact of technology (from the Educational Technology Plan for Virginia 2003-2009).

Gradual progress, rather than sudden transformation, is more likely to result in long-term change. Educational technology is not, and never will be, transformative on its own. Each initiative implemented to improve student achievement through the integration of technology in the curriculum provides a step toward the accomplishment of the vision proposed by PRDE for this technology plan:

We seek the full development of the abilities of students through the coordinated use of technology in the various subjects in the curriculum during their years in school. That is, students and teachers are to make technology their own, being able to work independently and in collaboration with others, and being able to decide what technology is required for a task and when it is appropriate to incorporate it.

Desired Plan Monitoring, Evaluation and Revision Model

PRDE has established comprehensive ongoing processes to manage and measure the vast data of nation's 3rd largest school district, including student demographics and achievement, parental involvement, federal reporting, procurement, finance, etc. Ongoing, PRDE will rely on these systems and processes for implementing, evaluating and revising this technology plan. Central to this process is a feedback loop that incorporates communal discussion of causes and effects of outcomes such that timely and meaningful adjustments can be made to this plan.

“Our education system at all levels will leverage the power of technology to measure what matters and use assessment data for continuous improvement.”
National Education Technology Plan 2010

What-to-measure includes process measures that confirm actions are consistent with the plan and outcome measures that confirm actions are making the desired difference. Process measures tend to be leading indicators that confirm plans are proceeding apace (e.g., equipment purchased on schedule, implementation without delays, professional development delivered per calendar). Outcome measures tend to be lagging indicators (e.g., standardized test scores, percentage of

lesson plans that utilize technology). Each element of this plan includes monitoring guides for the activities intended to yield improved student achievement through the integration of technology into instruction. The real assessment of success of the specified goals and the ability to make mid-course corrections will require group discussion (e.g., why did this technique yield better outcomes than that one?) The discussion can take the form of a formal meeting or retreat, or utilize a social media venue.

Evaluation of the progress of this technology plan will be a systematic on-going process, using both formal and informal measures of the effectiveness of the plan. This plan will be reviewed and updated at least annually.

Comprehensive School Plans [CSP]

The Comprehensive School Plans may be the most effective vehicle for disseminating PRDE's technology plan initiatives to the individual student, teacher and parent stakeholders, and thereby realizing the results sought. Each year, the Planning Department will outline the technology goals for the upcoming year as part of the CSP instruction set. Each school will be responsible for incorporating relevant technology plan components into its individual CSP.

Annual Review

Annually, an Evaluation Committee, in collaboration with the CIO, will review the plan's goals and progress toward completion and effectiveness. The review will include an assessment of the progress made versus the benchmarks established in this technology plan, discussion of causes and effects of outcomes and recommendations for changes or adjustments to the plan for the upcoming period based on the results and drivers of the results. To evaluate the goals of this plan, the Evaluation Committee will continue to rely on student assessments, available data from PRDE systems, surveys, observations and anecdotal reports, available recorded data from service provider systems, as well as the Key Indicators recapped below. Each year, the Evaluation Committee will have:

- At least one new member
- Confirmation that all stakeholders are represented
- A start-of-year conference to refresh focus on the goals and objectives of the plan
- As appropriate, remediation will be recommended and initiated for any flagging objectives.

Based on the Evaluation Committee's annual review, this plan will be updated to reflect the current status and any other factors which impact it, including any mid-course implementation adjustments initiated during the year's interim reviews.

The goals and budget of this Technology Plan will be updated annually, establishing an "evergreen," rolling five-year window of guidance. These Technology Plan Revisions will be submitted to Puerto Rico's Education Secretary for re-approval *annually*, creating a rolling three-year window of approval. This active revision process will allow the plan to accurately reflect PRDE's reality. Once updated and internally re-approved each year, the revised plan will be resubmitted to the US Department of Education for re-approval as the required support for

federal funding. This annual resubmission cycle will establish a rolling 3-year E-Rate approval and maintain an evergreen plan.

Once re-approved each year, this plan will be posted on PRDE's website, making readily available as a reference tool for all PRDE stakeholders.

Monitoring of progress of this technology plan will also include ongoing coordination of various programs (e.g., E-Rate funding, National Broadband funding) to make best use of dollars available.

Part of our monitoring process includes keeping good records, both for our own clarity of direction, and for compliance with programs such as E-Rate.¹⁵⁵

As appropriate, Technology Plan Progress will be included in reporting/communication of PRDE results in the State Educational Agency [SEA] report card, school report card and the Consolidated State Performance Report [CSPR].

Key Indicators

More specifically, key indicators from preceding elements include:

- Curriculum
 - PPAA and PPEA scores
 - AYP
 - 12th grade graduation rates
 - Absenteeism rates
 - Content standards
 - 8th grade IT literacy proficiency
 - Analysis of student products
 - Teacher training
- Professional Development
 - Teacher Training on New Technologies
 - Annual online survey of Technology Integration
- Infrastructure
 - Percentage of schools with adequate electrical and power distribution
 - Percentage of schools that are E-Rate Ready
 - Mbps per 1000 students of fast, reliable Internet access
 - Percentage of schools with modern LAN to distribute access to classrooms
 - Ratio of teachers per device, ratio of students per device
 - Deployment of BYOD strategy

¹⁵⁵ E-Rate Program Record Retention Rule: Starting with Funding Year 2004 and in accordance with the FCC's Fifth Report and Order (FCC 04-190, released August 13, 2004), both applicants and service providers are required to retain all records related to the application for, receipt and delivery of discounted services for a period of five years after the last day of services delivered for a particular Funding Year.

- Monitoring
 - Implementation and regular use of the Longitudinal Data System
 - Annual report of Technology Plan progress
 - Annually updated and approved Technology Plan
- Budget
 - Reduction of funding *lost* due to non-compliance
 - Increase in total dollars per student allocated to investment in educational technology and supporting infrastructure
 - Fund this plan
- Community and Parental Involvement
 - Websites for most schools
 - Expansion of Parent and Guardian Resource Centers.

Ongoing Initiatives

- Ensure stakeholders and evaluators are involved with the design and implementation of the evaluation process of this plan
- Include evaluation activities as part of every instructional initiative
- Disseminate evaluation models and results of research
- Include evaluation that is decision-oriented (to improve) as well as objective-based (to what extent were the objectives achieved)
- Envision unintended outcomes when designing evaluation activities
- Utilize ongoing data analysis to guide and revise instructional decisions
- Support efforts to develop shared instruments and sets of common data elements
- Integrate PRDE technology standards for students, teachers and administrators when designing evaluation activities (for example, needs assessments)
- Continuously improve student record handling, as well as data collection, to produce accurate information to manage PRDE operations and support decision-making
- Provide professional development activities and technical and academic support to ensure proper implementation of the PRDE Technology Plan
- Strive for all centrally located application systems to be web-based (capable of being used over the Internet), and integrated and interoperable.

Plan Objectives

During the 5 years of this plan,¹⁵⁶ PRDE will focus on the objectives presented in the following tables with the specific activities, timeframes, monitoring and responsible parties.

Element	Goal/Objective
Monitoring Goals	Create and maintain a technology plan document and process that is seen as, and over the next 5 years, continues to serve as a model for other states.

¹⁵⁶ SLD guidance is that a technology plan should not cover more than three years, since: new technologies and services develop and change rapidly; funding can be reduced or increased; staff changes can lead to modifications of organizational goals. For these and other reasons, technology plans can become out-of-date in a relatively short period of time. While recommending that a technology plan not cover more than three years, SLD also recognizes that in certain situations a technology plan may be in effect for longer than three years.

Element	Goal/Objective
Monitoring Objective	Improve data-driven decision-making, productivity, and effectiveness at all levels of the agency through the use of technology.
Monitoring Objective	At least once per year, include a comparison of tech plan progress to tech plan goals in a report that is available to the general public.
Monitoring Objective	Once per year, update the goals and budget of the Technology Plan to ensure an “evergreen,” living, rolling, five-year document that truly guides and rationalizes decision-making for technology procurement and implementation.

Due to the vast scope of PRDE’s jurisdiction, any document of this sort will inherently lack precise detailed information about individual school populations, infrastructure and needs. One of the monitoring objectives is to actively maintain detailed databases including equipment inventories, connection speeds, reliability statistics, demographic data and similar information. Implementation of these types of databases as well as tools to merge data across the databases is well underway.

Monitoring Goals	Create and maintain a technology plan document and process that is seen as, and over the next 5 years, continues to serve as a model for other states.

<p>Objective 4.1: Improve data-driven decision-making, productivity and effectiveness at all levels of the agency through the use of technology.</p> <p>Benchmarks:</p> <ul style="list-style-type: none"> a. By June 2015, complete Puerto Rico K-12 Statewide Longitudinal Data System Initiative b. By June 2016, complete professional development of Regional Office and District Office staff on use of Longitudinal Data System c. By June 2017, complete professional development of school staff on use of Longitudinal Data System d. By June 2018, 75% of PRDE staff regularly use the Longitudinal Data System to improve data-driven decision-making, productivity and effectiveness e. By June 2019, 99% of PRDE staff regularly use the Longitudinal Data System to improve data-driven decision-making, productivity and effectiveness
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Implementation Plan Activities	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
As final system development is completed, begin development of cloud-based educational components to share power and use of Longitudinal Data System with PRDE staff	July 2014 ó June 2015	Professional Development curriculum materials readied for delivery	Planning Department
Publish schedule of available cloud-based educational components and process for tracking staff completion	Nov 2015	Circular Letter published	Planning Department
Conduct live professional development of Longitudinal Data System educational components with Regional and District Office staff including evaluation of effectiveness of cloud-based tools	June 2016	Report of findings and recommended updates to tools All Regional and District Office staff capable of effective use of Longitudinal Data System	Planning Department Regional Office staff District Office staff
Continuously enhance available data elements and analysis tools of Longitudinal Data System [LDS]	Sep 2016, then annually each Sep	Circular Letter published of updates available	Planning Department Regional Office staff District Office staff
Implement recommended updates to educational components, publishing updated schedule of available cloud-based educational components and process for tracking staff completion	Nov 2016, than annually each Oct	Circular Letter published	Planning Department Regional Office staff District Office staff
Remind, encourage, support school staff to complete educational components and use the Longitudinal Data System [LDS]. Include LDS commitments in Comprehensive School Plans [CSP].	July 2016 ó June 2017	All school staff complete educational components as tracked by LDS	Planning Department Regional Office staff District Office staff School Principals

Implementation Plan Activities	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
Remind, encourage, support school staff to use the Longitudinal Data System [LDS] Include LDS commitments in Comprehensive School Plans [CSP].	July 2017 ó June 2018	75% of PRDE staff regularly use LDS (as tracked by LDS) to improve decision-making, productivity, effectiveness	Planning Department Regional Office staff District Office staff School staff
Remind, encourage, support school staff to use the Longitudinal Data System [LDS] Include LDS commitments in Comprehensive School Plans [CSP].	July 2018 ó June 2019	99% of PRDE staff regularly use LDS (as tracked by LDS) to improve decision-making, productivity, effectiveness	Planning Department Regional Office staff District Office staff School staff

Monitoring Goals	Create and maintain a technology plan document and process that is seen as, and over the next 5 years, continues to serve as a model for other states.

Objective 4.2: At least once per year, include a comparison of tech plan progress to tech plan goals in a report that is available to the general public.
 Benchmarks:
 a. By June 2015, then annually, publish tech plan progress report.
 b. By June 2015, then annually, actively share report of plan progress with parents and community soliciting feedback and suggestions for implementation activities that will continuously enhance success for students and PRDE staff

Implementation Plan Activities	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
Annually, assess progress per goal/objective in this plan and publish report of findings on PRDE website	June 2015, then annually	Report published on PRDE website	Planning Department
Annually, actively share report of plan progress with parents and community soliciting feedback and suggestions for implementation activities that will continuously enhance success for students and PRDE staff	June 2015, then annually	Report published on PRDE website	Planning Department
Incorporate relevant community suggestions into PRDE programs	June 2016, then annually	Report of incorporated suggestions published on PRDE website	Planning Department

Monitoring Goals	Create and maintain a technology plan document and process that is seen as, and over the next 5 years, continues to serve as a model for other states.

Objective 4.3: Once per year, update the goals and budget of the Technology Plan to ensure an “evergreen,” living, rolling, five-year document that truly guides and rationalizes decision-making for technology procurement and implementation.
 Benchmarks:
 a. By June 2015, then annually, updated Technology Plan is re-approved by USDoE.

Implementation Plan Activities	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
Update tech plan goals, objectives and budget using as input: the tech plan progress report, community suggestions, key indicators, data available from PRDE systems, surveys, observations	June 2015, then annually each June	Updated Tech Plan approved by CIO	Evaluation Committee under direction of Planning Department
Gather internal PRDE approvals for re-submission of plan for USDoE approval	Nov 2015, then annually each Nov	Updated Tech Plan approved by PRDE and submitted to USDoE for approval	Planning Department
Approval of plan by USDoE for continued support of E-Rate funding	July 2016, then annually each July	USDoE approval letter	Planning Department
Include Tech Plan initiatives in Comprehensive School Plans [CSP].	Annually, with CSP instructions	Annual publication of CSP instructions	Planning Department

Roles and Responsibilities

In addition to the individual school Teachers and Administrative staff (shown as "School" in preceding tables of objectives), following are descriptions of the various PRDE Offices and their responsibilities.

- The CIO Office:
 - Is responsible for organizing periodic reviews, and maintaining a continuous process for implementation, evaluation and revision of the PRDE Technology Plan and appropriate funding initiatives
 - Is also responsible for maintaining communication with stakeholders to provide information and build awareness of the strengths, and challenges related to educational technology.
 - Review all PRDE plans that involve technology integration to ensure compliance with PRDE Technology Plan.
 - Is in charge of coordinating and aligning the procedures with the technical and programmatic technology offices like OSIATD and UTC, Administration and any other office involved in the implementation of the PRDE Technology Plan.
- Division of Educational Innovation and Technology (ETA)
 - Projects to promote the creation of different learning environments, in tune with the technological demands of the students of our system
- Evaluation Unit:
 - Works on issues related to accountability.
- Human Resources Office:
 - Deals with matters related to the certification of teachers, directors and superintendents of schools and renewal of such certificates.
 - Appoints and evaluates the teaching personnel in charge of offering technical support.
 - Addresses matters related to all incentives affecting the job descriptions of employees.
- Institute for Administrative Training and Support to Schools [Instituto de Capacitación Administrativa y Asesoramiento a Escuelas (ICAAE)]:
 - Works with all aspects of the professional development of superintendents of schools, assistant superintendents, school directors and regional directors for them to strengthen and maximize their administrative and teaching skills to achieve proper operation of the schools in Puerto Rico.
 - Works on the analysis of circular letters,¹⁵⁷ regulations, compliance with the law governing the improvement of the school, and the functioning and strengthening of the school councils.
 - Develops a variety of activities to achieve these goals, such as workshops, orientations, academies, group and individual technical assistance, interviews, telephone consultations and coordination with university-level educational institutions, to strengthen and develop effective professional development programs.

¹⁵⁷ A "circular letter" is PRDE's terminology for internal memo or bulletin.

- National Institute for the Professional Development of Teachers (Instituto Nacional para el Desarrollo Profesional del Maestro [InDePM]):
 - The institute addresses three general areas:
 - 1) Pre-service component (teaching practice and teacher preparation programs)
 - 2) Induction into teaching component
 - 3) Professional development in service component.
 - Promotes the human and professional development of Puerto Rican teachers. Facilitates the development of their intellectual, professional and creative abilities through innovative training experiences that elicit critical thinking and facilitate the teaching-learning process.
 - Addresses matters related to public policy that will guide the professional development of teachers in the system, identify and compile statistical evidence on the current state of professional development of teachers in service, implement innovative initiatives on a variety of aspects of teacher training and identify successful practices in teacher training that have proven effective in Puerto Rico and abroad, and experiment with these in our system.
- Office for Academic Affairs:
 - Disseminates a template letter that contains the required statutory elements for school improvement, the availability of public school choice and the availability of supplemental educational services (if applicable). This letter is distributed to the districts, which distribute the letter to the schools. Schools are responsible for distributing the letter to parents before the start of the school year and in sufficient time for parents to make informed decisions about their options.
- Office of Corporate Partnerships (Oficina de Alianzas Corporativas):
 - Provides for the establishment of partnerships to promote the implementation of innovative strategies in the teaching-learning process.
- Office of Federal Affairs (OAF):
 - Provides technical support regarding the use and access of the funds, compliance with the law requirements, allowable cost for effective integration of technology into learning process and professional development.
- Office of the Assistant Secretary for Academic Services:
 - Develops the curriculum being offered through the academic programs by integrating the technology standards.
 - Does research on the impact of the curriculum on student academic achievement.
 - Provides the educational services that are offered to students with linguistic limitations and offer support in related matters.
- Office of the Assistant Secretary for Special Education:
 - Offer educational services for this student population and support in related matters.
- Office of the Undersecretary for Academic Affairs:
 - Develops and implements the public policy on academic affairs related to best practices and providing equal technological access and resources for all students.
 - Reviews new research-based reports/studies to identify new scientifically based research supporting educational strategies. Based on this review, the achievement information from prior PRDE assessments, the PRDE Standardized Testing (Pruebas Puertorriqueñas de Aprovechamiento Académico [PPAA]) and a review

of current best practices, the Office for Academic Affairs identifies approved academic strategies that schools can use in the upcoming program year. The identified instructional strategies become the focus of professional development provided throughout the PRDE.

- Evaluates the technology literacy of teaching personnel with the collaboration of the Office of the Assistant Secretary for Academic Services and the UTC.
- Develops the curriculum that is offered in the academic programs, integrating the technology standards.
- Does research on the impact of the curriculum on the academic achievement of students.
- Office of the Undersecretary for Administration:
 - Identifies funding to pay for the proposed incentives and refers this information for appropriate action to the Office of Budget and Finance.
- Parent and Guardian Resource Centers [CREMPE] attached to the Office of the Undersecretary for Academic Affairs:
 - Coordinates these tasks with the collaboration of the Evaluation Unit, OSIATD, UTC and USATAD, as described below. PRDE's parent resource centers assist in disseminating information to parents to increase their awareness about school improvement, school choice, parental involvement and other similar issues. Once PRDE's student information system (Sistema de Información Estudiantil [SIE]) is fully operational, letters will be generated through the database system and will continue to be disseminated by the school.
- PRDE IT Unit (Oficina de Sistemas de Información y Apoyo Tecnológico a la Docencia OSIATD], central level):
 - Reviews data from the SIE needed to prepare the "Right to Know" letters.
 - Offers training on management of information systems related to non-teaching personnel.
 - Guarantees the access required for development of the activities proposed and disseminates these through the PRDE website.
 - Offers access to equipment, the Internet and technical support.
 - Processes all incentives related to access to technology.
 - Provides technical support
 - Disseminates information through the PRDE website.
- Project Management Office [PMO]:
 - Improve the monitoring and implementation of PRDE's technology projects encompassed in the technology plan.
- Technology and Curriculum Unit (Unidad de Tecnología y Currículo [UTC]):
 - Provide academic and technical support at the district level
 - Works with issues related to the integration of technology in the curricula and supports its application in the classroom.
 - Coordinates the work of teachers specialized in educational technology who offer technical support in the integration of technology in the curriculum.
 - Fosters, encourages, promotes, motivates, develops training experiences and looks for proper integration of high technology in the curriculum, identifies best practices in this area and disseminates them.

- Offers technical assistance to teachers in matters related to technology for the development of technology literacy in the students.
- Offers technical assistance to teachers in regard to the integration of technology for the development of technology literacy in students.
- Makes certain that there is adequate integration of high technology in the curriculum.
- Develops and implements the National Repository of Learning Objects
- Develops and disseminates educational materials in multimedia.
- Technology Support Centers (Centros de Innovaciones Tecnológicas para la Docencia [CITeD]):
 - Provide academic and technical support at the district level
 - These centers provide support in areas related to the use of technology in the educational process.
 - The CITeD will respond to a new concept of technological community that maximizes technological resources to reinforce the teaching learning process. These centers contribute to the development of an individual who is able to compete in a global economy. The Technology Support Centers will be staffed by a teacher specialized in educational technology who will provide training and support in technology as well as technology integration.
- The Title I Systems Unit for Technical Assistance and Support of Teaching Personnel - USATAD (central level):
 - Provides information to schools on parental involvement activities under Section 1118.
 - Develops the LEA parental involvement policy and provides technical assistance to ensure that schools disseminate the required information.
 - In coordination with the Title I Program Officers, provides training to the Parent Resource Centers on public school choice, supplemental educational services and the Title I academic program.
- CeL (Cursos en Línea / Online Courses)*
 - CeL is an innovative project that offers distance courses in various subject matters to students from 10th to 12th grade.
- CENIT (Centro de Iniciativas Tecnológicas / Technological Initiative Centers, <http://cenitpr.com/>)**
 - These centers contribute to the development of the infrastructure and the academic content areas through professional development activities and the provision of technological resources.
 - Contributes to the academic promotion and the integral development of students by means of effective integration of technological tools in the curriculum.
 - With participant schools, CENIT establishes an on-line community to encourage professional development that is updated constantly on line. It is intended to keep contributing with ongoing, intense professional development in technology integration in the curriculum and in this way to provide support and necessary training that will yield improvement in students' academic achievement.

** Appendix D from 2010-2014 tech plan: Examples of PRDE Technology Integration in Curriculum Implementation Activities, page 75.

- Provides access to state-of-the-art technology resources and access to Internet.
 - Promotes professional development, collaboration, dissemination of best practices and support
- EE (Editorial Electrónica / Electronic Press)*
 - Creates and develops multimedia productions to satisfy the need for reference materials to supplement and enrich the curriculum.
- TEEE (La Televisión como Estrategia Educativa Efectiva / Use of the television as Effective Educational Strategy)*
 - This strategy integrates the use of the television as a resource to enhance the teaching learning process.
- PVAD (Plataforma Virtual de Alfabetización Digital / Digital Literacy Virtual Platform)
 - The primary purpose of this initiative is to develop competencies related to digital literacy in teachers and 8th grade students as required by federal mandate.

ELEMENT 5 – BUDGET

Budget to acquire and support the non-discount elements of the plan

The plan provides for a sufficient budget to acquire and support the non-discount elements of the plan: the hardware, software, professional development, and other services that will be needed to implement the strategy

Although a Budget discussion is no longer required¹⁵⁸ for approval of an E-Rate level technology plan, E-Rate Applicants are expected to be able to document their ability to pay the applicant share of E-Rate eligible services, plus the necessary but ineligible products/services required to make effective use of the E-Rate funding.¹⁵⁹ Further, the order of magnitude of this technology plan warrants reasonable financial planning.

Considerable funding will be needed to meet the ultimate 5-year goals of:

- One-to-one computing devices for about 20% of the half million PRDE students and staff
- Sufficient electricity to power or recharge those devices
- 100 Mbps per 1000 students for 100% of schools
- Sufficient internal connections to adequately distribute bandwidth *wirelessly* and support many devices using it effectively.

Summary of Needs

Anticipated costs for technology requirements described in this plan can be estimated, for discussion purposes, before completing the plan and soliciting bids for products and services. Actual costs could vary considerably, especially for infrastructure projects, depending on details such as the distances between buildings, the nature of the construction materials, local labor market and other factors. We have categorized estimated costs for technology needs discussed in this plan as E-Rate Eligible or as Not Eligible for E-Rate Support as detailed in the following.

¹⁵⁸ As of 2011 with implementation of the FCC 6th Order and Report, Applicants no longer have to include a section on budget, as this information is covered by certification on necessary resources.

¹⁵⁹ Form 470, Item 21 certification (õI have consideredö): I acknowledge that support under this support mechanism is conditional upon the school(s) and/or library(ies) I represent securing access, separately or through this program, to all of the resources, including computers, training, software, internal connections, maintenance, and electrical capacity necessary to use the services purchased effectively. I recognize that some of the aforementioned resources are not eligible for support. I certify that I have considered what financial resources should be available to cover these costs. Form 471, Item 25 (õI... have secured access.ö): I certify that the entity I represent or the entities listed on this application have secured access, separately or through this program, to all of the resources, including computers, training, software, internal connections, maintenance, and electrical capacity, necessary to use the services purchased effectively. I recognize that some of the aforementioned resources are not eligible for support. I certify that the entities I represent or the entities listed on this application have secured access to all of the resources to pay the discounted charges for eligible services from funds to which access has been secured in the current funding year. I certify that the Billed Entity will pay the non-discount portion of the cost of the goods and services to the service provider(s).

Table A. E-Rate Eligible Costs

Based on 2013-2014 E-Rate application amounts, estimates are projected based on:

- Assumed 5% increase in cost each year over prior year for the recurring services of Internet, Telecom and Basic Maintenance of Internal Connections [BMIC]
- Internal Connections for 400 of schools each year beginning in 2015-2016 costing about \$10K per school.

Eligible Costs	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019
Priority 1						
Internet	\$8,948,787	\$9,396,226	\$9,866,038	\$10,359,340	\$10,877,307	\$11,421,172
Telecom	\$3,036,374	\$3,188,192	\$3,347,602	\$3,514,982	\$3,690,731	\$3,875,267
P1 TOTAL	\$11,985,161	\$12,584,419	\$13,213,640	\$13,874,322	\$14,568,038	\$15,296,440
Priority 2						
Internal Connections	\$0	\$0	\$4,000,000	\$4,000,000	\$4,000,000	\$4,000,000
BMIC	\$9,245,337	\$9,707,604	\$10,192,984	\$10,702,633	\$11,237,765	\$11,799,653
P2 TOTAL	\$9,245,337	\$9,707,604	\$14,192,984	\$14,702,633	\$15,237,765	\$15,799,653
TOTAL	\$21,230,498	\$22,292,023	\$27,406,624	\$28,576,955	\$29,805,803	\$31,096,093

Table B. Costs Not Eligible for E-Rate Support

Of all of the costs for technology, some are not eligible for E-Rate funding (e.g., computers, iPads, cellular phone handsets, iPhones, smart boards, training, software, professional development, filtering software/licenses, electrical capacity, technical support for integrating technology into the curriculum, universal threat management devices, telephone handsets, consulting services, maintenance of internal applications etc.). Based on prior year PRDE budget information, about \$14M has been allocated to technology costs not eligible for E-Rate support. Assuming 10% increase in cost each year over prior year for the necessary, but ineligible, technology costs, we project the following.

Ineligible Costs	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019
Form 471, Item 25d	14,500,000	15,950,000	17,545,000	19,299,500	21,229,450	23,352,395

Total Technology Budget

Together, the E-Rate Eligible Costs and Costs Not Eligible for E-Rate Support create a complete technology budget.

Technology Budget	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019
Eligible & Ineligible	\$35,730,498	\$38,242,023	\$44,951,624	\$47,876,455	\$51,035,253	\$54,448,488

Combining data from Tables A and B, and assuming PRDE continues to have 90% E-Rate discount, we can project PRDE's share of technology costs after E-Rate discounts.

Form 471, Item 25	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019
a. Total funding year pre-discount amount	\$22,292,023	\$27,406,624	\$28,576,955	\$29,805,803	\$31,096,093
b. Total funding commitment request amount	\$20,062,820	\$24,665,961	\$25,719,260	\$26,825,222	\$27,986,484
c. Total applicant non-discount share	\$2,229,202	\$2,740,662	\$2,857,696	\$2,980,580	\$3,109,609
d. Total budgeted amount allocated to resources not eligible for E-rate support	\$15,950,000	\$17,545,000	\$19,299,500	\$21,229,450	\$23,352,395
e. Total amount necessary for applicant to pay non-discount share of services requested on application AND secure access to resources necessary to make effective use of discounts	\$18,179,202	\$20,285,662	\$22,157,196	\$24,210,030	\$26,462,004

As a point of comparison, prior year applications had these amounts:

Form 471, Block 6, Item 25	Y12 2009	Y13 2010	Y14 2011	Y15 2012	Y16 2013
a. Total funding year pre-discount amount	\$5,778,177	\$7,715,057	\$15,875,786	\$80,946,757	\$21,230,498
b. Total funding commitment request amount	\$5,200,359	\$6,943,552	\$14,288,208	\$72,852,081	\$19,107,488
c. Total applicant non-discount share	\$577,818	\$771,506	\$1,587,579	\$8,094,676	\$2,123,050
d. Total budgeted amount allocated to resources not eligible for E-rate support	\$1,000,000	\$1,000,000	\$1,000,000	\$14,500,000	\$14,500,000
e. Total amount necessary for applicant to pay non-discount share of services requested on application AND secure access to resources necessary to make effective use of discounts	\$1,577,818	\$1,771,506	\$2,587,579	\$22,594,676	\$16,623,050

Per Pupil Technology Spending

These equate to per pupil spending on technology of:

	Y12 2009	Y13 2010	Y14 2011	Y15 2012	Y16 2013
Total spending on technology	\$6,778,177	\$8,715,057	\$16,875,786	\$95,446,757	\$35,730,498
Students	500,000	500,000	500,000	469,226	466,732
Per pupil technology spending	\$13.56	\$17.43	\$33.75	\$203.41	\$76.55

	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019
Total spending on technology	\$38,242,023	\$44,951,624	\$47,876,455	\$51,035,253	\$54,448,488
Students	459,649	451,338	441,792	428,882	419,112
Per pupil technology spending	\$83.20	\$99.60	\$108.37	\$119.00	\$129.91

Comparative Data

While it is difficult to tease out just the “technology” dollars, interesting comparative data points follow. According to the U.S. Census Bureau,¹⁶⁰ the nation’s schools spent \$10,560 per student in 2011, down from \$10,600 per student in 2010 (dollars not adjusted for inflation). The top spenders were:

1. *New York City School District spent the most per pupil (\$19,770)*
2. *Baltimore City Public Schools in Maryland (\$15,483)*
3. *Montgomery County Public Schools in Maryland (\$15,421)*
4. *Milwaukee Public Schools in Wisconsin (\$14,244)*
5. *Prince George’s County Public Schools in Maryland (\$13,775)*

States spending the least per student in 2011 were Mississippi (\$7,928), Arizona (\$7,666), Oklahoma (\$7,587), Idaho (\$6,824) and Utah (\$6,212). Ranking with the lowest state spenders, Puerto Rico spent \$6,483 in 2010.¹⁶¹

Plan Objectives

Element	Goal/Objective
Budget Goals	Over 5 years, ensure that PRDE’s participation in E-Rate and other funding mechanisms aimed at educational technology reaches 99% of the amount to which it should be entitled based on poverty demographics and other applicable criteria. Ensure that no school suffers from inadequate funding for technology due to funding denials caused by flawed procurement procedures or inadequate proactive investment in necessary but ineligible supports such as electrical capacity, devices for teachers and students, or professional development.
Budget Objective	Reduce to approximately \$0.00 the amount of funding <i>lost</i> due to noncompliance and non-reporting.
Budget Objective	Increase by 200% the total dollars per student allocated to investment in educational technology and supporting infrastructure, without significant adverse consequences to other priorities.
Budget Objective	Through identification of additional funding source, reduction of waste and lost funding and prioritization of technology, fully fund implementation of each element of this plan.

During the 5 years of this plan, PRDE will focus on the objectives presented in the following tables with the specific activities, timeframes, monitoring and responsible parties.

As discussed in the Introduction to this plan, From these details we can calculate that 112,657 students (466,732 - 354,075), about 24%, will “not be served,” with the benefit of 90% E-Rate discount funding; PRDE will have to pay the 100% of cost for E-Rate eligible services for these students. For funding year 2013-2014, PRDE applied for \$8,053,908 of E-Rate funding for Internet access alone, or \$22.75/student (\$8,053,908 / 354,075). Had the other 112,657 students been included in the request for E-Rate funding for Internet access, PRDE would have saved \$2,562,533 (112,657 x \$22.75). Ideally these savings will be exploited going forward, making more funds available for technology that is not eligible for E-Rate funding such as computing devices, electrical power, professional development for staff, etc.

¹⁶⁰ <http://www.census.gov/newsroom/releases/archives/governments/cb13-92.html>

¹⁶¹ <http://flamboyanfoundation.org/wp/wp-content/uploads/2011/06/Puerto-Ricos-Public-Education-Profile.pdf>

Budget Goals	Over 5 years, ensure that PRDE’s participation in E-Rate and other funding mechanisms aimed at educational technology reaches 99% of the amount to which it should be entitled based on poverty demographics and other applicable criteria. Ensure that no school suffers from inadequate funding for technology due to funding denials caused by flawed procurement procedures or inadequate proactive investment in necessary but ineligible supports such as electrical capacity, devices for teachers and students, or professional development.

<p>Objective 5.1: Reduce to approximately \$0.00 the amount of funding lost due to noncompliance and non-reporting.</p> <p>Benchmarks:</p> <ul style="list-style-type: none"> a. By June 2015, reduce to less than \$2M the amount of funding lost (from \$2.5M in 2013-2014) b. By June 2016, reduce to less than \$1.5M the amount of funding lost c. By June 2017, reduce to less than \$1M the amount of funding lost d. By June 2018, reduce to less than \$.5M the amount of funding lost e. By June 2019, reduce to approximately \$0.00 the amount of funding lost

Implementation Plan Activities	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
Focus on executing plan activities to make all schools ðE-Rate Readyö will yield the desired funding improvements. Calculate lost funding based on Form 471 E-Rate application and schools excluded from Block 4 eligible entities list.	April 2015, then annually each April after 471 submission	Report/spreadsheet prepared by E-Rate team and approved by Budget Department	E-Rate Team Budget Department

Budget Goals	Over 5 years, ensure that PRDE’s participation in E-Rate and other funding mechanisms aimed at educational technology reaches 99% of the amount to which it should be entitled based on poverty demographics and other applicable criteria. Ensure that no school suffers from inadequate funding for technology due to funding denials caused by flawed procurement procedures or inadequate proactive investment in necessary but ineligible supports such as electrical capacity, devices for teachers and students, or professional development.

<p>Objective 5.2: Increase by 200% the total dollars per student allocated to investment in educational technology and supporting infrastructure, without significant adverse consequences to other priorities.</p> <p>Benchmarks:</p> <ul style="list-style-type: none"> a. By June 2015, increase by 25% the total dollars per student allocated to investment in educational technology and supporting infrastructure over baseline year b. By June 2016, increase by 50% the total dollars per student allocated to investment in educational technology and supporting infrastructure over baseline year c. By June 2017, increase by 100% the total dollars per student allocated to investment in educational technology and supporting infrastructure over baseline year d. By June 2018, increase by 150% the total dollars per student allocated to investment in educational technology and supporting infrastructure over baseline year e. By June 2019, increase by 200% the total dollars per student allocated to investment in educational technology and supporting infrastructure over baseline year
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Implementation Plan Activities	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
Focus on executing plan activities to deploy more technology to more schools, teachers and students will yield the desired improvements. Calculate increased per student technology allocations based Form 471 Item 25 total technology spending amounts divided by student enrollment.	April 2015, then annually each April after 471 submission	Report/spreadsheet prepared by E-Rate team and approved by Budget Department	E-Rate Team Budget Department

Budget Goals	Over 5 years, ensure that PRDE’s participation in E-Rate and other funding mechanisms aimed at educational technology reaches 99% of the amount to which it should be entitled based on poverty demographics and other applicable criteria. Ensure that no school suffers from inadequate funding for technology due to funding denials caused by flawed procurement procedures or inadequate proactive investment in necessary but ineligible supports such as electrical capacity, devices for teachers and students, or professional development.

<p>Objective 5.3: Through identification of additional funding source, reduction of waste and lost funding and prioritization of technology, fully fund implementation of each element of this plan.</p> <p>Benchmarks:</p> <ul style="list-style-type: none"> a. By June 2015, fully fund each element of Year 1 of this plan b. By June 2016, fully fund each element of Year 2 of this plan c. By June 2017, fully fund each element of Year 3 of this plan d. By June 2018, fully fund each element of Year 4 of this plan e. By June 2019, fully fund each element of Year 5 of this plan

Implementation Plan Activities	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
Identify and apply for grant opportunities	Ongoing	Grant application and awards	Budget Department
Annually, reconcile prior year and upcoming year technology budget within the larger PRDE budget.	Annually, during routine budget planning	Amount for E-Rate Form 471 Item 25d (Total budgeted amount allocated to resources not eligible for E-rate support)	Budget Department

ELEMENT 6 – COMMUNITY AND PARENTAL INVOLVEMENT

Pedagogical research establishes that there is a direct relationship between the participation of parents and academic achievement by their children. Further, involvement of parents strengthens understanding between the school, the family and the community, which fosters partnerships among them. In addition, participation by families in schools encourages respect for all the adults who interact with and have an influence in the lives of students.

Current Community and Parental Involvement Model

Comprehensive School Plans, as discussed in more detail in the Monitoring and Evaluation chapter, allow each school to plan activities that reflect the interests and needs of parents, plan initiatives to engage parents in the school's educational processes and promote strong and effective family-school relationships.

All school districts also have a coordinator that oversees the Committee for Parents, whose role is to provide technical assistance to parents, coordinate workshops, and encourage parental involvement in the school community.

In June 2013 PRDE established a parental involvement public policy (CC 15-2013-2014) based on the PTA National Standards for Parental Involvement, the PRDE parental involvement model, and an action plan for implementation. The standards include support for families in acquiring parenting skills; good communication between the school and the home; volunteer work by parents and guardians; support for home-schooling and homework assignments; participation in decision making by school working committees. Activities are planned throughout the year to build parental capacity for involvement at the district and school levels.

With implementation of this public policy, the Resource Center for Parents and Guardians (Centro de Recursos para Madres, Padres o Encargados [CREMPE]) was developed. The regional and district centers have technological equipment, such as laptops, digital cameras, and printers to facilitate access to information for parents and guardians who request them. The CREMPE is:

- 1) In charge of dissemination of the PRDE public policies: Carta Circular Núm. 15-2013-2014:¹⁶² Política Pública sobre la Participación de las Madres, Padres y Encargados a la escuela (Circular Letter No. 15-2013-2014: Public Policy on Participation by Parents and Guardians in the School), to the educational regions and school districts, and to the schools that request it
- 2) The liaison between the central level and the school districts for dissemination of and training on successful practices in parental involvement in schools
- 3) Distributor to the school districts of the Parent's Right to Know Letters (Highly Qualified Teachers, School Choice, and others)
- 4) Disseminator of successful practices regarding the participation of parents and guardians in the improvement of student achievement using billboards, newspaper ads, the press and/or radio.

¹⁶² <http://intraedu.dde.pr/Cartas%20Circulares/15-2013-2014.pdf>

In summary, the purpose is to keep parents informed about the progress of the students and about the technology to which they have access.

Through the CREMPE, the PRDE informs parents (via meetings, letters, PRDE website, school websites¹⁶³ and parent portal at some schools¹⁶⁴) about how they can benefit from the agency's investment in technology, through access to information that will lead them to reflect on matters that have a bearing on the development of their children's abilities.

In most cases, it is not enough to report that the PRDE has tools that make data available on many matters of interest to parents and the community, but there must be training and technical assistance to develop and strengthen the skills of parents so that they can access the information that is available from their computers at home or work, at school libraries, as well as via smartphones.

Desired Community and Parental Involvement Model

It is imperative to design activities (needs assessments, provide technical assistance and access to technology, develop hands-on technological experiences, etc.) that will lead to increased and improved parental involvement skills.

Technology offers an excellent medium of support that, effectively designed and used, can serve the purpose of strengthening communication with parents and encouraging active participation in the educational process of their children. Issues such as the effective participation of parents in the educational process, the public policy in effect in the schools, the training of teachers, academic achievement, the services provided and adequate yearly progress of the school may be disseminated easily through the available technological media.

Opportunities to use technology effectively to increase parental and community involvement and improve communication with parents and community members include:

- Further development of school websites, so that most schools have a site, and most teachers have a page and a blog
- Further development of student information system parent portals
- Campaign to get more parents to access the PRDE website
- Use of email to inform parents
- After-hours access to technology resources for students, parents and community members
- Partnering with public and private entities to promote involvement, get expertise, support and resources through the Educational Partnerships Office, a program where people from community (e.g., parents) are contracted by PRDE to help with local projects
- Publication of PRDE Newsletter on web site, Facebook and Twitter
- Expansion of the Parent and Guardian Resource Centers, beyond the currently available sites (21 school sites and 7 regional sites)
- Engage CREMPE in rollout of PRDE's BYOD strategy.

¹⁶³ About 50% of schools have their own websites and most have a page for each teacher with the teacher's blog.

¹⁶⁴ Each school decides if parent portal can be opened, depending on its available technology and support staff.

PRDE's community involvement objectives reflect the National Education Technology Plan:

Every parent of a student under 18 and every student 18 or over should have the right to access the student's own assessment data in the form of an electronic learning record that the student can take with them throughout his or her educational career.

Plan Objectives

In support of the PRDE's curricular goals, we have established the following objectives and strategies for involving parents and community.

Element	Goal/Objective
Community and Parental Involvement Goals	Improve communications and promote leadership among administrators, parents and community members to strengthen cooperation, involvement and support of academic achievement
Community and Parental Involvement Objective	Further develop school websites, so that most schools have a site, most teachers have a page and a blog, and most schools have an open parent portal.
Community and Parental Involvement Objective	Double the reach and accessibility of Parent and Guardian Resource Centers.

Community and Parental Involvement Goals	Improve communications and promote leadership among administrators, parents and community members to strengthen cooperation, involvement and support of academic achievement
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<p>Objective 6.1: Further develop school websites, so that most schools have a site, most teachers have a page and a blog, and most schools have an open parent portal.</p> <p>Benchmarks:</p> <ul style="list-style-type: none"> a. By June 2015, increase number of schools with web sites (that include pages for most teachers and their blogs, and open parent portal) to 60% (increased from 50%) b. By June 2016, increase number of schools with web sites to 70% c. By June 2017, increase number of schools with web sites to 80% d. By June 2018, increase number of schools with web sites to 85% e. By June 2019, increase number of schools with web sites to 90%

Implementation Plan Activities	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
Develop a website template (that will aid school without sites to develop their own) by evaluating existing sites and compiling list of common content, most frequently accessed areas, often engaged developers/webmasters, and other best practices. Update template annually.	January 2016, then annually thereafter	Annual publication of current website template	Student Services Department
Urge schools to include development/maintenance of school website in their Comprehensive School Plans [CSP], perhaps giving honorary award for best new site each year	Annually, with CSP instructions	Annual publication of CSP instructions	Planning Department
Continue ongoing campaign to urge parents to access PRDE website via meetings with presentations (e.g., PowerPoint with examples) of what info is available to parents. Meetings with presentations offered to superintendents of districts, then to individual schools, then to parents	At least once per semester, ongoing	Agenda item on new semester meetings	CREMPE
Capture parent email addresses at every opportunity (annual enrollment, parent-teacher meetings, open houses, welcome back events, on websites, in newsletters), always providing manual and digital email registration opportunities	Every parent interaction opportunity	Growing percentage of complete parent email addresses in SIE	All PRDE staff

Community and Parental Involvement Goals	Improve communications and promote leadership among administrators, parents and community members to strengthen cooperation, involvement and support of academic achievement

<p>Objective 6.2: Double the reach and accessibility of Parent and Guardian Resource Centers.</p> <p>Benchmarks:</p> <ul style="list-style-type: none"> a. By June 2015, increase number of Parent and Guardian Resource Centers from 28 to 30. b. By June 2016, increase number of Parent and Guardian Resource Centers to 35. c. By June 2017, increase number of Parent and Guardian Resource Centers to 42. d. By June 2018, increase number of Parent and Guardian Resource Centers to 49. e. By June 2019, increase number of Parent and Guardian Resource Centers to 56.

Implementation Plan Activities	Frequency/Timeframe	Monitoring/Evaluation	Responsible Party
Develop a CREMPE model for replication (that will aid new site openings) by evaluating existing sites and compiling list of common activities, most well attended offerings, creative funding strategies, and other best practices. Update model annually.	January 2016, then annually thereafter	Annual publication of current model	Student Services Department
Continue partnering efforts with public and private entities to promote involvement, get expertise, support and resources through the Educational Partnerships Office	Ongoing	Growing list of cooperating organizations	Student Services Department
Urge schools to incorporate activities with Resource Centers and Educational Partnerships Office in their Comprehensive School Plans [CSP], or become a CREMPE site	Annually, with CSP instructions	Annual publication of CSP instructions	Planning Department
Actively engage CREMPE in the BYOD implementation	Ongoing	CREMPE staff knowledgeable about BYOD	PRDE IT

APPENDICES

Several referenced appendices follow.

Appendix – CIPA REQUIREMENTS¹⁶⁵

The Child Internet Protection Act [CIPA] addresses concerns about access to offensive Internet content. E-Rate funded schools/libraries must comply with the following CIPA requirements, and provide periodic certification of compliance.

1. Technology Protection Measure

A technology protection measure is a specific technology that blocks or filters Internet access. It must protect against access by adults and minors to visual depictions that are obscene, child pornography, or with respect to use of computers with Internet access by minors harmful to minors. It may be disabled for adults engaged in bona fide research or other lawful purposes. For schools, the policy must also include monitoring the online activities of minors.

2. Internet Safety Policy

The Internet safety policy must address the following issues:

- Access by minors to inappropriate matter on the Internet and World Wide Web
- The safety and security of minors when using electronic mail, chat rooms, and other forms of direct electronic communications
- Unauthorized access including "hacking" and other unlawful activities by minors online
- Unauthorized disclosure, use, and dissemination of personal information regarding minors
- Measures designed to restrict minors' access to materials harmful to minors
- Education of minors about appropriate online behavior, including interacting with other individuals on social networking sites and in chat rooms, and cyberbullying awareness and response (July 1, 2012 was the deadline to incorporate this new aspect).
- For schools, the policy must also include monitoring the online activities of minors.

3. Public Notice and Hearing

The authority with responsibility for administration of the school or library must provide reasonable public notice and hold at least one public hearing to address a proposed technology protection measure and Internet safety policy.

In addition to compliance and certification of compliance with CIPA, E-Rate recipients must retain the following documentation for at least five years after the last date of service for which funding was received. These should be readily available for E-Rate program review:

- Internet Safety Policy (including all points noted above)
- Documentation demonstrating that the technology protection measure or filter is in place for all funding service dates (e.g., quarterly logs from the appliance showing blocking of inappropriate sites)
- Documentation of public notice (e.g., newspaper ad, flyer, announcement) and documentation of hearing or public meeting (e.g., board meeting minutes).

¹⁶⁵ From the SLD website, <http://www.usac.org/sl/applicants/step06/cipa.aspx>

Appendix – Professional Development Incentives

This Appendix describes how PRDE will provide incentives to motivate teachers:

- To learn to use technology and integrate it into the curriculum.
- Who are technologically literate and teaching in rural or urban areas to remain in those areas.

Incentive	Impact	Offices
Release time to acquire new computer skills and for implementation.	Class time Human resources New policies	Undersecretary AA Human Resources
Flexible schedules for mentoring, tutoring and follow-up activities.	Class time Human resources New policies	Undersecretary AA Human Resources
Remuneration for professional development on weekends and during summer.	Budget New policies	Finance
Recognition.	Budget	Finance
Activities.	Budget	Finance
Certificates.	Budget	Finance
Encourage personnel to share their experiences through		Undersecretary AA
Writing magazine articles		Undersecretary AA
Sharing at conferences		Undersecretary AA
Leading workshops		Undersecretary AA
Peer coaching	Human resources	Undersecretary AA
Participation on planning committees	Class time	Undersecretary AA
Other		Undersecretary AA
Financial support for personnel to attend professional development activities.	Budget New policies Class time	Finance Undersecretary AA
Give progressive additional access to hardware and software.	Hardware and software New policies	OSIATD
Instituting computer purchase assistance programs.	Budget	Finance
Instituting summer and weekend computer (Internet) loan programs.	Equipment and Internet New policies	OSIATD
Encourage visiting each other's classrooms to observe technology integration.	Class time Human resources New policies	Undersecretary AA Human Resources
Mini-grants to reward teachers who develop innovative uses for classroom technology (recognize authorship in the educational community).	Budget New policies	Finance
Earn credits for Carrera Magisterial (Merit System for Educators).	New policies	Merit System for Educators (Carrera Magisterial)
Free Internet account for personal use.	Internet New policies	OSIATD
Personal use of PRDE computer.	New policies	OSIATD
Additional points on the recruiting ranking order		Human Resources
Bonuses.	Budget	Finance

Appendix – Invitation To Tech Plan Committee

ACTUALIZATION Technology Plan

The Department of Education, through the Office of Information and Support System Tecnológico to Teaching (OSIATD) is in the process of updating the Plan Technology. The Technology Plan is the guide to set priorities compliance with Department strategies, technologies that support those strategies to support teaching in the teaching and learning process, trends in the field of education and best practices. Furthermore, it is requisite for the Department receives funding for technology services, such as internet, telefonla, wireless access, among others, the E-Rate program. Plan for the upgrade, we request your participation in the review of CHAPTER for your work area. You can access the Plan on the following link: <https://www.dropbox.com/sh/mlxa0dog8eqmdzb/e2pny-xfz>

The Wynndalco COMPANY Trade will be providing support for this update of the Plan, appreciate the info you can provide them.

Thanks for your support

APPENDIX – TECH PLAN SURVEY

In September 2013, all PRDE staff were invited to participate in an online survey (Technology Integration into Curriculum, presented in both English and Spanish) regarding the current and anticipated use of technology in the curriculum, as well as personal technology literacy skills (<https://www.surveymonkey.com/s/JKGYX9T>). The survey was left open through November 30, 2013. Thirty-one questions were included; more than 100 respondents skipped 12 questions; most respondents skipped the final “any additional comments” question. PRDE staff responded to student specific questions on behalf of their students.

1394 responses were received (through 11/15/2013). While this is a small response rate (maybe 1-3%, depending how many staff actually received an invitation to participate), enough data was gathered and enough consistency in responses was seen to declare some themes.

Following are high-level findings from this survey.¹⁶⁶

Q	Result
Q1	Most of the respondents were Teachers (51)%
Q2	Most of respondents have been in current or similar position for over 10 years (61%)
Q3	Most of respondents plan to be in current or similar position for over 10 years (46%)
Q4	Respondents work most often with lower grades, especially grades 4-6
Q5	Use of various computing devices is: <ul style="list-style-type: none"> • Greatest for staff using desktops or laptops (58% daily) and handheld devices (e.g., iPod Touch, Kindle, smart phone) (42% daily) • Greatest for students using handheld devices (e.g., iPod Touch, Kindle, smart phone) (30% daily) • Greatest interest was expressed in learning to use Chromebooks for staff (27%) and students (24%)
Q6	Use of various other technology is: <ul style="list-style-type: none"> • Greatest for staff using projector (24% daily) • Greatest for students using projector (13% daily) • Greatest interest was expressed in learning to use document cameras, simulations, robots for staff (15%, 18%, 18%, respectively) and students (12%, 14%, 14%, respectively)
Q7	Use of productivity software is: <ul style="list-style-type: none"> • Greatest for staff using Word (69% daily/weekly) and presentations (62% daily/weekly) • Greatest for students using Word (35% daily/weekly) and presentations (33% daily/weekly) • Greatest interest was expressed in learning to use photo editing for staff (16%) and students (12%)
Q8	Staff use of productivity software to support administration is: <ul style="list-style-type: none"> • Greatest for Student Information System (81% daily/weekly) and Time and Attendance (74% daily/weekly) • Least for financial system (50% never), analytical system to assess student achievement (47% never), procurement system (46% never), Special Ed system (43% never) • Greatest interest was expressed in learning to use analytical system to assess student achievement (19%)

¹⁶⁶ For complete survey results, see responses_20131115.pdf

Q	Result
Q9	Use of OFFLINE instructional resources is: <ul style="list-style-type: none"> • Greatest for staff using math (25% daily/weekly), but with 45% never • Greatest for student using computer games (25% daily/weekly), but with 40% never • Greatest interest was expressed in learning to use analytical system to assess student achievement (19%) for staff, and language curriculum (14%) for students
Q10	Use of ONLINE instructional resources is: <ul style="list-style-type: none"> • Greatest for staff using Youtube (45% daily/weekly) • Greatest for students using Youtube (43% daily/weekly) • Greatest interest was expressed in learning to use courses online for staff (19%) and students (15%)
Q11	Use of Internet technologies is: <ul style="list-style-type: none"> • Greatest for staff using research to support lesson plans, etc. (80% daily/weekly) and email (67% daily/weekly) • Greatest for students using research to support projects, etc. (56% daily/weekly) and social networking (48% daily/weekly) • Greatest interest was expressed in learning to use online meetings/networking for staff (16%) and students (13%)
Q12	Portfolios of work are stored using: <ul style="list-style-type: none"> • By staff using hard drive (67% daily/weekly) and thumb drive (55% daily/weekly) • By students using hard drive (31% daily/weekly) thumb drive (24% daily/weekly)
Q13	In general, technologies are integrated into the normal school day (63%) or available as outside of school workshops (14%); 23% indicated not available at all
Q14	Staff computing tools available at home (e.g., iPhone, laptop, iPad, DSL Internet, 3 Mbps Internet, printer, fax, scanner, digital camera, wireless network, wired network, email, Microsoft Office suite, online banking) include:
Q15	Student computing tools available at home (e.g., iPhone, laptop, iPad, DSL Internet, 3 Mbps Internet, printer, fax, scanner, digital camera, wireless network, wired network, email, Microsoft Office suite, online banking) include:
Q16	In general, technologies are available for STAFF in the library or computer lab (70%), in the classroom (46%); 15% indicated no tech available
Q17	In general, technologies are available for STUDENTS in the library or computer lab (69%), in the classroom (37%); 19% indicated no tech available
Q18	In general, technology implementations are initiated for STAFF at the School level (31%), the Department level (28%) and by the Teachers (24%)
Q19	In general, technology implementations are initiated for STUDENTS at the School level (38%), by the Teachers (36%) and at the Department level (20%)
Q20	In general, STAFF share a technology device for a specific activity with 10 or more (35%); only about 27% share with only 1 or 2 others.
Q21	In general, STUDENTS share a technology device for a specific activity with 10 or more (48%); only about 27% share with only 1 or 2 others.
Q22	Overwhelmingly (75 ó 80%), staff and students have better computers and faster Internet at home than at school
Q23	Most classrooms have no Internet connections (39%) or have connections that are too slow for most teaching/learning activities (40%)

Q	Result
Q24	Digital grade books are generally not in use (86%) VoIP phones in generally not in use (94%) Air-conditioning is available in rooms where networking equipment is housed (56%) Phones are not available in classrooms (90%); and needed (62%) Students are not allowed to bring technology devices from home (84%)
Q25	The biggest obstacle to integrating technology into the classroom is lack of sufficient devices (85%) and lack of power for devices (41%)
Q26	The preferred format for technology professional development is 1 on 1 (59%) or peer training (41%); few want to ñfigure it out on my ownö (12%)
Q27	Technical support is needed in the classroom often (42%), due to problems (e.g., with our network, Internet connection, electricity) and never (30%) because no technology is in the classroom
Q28	When tech support is needed, Central tech support is called (51%) or another person at school is called (45%)
Q29	When requested, technical support is received too late to matter (41%) or eventually (34%)
Q30	The top 3 priorities to facilitate technology integration into curriculum are:
Q31	Additional (confidential and anonymous) thoughts shared regarding the integration of technology within the curriculum include:

APPENDIX – TECH PD needs SURVEY

From technology_needs_assessment_results.xlsx, 3386 responses were received to these questions:

- What technology productivity PD do you need?
- What technology technical PD do you need?
- What technology educational PD do you need?

APPENDIX – E-RATE READINESS CERTIFICATION

This example certification is from PIA response for funding year 2009, Application # 651373.

Entity No.	Entity Name	Eligibility Source Document (Copies included with Response)	
16048619	SU MARTIN HERNANDEZ	6/11/2008 School Survey	
		Question	Response
		Does the School have computers	Si
		Do the Computers have Internet connections	Si
		Have the teachers received technology integration training	Si
		Does the school have teachers integrating technology in the classroom	Si
		Indicate the applications used in the School	Internet, Power Point, Office programs, various programs - English and Math
		Is the electricity in the classrooms with computers stable	Si
		Is the classroom where the computers are secure	Si
		Is there air conditioning in the classrooms with computers	Si
PRDE COMMENTS: Prior to the start of the Funding Year 2009, teachers in this school had received training on the use of technology in the classroom and were integrating technology into the curriculum. In addition, the computers were secure in air-conditioned classrooms, and the electricity in the classrooms was stable. We believe this survey establishes the readiness of the school for all of E-Rate FY2009.			



GOBIERNO DE PUERTO RICO
DEPARTAMENTO DE EDUCACIÓN

SECRETARIA AUXILIAR DE SERVICIOS ACADÉMICOS
Y SERVICIOS EDUCATIVOS A LA COMUNIDAD

CERTIFICACIÓN

Certifico que los maestros mencionados e identificados por la materia que ofrecen en la lista adjunto, de la escuela Superior Vocacional Antonio Reyes Padilla, está integrando el uso de la tecnología en la sala de clase.

Dado hoy 9 de noviembre de 2011, en Utua do, Puerto Rico.


 Firma
 Director de Escuela


 SELLO ESCOLAR

El sello no esta disponible

P.O. BOX 190759, SAN JUAN, PUERTO RICO 00919-0759 * TEL.: (787) 773-3533, 3531, 3522

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Certification Translation
I certify that the above teachers and identified through the material offered in the attached Schedule, the Vocational High School Antonio Reyes Padilla, is integrating the use of technology in the classroom just do.

Per USAC PIA correspondence:
 The following eligible schools qualify for only one month of service for FY2009 due to their June 2010 School Survey Certification (emphasis added). Funding for these schools on your FY2009 amount will be reduced on a pro-rata basis to reflect one month of service. *Do you agree for USAC to reduce your totals by 1 month of service for each school noted above?*

Ultimately PRDE received a Further Explanation of Administrator's Funding Decision and the school received funding for 1 month of service.

Appendix – Glossary and Acronyms

Acronym	Meaning
CCSS	Common Core State Standards
CITeD	Technological Innovation Centers Centros de Innovaciones Tecnológicas para la Docencia
CREMPE	Parent and Guardian Resource Centers Centros de Recursos para madres, padres y encargados
ICAAE	Institute for Administrative Training and Support to Schools Instituto de Capacitación Administrativa y Asesoramiento a Escuelas
INDEPM	Teachers Professional Development Institute Instituto Nacional para el Desarrollo Profesional del Maestro
LAS	Language Assessment Scale Escala de Avalúo del Lenguaje
NGSS	Next Generation Science Standards
OFA	Office of Federal Affairs of the Department of Education was created to raise awareness and guide the school community organizations or non-profit, and government entities on federal programs in support of education or whose order is complementary to the education of our children.
OMEP	The Office for the Improvement of Public Schools of Puerto Rico (OMEP), attached to the Department of Education, is established in 1990 by joint resolución number 3 of August 28, 1990 to implement an accelerated program function repair and beautification school facilities and the purchase of books, desks, teaching materials and equipment to support the teaching and learning process.
OSIATD	PRDE IT Unit Oficina de Sistemas de Información y Apoyo Tecnológico a la Docencia
PARCC	Partnership for Assessment of Readiness for College and Careers
PEI	Individualized Educational Plan Plan Educativo Individualizado
PIDE	PRDE Information Portal Portal de Información del DEPR
PPAA	PRDE Standardized Testing Pruebas Puertorriqueñas de Aprovechamiento Académico
PPEA	PRDE Alternate Standardized Testing Pruebas Puertorriqueñas de Evaluación Alterna
SBA	Smarter Balanced Assessments
SEAS	Special Education System Sistema de Educación Especial
SIFDE	PRDE Financial System Sistema de Información Financiera del Departamento de Educación
STAFF	PRDE Human Resource system Sistema de Recursos Humanos del DEPR
TAL	Time, Attendance & Leave system Sistema de Tiempo, Asistencia y Licencias
UTC	Technology and Curriculum Unit Unidad de Tecnología y Currículo
USATAD	The Title I Systems Unit for Technical Assistance and Support of Teaching Personnel Unidad de Sistemas de Título I para Asistencia Técnica y Apoyo a la Docencia