New Visions for Public Schools

Personalization at Scale: Technology Integration to Drive Common Core Writing

Table of Contents

Personalization at Scale: Technology Integration to Drive Common Core Writing

New Visions for Public Schools (New Visions), partnering with the New York City Department of Education (NYC DOE), proposes a four-year i3 development grant that will leverage technology to support writing instruction aligned with the Common Core State Standards (CCSS) (*Absolute Priority #3).* We will support high school teachers in high-poverty urban classrooms in establishing a low cost "technology infrastructure" and adopting digital tools to improve their workflow in distributing, collecting and grading assignments. We hypothesize that these course management and rubric-aligned grading tools will facilitate teacher feedback on student work and support the writing and revision process necessary to improving literacy skills.

A. SIGNIFICANCE

Addressing Absolute Priority #3. The CCSS call for greater emphasis on literacy across disciplines, with writing positioned as a critical activity, both in terms of developing students' communication skills and as a means to engage with content knowledge.[1] The focus on writing stems from dismal national statistics on the state of education, with the U.S. claiming one of the lowest literacy rates among industrialized nation– and strongest correlation with socioeconomic status.[2] In NYC, fewer than one-third of public school students (29%) exit 8th grade proficient in English language arts.[3] Teachers in high-poverty high schools, then, experience the brunt of this challenge, as they prepare students for advanced work required in college and careers.

New Visions works with a network of 77 public high schools in NYC, and we see students struggle to demonstrate content knowledge through writing, notably on state exams. For

[1] NGACBP & CCSSO, 2010; Wagner, 2008.

[2] OECD, 2013.

[3] NYC DOE, 2014. Reflects scores on NY State's Common Core 8th Grade ELA Exam.

example, students consistently struggle with Global History (GH), a NY State-required subject heavy in content, primary-source texts and writing. GH is the state's most failed exam and a major barrier to graduation for many students.[4] In June 2014, only 61 percent of first-time test takers in our network passed the GH exam, earning 58 percent of available points on multiple-choice questions but only 39 percent on long-form essays.[5] The first-time exam pass rates for ELL students (37 percent) and students with IEPs (41 percent) were significantly lower. A GH teacher's task is difficult in the best of circumstances: they must cover centuries-worth of events, issues and historical figures, and ensure that students gain both content mastery and skill development, while tailoring instruction to diverse student needs.

In this and other disciplines, teaching writing is perhaps the most critical task, and the most difficult. Frequent writing assignments inherently offer opportunity to give students feedback on knowledge and skill growth. However, a challenge persists for even the most experienced teacher– how to provide actionable, timely and individualized feedback on 150 student papers in the typical teaching load. In our *Personalization at Scale* project, we propose using technology to accomplish this critical instructional objective. Technology alone cannot *personalize* feedback, but it can help make delivering such feedback practical *at scale* for teachers. Technology has transformative potential to manage writing tasks and improve feedback loops by rendering teachers' workflow more efficient. New Visions has developed digital tools, the focus of this proposal, that make increasing the number of quality writing tasks a viable option for teachers. These tools have gone viral in suburban environments but are only nominally used in urban schools. We have not yet had the resources to delve deeper and entwine these tools

[4] Wall, 2013; Decker, 2014.

[5] New Visions for Public Schools, 2014. 9,868 first-time test takers in our network in June '14.

with curricula or cultivate the infrastructure necessary for classroom adoption in urban settings.

New Visions will address this disparity as part of **Absolute Priority #3**, leveraging technology to support instructional practice. The i3 Development grant will allow us to systematically test a theory that a technology-enhanced teacher workflow can improve the amount and quality of student writing, and that this transition, with the right supports, can be easily made even in high poverty urban schools. In partnership with the NYC DOE, New Visions has developed protocols and training for schools in digital device procurement and management as well as integration in instruction, addressing practical and pedagogical challenges associated with tech adoption. With teacher input, we have innovated on the widely used Google Apps for Education (GAFE) platform to develop a suite of popular teacher tools, called Add-ons, that facilitate course management in any discipline. Yet while all 77 schools supported by New Visions are set up with GAFE domain accounts, use varies in terms of administrator-, teacher- and student-level adoption. Approximately 15% of our schools have elected to create student-level accounts, which indicates slow growth for classroom use. In this proposal, we detail plans to formally pilot a flexible "technology infrastructure" in classrooms using our CCSS-aligned Global History (GH) and English language arts (ELA) curricula, moving beyond tech enthusiasts to target all teachers in writing. GH and ELA teachers will use free, cloud-based tools to enhance their ability to create and distribute assignment templates according to student need; increase student writing production; and offer actionable feedback to inform cycles of writing composition and revision. Their classrooms will serve as technology bright spots in under-resourced schools to demonstrate the possibilities of tech-enhanced teaching.

Innovation of Existing Strategies. This project innovates on existing strategies both for instruction and technology integration in the classroom. As an educational system, we know what works in terms of effective writing instruction. The *Writing Next* report, released in 2007 by the Carnegie Corporation of NY, includes a meta-analysis of experimental and quasi-experimental research examining writing instruction with adolescents and isolates those techniques with the greatest impact on students' writing, for both proficient and low-achieving writers.[6] With practice in planning, revising and editing written work, student writers advance from what Bereiter and Scardamalia (1987) call "knowledge-telling" to "knowledge-transformation," which involves reasoning, problem solving and creative thinking.[7] However, in the day-to-day reality of urban high schools, where instruction remains largely paper-based, implementation of such tasks is often unmanageable. For instance, NYC teachers feel pressure to maintain an ambitious pacing schedule to get through content required for state exams. Even when assigned, writing tasks are usually one-time occurrences rarely revisited by students, even when teachers can take the time to offer meaningful feedback. Due to the time-consuming elements of transporting stacks of paper, writing comments by hand and recording grades, teachers may undercut feedback due to delay. Simply keeping track of a piece of paper– from students, to peers, to the teacher and back– can impede the frequency and quality of collaborative projects or long-form essays, which are essential to the mastery of CCSS.

Despite the potential of technology-enhanced classrooms to facilitate CCSS instructional shifts, most technology initiatives fail to take root and demonstrate impact in high-poverty

[6] Graham & Perin, 2007. The most impactful activities include: writing strategies, collaborative writing, summarization, and writing for content learning. Note that transitioning students to using word processing programs has a demonstrable impact on writing quality (effect size 0.55), with greater benefits for low-achieving writers (0.70).

[7] Bereiter & Scardamalia, 1987.

schools.[8] The vast "digital divide" between suburban and urban classrooms is magnified by tech infrastructure concerns that must be addressed before all else. Research confirms that classroom tools cannot be introduced without thoughtful integration of content and pedagogy.[9] Even if teachers have access to laptop carts for students, no meaningful instruction will occur if the cart cannot be found come class-time; if cords are missing or batteries are dead; or if it takes 10 minutes to boot up and some applications fail. Thus, a key piece of this project will involve a technology coordinator training school staff and faculty in equipment management.

National Significance & Advancement of the Field. New Visions' *Personalization at Scale* program is an attempt to expand upon Koehler and Mishra's notion of technological pedagogical content knowledge, or tech PCK.[10] Content (*what* is taught), pedagogy (*how* it is taught) and technology (a translation vehicle for the *what* and *how*) are inextricably linked, and one cannot be successfully improved without consideration of the others. Whereas technology could refer to a chalkboard or flashcards, digital technology, as described here, evolves rapidly and requires that ed tech initiatives focus on developing skills related to technology adoption rather than tool-specific adoption. Our program narrows in on technological pedagogical knowledge (tech PK), holding content constant through use of our shared GH and ELA curricula. In a parallel process to students' writing development, as teachers deepen their skillsets, they will advance from using technology to deliver instruction to transforming it.[11]

---

[8] Darling-Hammond, Zielezinski & Goldman, 2004.

[9] Kim & Bagaka, 2005; Koehler & Mishra, 2009; Darling-Hammond et al., 2004.

[10] Koehler & Mishra, 2009.

[11] Following the popular SAMR model for tech adoption (Puentedura, n.d.), this means moving from *Substitution* and *Augmentation* to *Modification* and *Redefinition*.

The proposed project has national implications in its effort to address both technological pedagogical knowledge and logistical barriers that teachers in urban schools confront. Encouragingly, low-cost, cloud-based platforms such as GAFE and cloud-managed hardware such as Chromebooks can support tech integration even in schools with limited capacity.[12] In 2015, the NYC DOE, with New Visions' active support, made Google Apps available to *all* district schools under official sanction, and will soon introduce a "single user login," which will allow educators to log into legacy data systems as well as the GAFE domain using the same login (their schools.nyc.gov accounts). GAFE will create a collaboration infrastructure for teachers, with connected email, file storage, data tools, and more, rather than adding yet another portal or software to master. The platform is browser- and device- agnostic, and permits schools to opt for inexpensive web-enabled devices that are simple to maintain, like Chromebooks, since it requires no local software downloads. New Visions has begun to address the infrastructure questions that typically hinder adoption, such as batch processing of large datasets by administrators. For example, our *rosterSync* tool pre-populates a GAFE tool with student rosters from DOE systems, rather than requiring separate data entry and upkeep as students come and go,[13] and our *chromebookInventory* app substantially streamlines the device inventory process, recently used by Denver Public Schools to introduce 12,000 Chromebooks.[14]

The GAFE platform includes popular Google productivity applications such as Docs, Sheets, Slides, and Gmail, set up on school-level domains. One major benefit of GAFE is that apps can be personalized through Add-Ons that extend functionality with custom user-interfaces

---

[12] Kosner, 2014.

[13] Google highlighted rosterSync in a press release for Google Classroom: http://bit.ly/1I5fOKB

[14] Obee, personal communication, December 2, 2014.

and task automation. In a simple example, if a GAFE user creates a spreadsheet of "to do" tasks listed by date, she could use an Add-On to automatically email her team reminders the day before a task is due. The GAFE platform promotes collaboration through shared, simultaneous access (e.g., many users can write in a Doc at once), with advantages for teachers in sharing tasks, rubrics and student work and gaining insight into students' writing process via continuous access. New Visions' CloudLab team has created a suite of free Add-Ons that are achieving viral spread, used by thousands of educators to manage workflow and feedback on writing tasks.[15] Figure 1 describes the specific New Visions (and Google) tools used in this pilot.

Figure 1. List and Description of Personalization at Scale Digital Tools

Tool	Description
New Visions' Doctopus	***Function: Course Management.*** New Visions' *Doctopus* Add-On, a course management tool, lets teachers easily establish folder structures in Google Drive (Google's cloud-based file storage service) and push out assignments to groups of students in different configurations— monolithic, differentiated, or group. With access to all student work, teachers monitor metrics on student writing, such as how many words/comments written, how often the Doc was revised, and contributions by each student on group projects.
Google Classroom	***Function: Course Management.*** Teachers can also choose to use *Google Classroom*, Google's course management tool introduced in Spring 2015 to organize student writing assignments, however (at this time) differentiation of tasks is only possible through use of *Doctopus* in conjunction with *Classroom*.
New Visions' Goobric	***Function: Grading & Feedback***. With either course management tool, teachers will use *Goobric* for rubric-based assessment. Using *Goobric,* teachers embed a rubric in student assignments and submit their grades and comments (written or audio) that appear directly in the Doc and are emailed to the student. Feedback is automatically recorded and aggregated in a spreadsheet for analysis. *Goobric* hosts a Rubric Bank where teachers in the same school, district or state (depending on sharing permissions) can access shared rubrics, and New Visions can track usage of specific rubrics.[16]

To date, case studies have examined GAFE use in single schools, but little insight exists

[15]New Visions CloudLab tools are available for free at: cloudlab.newvisions.org.

[16]We are partnering with i3-funded Literacy Design Collaborative to share rubrics using Goobric.

into adoption across *networks* of high-need schools.[17] *Doctopus, Classroom* and *Goobric* are tools that strengthen the teacher-student relationship. Rather than receiving handwritten notes from teachers on paper essays that are rarely revised or revisited, students will see comments directly in their Doc, with opportunities to respond, ask questions and incorporate the feedback into a next draft, thus iteratively improving their writing. In group work, students can work concurrently on the same document and see each other's changes in real time. Such features enable peer-editing and dialogue around writing, addressing CCSS skills related to the use of technology to collaborate, communicate with different audiences and practice informal writing.

***Potential Replicability*.** Few initiatives are as ripe for scale as the proposed project; our tools have already spread extensively across the teaching community without any formal piloting by New Visions. Our specific tools are among GAFE's most popular (89,000 *Doctopus* users; 54,000 *Goobric* users), with a dedicated following on social media.[18] New Visions manages the national Google Apps Scripts for Education Google+ community, which has 5,800 members, including many of the country's leading classroom technology integrators. Teachers unaffiliated with New Visions have produced their own tutorials on our tools for their peers, with dozens of how-to videos posted on YouTube. We believe that this usage will be further enhanced if we (1) target teachers in the urban core where technology is less used and (2) tie these tools to content. For content, New Visions has designed a set of CCSS-aligned curricula in core subjects,[19] posted publicly on websites. In its first year, our GH curriculum is being accessed by thousands of users

---

[17] Google for Education, n.d.; Google for Education, 2009 (ACTvF - New Visions school).

[18] Doctopus [bit.ly/1lszTwx]; Goobric [bit.ly/1GLrcY4]; In 30-day period (Apr. 2015), Doctopus gained 4,000+ new users, served 20,000+ returning users & distributed 350,000 tasks.

[19] globalhistory.newvisions.org; livingenvironment.newvisions.org; ushistory.newvisions.org

across NY State. By linking our tools to curriculum, we offer a shared basis for adoption across a teacher network. Since our tools run on Google's free infrastructure and our curriculum is open source, once piloted and proven, this approach can scale radically at *almost zero cost* to schools.

B. PROJECT DESIGN

Goals, Objectives & Outcomes. The goal of New Visions' *Personalization at Scale* project is to encourage adoption of digital tools to manage courses, resulting in CCSS writing instruction that is personalized to student need and improves student writing. We will pilot a tech PK approach with GH and ELA teachers in our network and measure success using analytics of user behavior from digital tools, surveys of teacher experiences and student exam performance. We will compare outcomes to teachers in other schools using the same curricula without the intentional tech integration.[20] The primary research question is: can moving teacher and student workflow to a digital, cloud-based environment improve the amount and quality of student writing, relative to comparison schools and over time? Proposed outcomes are:

1. Increase the number of writing tasks assigned by teachers and the frequency with which these tasks are differentiated (rather than monolithic).
2. Expand student use of GAFE applications, with an increase of student writing in digital spaces and more opportunities for revision of their work.
3. Increase the amount and timeliness of teacher feedback to students on writing tasks.
4. Improve students' scores on the written section of the Global History state exam, and strengthen their self-efficacy with the writing process.

Theory of Action. With vetted curriculum in place, if teachers use technology to

[20] With district policy focused on CCSS and literacy, both program and comparison schools could improve over time, but we anticipate program schools' growth would be accelerated.

systematize the workflow tasks involved in task distribution and assessment (see Figure 5), they will have more capacity to assign writing tasks, differentiate instruction and offer timely and actionable feedback that improves student writing (Figure 2). An advantage of this project is the automated collection of unusually rich data on writing activity in program schools through Google Analytics, paired with our existing data warehouse of student performance metrics (our NYC DOE contract affords us access to all student-level data in our schools). In a small-scale experimental design, an external evaluator, MDRC, will assess the process of tech adoption by teachers, and conduct an impact analysis comparing teacher use of digital tools and student use of digital writing applications between program schools and a group of control schools.

Figure 2. Logic Model

Inputs	Activities	Outputs	Proximal Outcomes	Distal Outcomes
New Visions for Public Schools NYC network NVPS Digital Tools NVPS Global History & ELA Curricula (shared content across pilot) NVPS Instruction, Data, Systems Teams Google Analytics & Data Warehouse Guidance for Tool Adoption: Technical & Pedagogical	Select 10 schools & assist hardware setup Build & modify assessments & tools Train 9th/10th grade teachers in tech & pedagogical PD series Coach teachers 1:1 & on small teams Collect tool usage & writing activity data Evaluate project & create adoption model	# teachers trained across schools # assignments differentiated by task type and skill level # GAFE, Doctopus & Goobric usage # instances of teacher feedback # student written products & activity Replicable model of tool adoption	Outcomes related to teachers' behavior with students: **Teachers** ⬆ assigned writing tasks ⬆ differentiation of writing tasks ⬆ teacher feedback ⬆ feedback timeliness	Improvements in student achievement: **Students** ⬆ writing in Docs ⬆ revisions of writing ⬆ scores on written section of Global History CCSS-aligned state exam ⬆ self-efficacy in writing

Management Plan–Overview. We propose a pilot over three school years, beginning in SY 2016-17 after a brief planning phase. Global history is a two-year course, usually taught in 9th and 10th grade, with the NY state exam taken for the first time at the end of 10th grade. In the program, we will work with *9th grade GH teachers* and *10th grade ELA teachers*. We have elected to work with ELA rather than GH in 10th because 10th grade GH teachers will be facing the arrival of a new CCSS GH exam in June 2018, which is an inopportune time to introduce an instructional approach. ELA teachers help students develop the same skills necessary to master the written section of the GH exam. This design will provide the added benefit of demonstrating a cross-disciplinary pedagogical approach, in line with the CCSS, and how the tools can work across subject areas. As illustrated in Figure 3, the intervention spans two years for each cohort of students. We will begin with 9th grade teachers in year one and add 10th grade in year two, with a year of full replication (year 3) as we package the strategy for dissemination.

Figure 3. Overview of the Project's Timeline

Jan-Jun 2016	SY 2016-17	SY 2017-18	SY 2018-19	July-Dec 2019
Planning Period	Grade 9 Global History	Grade 9 Global History	Grade 9 Global History	Dissemination
		Grade 10 ELA	Grade 10 ELA	
		Global History Regents Exam	Global History Regents Exam	
	12 teachers 1,000 students	24 teachers 2,000 students	24 teachers 2,000 students	

Activity 1 - School Selection. New Visions will work with 10 NYC high schools, selected from our network of 77 district and charter schools: 77% of our 47,000 students are eligible for free/reduced lunch (vs. 61% citywide) and 19% receive special education services (vs. 15%). We will select schools from a subset in our network that are using our curriculum frameworks: 40 district schools enrolled in the GH curriculum professional development series in 2015-16.[21] From this group, we will narrow down the pool to 20 district schools using the selection criteria in Figure 4, and then we will randomly select 10 program schools, with the other 10 schools serving as the comparison group -- all having met the same requirements.

---

[21] This is the second year of the GH pilot; we anticipate adding more schools each year. Our ELA framework is currently in development, with use expected by the same schools in '16-17.

Figure 4. Selection Criteria for Schools

Selection Criteria for 20 District Schools	
10 Program Schools	**10 Comparison Schools**
Curriculum Use: Schools will have used the New Visions GH curriculum for at least one year prior to project launch, with GH and ELA teachers expressing a commitment to using our curricula in project years. "Use," at a minimum, means following the common scope and sequence, accessing course resources and distributing end-of-unit assessments. Embedded in our curricula is guidance on best pedagogical practice in teaching writing, following Judith Hochman's approach to sentence- and paragraph-level development.[22]	
GAFE Interest: Schools will have expressed interest in obtaining New Visions' support to train teachers in use of GAFE tools to manage courses and interact with students. In some schools, teachers may already be using digital course management tools (GAFE or otherwise); this level of use will not factor in as a selection criterion, as we are interested in testing the systematic implementation of a tech pedagogy approach among a variety of users. (About 15% of our schools *currently* use GAFE at the classroom level; fewer use the tools mentioned.)	
GAFE Capacity: Schools will need to be set up with GAFE domain accounts, which all schools in our network currently are; have functional devices for student use or use Chromebooks provided by New Visions; and have reliable internet access (the NYC DOE works to ensure city schools have wireless access points). It varies by school whether and how computers or laptops are used in the classroom, but device availability and type of device will not be selection criteria for participation. We are interested in seeing this initiative succeed in any urban high school, regardless of current device use.	

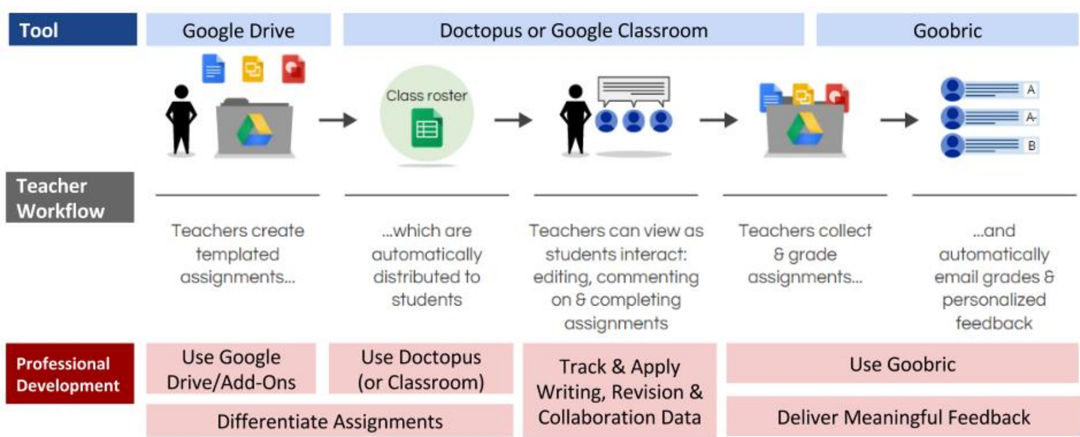
Thus, teachers in 10 *program* schools will implement the intervention, meaning curricula use plus intensive training on tech integration, while teachers in 10 *comparison* schools will use our curricula without a formal tech component (they may still use technology, independently). We anticipate that teachers will be eager to participate for a few reasons: (1) we will highlight the tools' time-saving nature, which increases capacity rather than adding yet another task to teachers' full plates, (2) due to previous requests, we expect high demand for the coaching (device management and course integration for teachers) and (3) as incentive for participation and to ensure equitable access, we will supply one Chromebook classroom set (35) per program

[22] Hochman, 2009.

school (with schools agreeing to ensure sufficient hardware if more sets are needed).

Activity 2 - Professional Development. Teachers from program and comparison schools will be invited to participate in New Visions' ongoing GH and ELA PD series (~8 full-day trainings per year each).[23] The difference will be that program teachers will attend sessions, as part of these PDs, specific to implementing digital workflows and instructional techniques. See "PD" in *Figure 5* below for components. Program teachers will learn how to use basic GAFE apps technology; use *Doctopus*, *Classroom* and *Goobric;* and gauge student writing activity using the collected metrics. Then, they will be coached on how to apply the tools pedagogically to (a) differentiate tasks from GH/ELA curricula, (b) deliver feedback to students, and (c) track revision by students, as the evidence-based practices (described earlier) that improve writing. The "differentiation" PD sessions will address how to use writing tasks as formative assessments, assess student progress and responsively tailor teaching to student need.

Figure 5. Intersections of Technology, Teacher Workflow & Professional Development



Between these sessions, two instructional coaches with expertise in tech pedagogical knowledge related to literacy will offer on-site support to program teachers as they adopt this

[23] PD logs and attendance will be captured for teachers from both groups, as well as notes from in-school team meetings (inquiry logs).

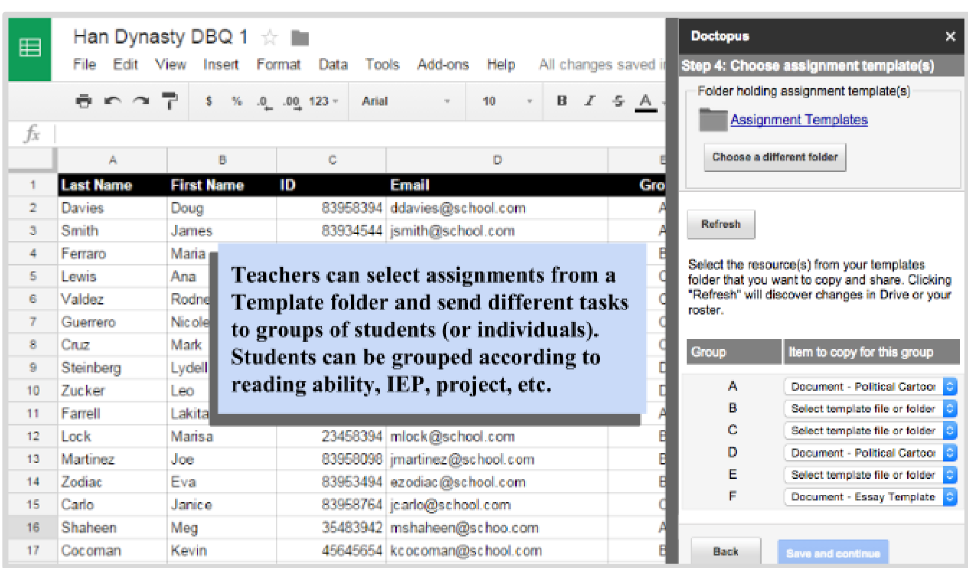
approach, including one-on-one coaching and classroom observations to inform feedback, with additional virtual meetings, as needed. Coaches will keep school leaders informed of the project, with invitations to attend PDs and regular pilot updates. As the project evolves, school leaders will be encouraged to allot time for other teachers in the school to visit these “bright spot” classrooms of tech adoption, as peer endorsement helps to foster buy-in for new methods and within-school spread. Finally, our technology coordinator will coach technology specialists in each program school in device procurement, set-up and maintenance, helping schools adopt “best practices” that facilitate classroom use on a daily basis. The coordinator will assist teachers in setting up their tech routines and infrastructure, and field requests to troubleshoot GAFE issues.

Activity 3 - Resource & Tool Design. Our tech PK coaches will support the integration of the existing GH and ELA curricula with GAFE tools by ensuring all materials are in formats necessary for digital distribution and adding rubrics to the shared *Goobric* rubric bank for easy access. While the curricula will be managed by GH and ELA coaches on our instructional team, the tech PK coaches will curate additional literacy assessments for students with various learning needs (e.g., reading below grade level or with IEPs) to support differentiated instruction. Finally, they will develop screencasts that demo how to distribute, collect and grade writing assignments digitally, for use in between PD and coaching, and others that illustrate the use of tools with specific types of student work. While these materials will be available to all teachers using the curricula, only program teachers will be specifically trained on their use.

Throughout the project, our systems developer will be responsive to teacher feedback and iteratively make adjustments and improvements to tools, as we do with all of our GAFE applications. Tool adoption in both program and comparison schools will be measured using Google Analytics, and the developer will design a means of extracting data on user activity from each teacher's *Doctopus*, *Google Classroom* and *Goobric* analytics, to monitor implementation across all New Visions schools. Metrics include: number and length of writing tasks assigned; number of differentiated student tasks distributed via *Doctopus*; number of words written and revision actions by students on docs managed via *Doctopus/Google Classroom;* number of teacher comments on student docs; and timeliness of feedback (measured by timestamps of Doc creation, student revision and teacher rubric score submissions). In addition, *Goobric* will track how often teachers use rubrics with their students and share rubrics with other teachers.

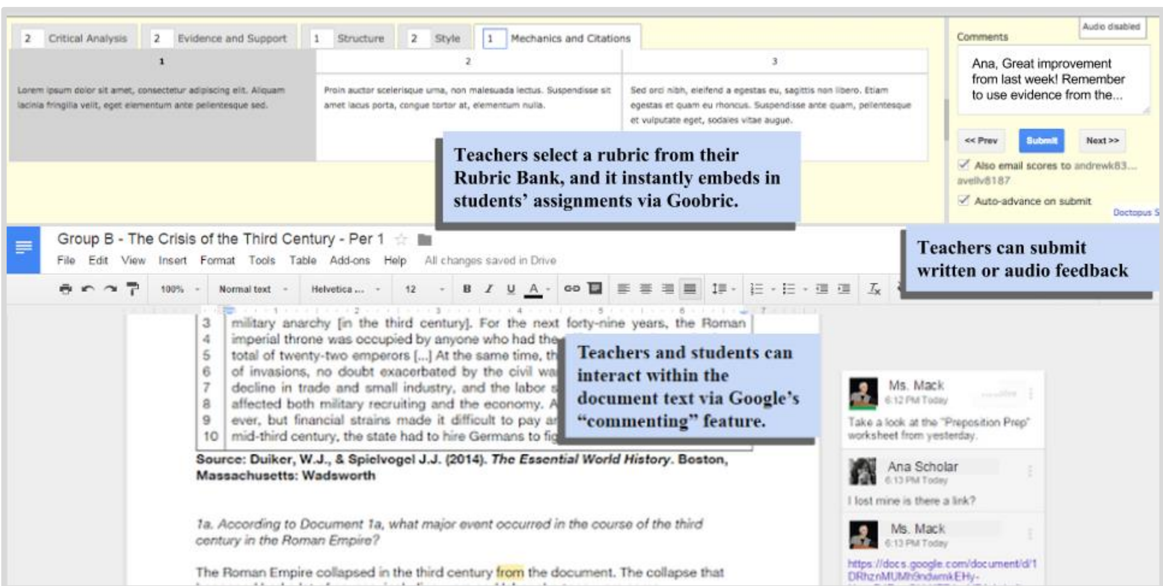
***Activity 4 - Tech Implementation*.** Program teachers will receive this additional training and coaching, which will encourage use of *Doctopus* (and/or *Classroom*) to distribute key writing assignments throughout the year, with students completing tasks online using Apps (e.g., Google Docs). Within *Doctopus*, teachers can choose who has access to which documents, create assignment templates, deliver differentiated (or monolithic) tasks directly to student folders and automatically share student documents with co-teachers (see Figure 6). With access to students' Docs, teachers will be able to monitor student writing in real-time, and analyze metrics collected by the tools, including number of words written, revisions and comments made.

Figure 6. Illustration of Doctopus



Assignments will be automatically organized and ready for teacher review; teachers can temporarily revoke student permissions (from "editing" to "view only") using *Doctopus* or *Classroom* as they begin the grading process. Teachers will submit feedback directly to students using *Goobric's* shared rubrics, appearing to the student as comments in the Doc as well as via email. Students will be able to respond to feedback via the "commenting" feature (see Figure 7). The degree to which teachers use these tools will be of key interest to the study.

Figure 7. Illustration of Goobric



<u>Management Plan–Qualifications of Key Staff</u>. The project's leadership team includes:

Mark Dunetz, vice president (VP), leads all school support initiatives for New Visions' affinity network of 70 district schools (in contract with the NYC DOE) and will liaise directly with the DOE on this project. He founded the Academy for Careers in Television & Film (ACTvF) in Queens in 2008, renowned for its integration of cloud-based systems to manage school processes and profiled by Google in 2009. Serving high-need students, its graduation rate in 2014 was 95.8%. Dunetz has a Ph.D. in urban education from the City University of NY.

Daniel Voloch, director of instruction, will be project director (PD) for *Personalization* *at Scale.* He manages a team of instructional coaches who work with teachers to adopt CCSS-aligned curricula and pedagogical techniques, including GH and ELA. Prior to New Visions, he oversaw the design of iMentor's program model, and founded At Home in College, a CUNY program that aligns senior year coursework with the skills required for success in first-year college courses. He holds a Ph.D. in urban education from the CUNY Graduate Center.

Andrew Stillman, director of systems (DS), designed *Doctopus* and *Goobric* and oversees a team of specialists that designs, implements and supports web-based systems for improving operations and instruction. A former STEM teacher, he co-founded the Columbia Secondary School for Math, Science & Engineering, and holds an M.A. from The City College of NY. **Kami Lewis Levin**, director of curriculum (DC), oversees the implementation of curricula in New Visions schools, including special education and ELL programming. A former history teacher with an M.A. from New York University, she previously worked as district-wide social studies coach for Cambridge Public Schools. The **project team** will include: two instructional specialists (ISs), technology coordinator (TC), knowledge management officer (KMO), data analyst and systems developer.

MDRC will serve as the project's external evaluator, led by **Rekha Balu**, Ph.D., the principal evaluator. Dr. Balu brings experience designing impact and implementation analyses, managing large-scale projects with complex datasets, including federal contracts, and evaluating data-driven instructional interventions. She served as a lead quantitative analyst for the Success for All i3 Scale-up evaluation completed this year. She has provided independent evaluation to New Visions on other research projects as well.

Management Plan–Timeline & Milestones.

Figure 8. Project Timeline & Milestones

Timing	Major Activity	Staff Responsible	Milestone
Planning Phase: January - June, 2016			
Jan ‘16 – Mar ‘16	Finalize program plan; recruit schools using criteria & randomly assign 10 to program	PD, DS, DC, VP	10 program & 10 comparison schools
Jan ‘16 – Feb ‘16	Finalize evaluation plan	MDRC; PD; Analyst	Eval plan sent to NEi3
Apr ‘16 – Jun ‘16	Hire ISs & TC	PD; DS; DC	Project team staffed
Annual Implementation for Program Schools, July 2016 – July 2019			
School Year ‘16-‘17 is used as the example below; The same activities will be repeated in ’17-’18 and ’18-‘19.			
Jul ’16 - Aug ‘17	Chromebooks distributed & set up	DS; Developer; TC	Chromebooks active
Ongoing	Ongoing material/assessment design	ISs; DC; PD	Materials designed
Aug ’16 – May ‘17	PD series on tech PCK	ISs; TC; PD; DC; DS	8 sessions per year
Ongoing	Ongoing tool adjustments & improvements	Developer; DS	Improvements made
Aug ’16 – Sept ‘16	Establish classroom tech infrastructure	TC	GAFE student accounts
Oct ’16 – May ‘17	On-site/virtual coaching; GAFE support	ISs; TC	Biweekly coaching
Oct ’16 – May ‘17	Document pilot practices & case studies	KMO; ISs; TC	Documentation
Feb ‘17	Focus groups with teachers and students	MDRC; PD	Analysis
Ongoing	Engagement of GAFE community & DOE	KMO; ISs; VP	Outreach made
Aug ’16 – Jul ‘17	Data collection on program progress	MDRC; Developer; Analyst	PM system
Aug ’16 – Jul ‘17	Data collection/analysis on implementation/impact	MDRC; Analyst	Analysis
Dec ‘17	Release report brief on early findings	MDRC; KMO	Report brief
Dissemination, August 2019 – December 2019			
Aug ‘19 – Dec ‘19	Write report for final impact data	MDRC; Analyst	Final evaluation report
Aug ‘19– Dec ‘19	Disseminate results via strategic partners & conferences	KMO; PD	Publicity, partner mtgs & presentations

Procedures for Continuous Improvement. New Visions ascribes to the Carnegie Foundation’s model of continuous improvement for each of our programs.[24] As in all of our curriculum initiatives, we will establish a process monitoring system for this project that integrates data from different pilot sources (e.g., PD attendance, GAFE tool analytics, student performance) and hosts Tableau dashboards that visualize progress across our schools. This system facilitates sense-making, and it allows us to be responsive to project needs and mitigate

[24] Park, Hironaka, Carver & Nordstrum, 2013.

risks that might lead to unintentional variation in implementation, rather than waiting for year-end summative results. By establishing this system early on, we lend immediate clarity to what are considered key components of implementation and targeted outcomes for tracking over the next three years. In biweekly meetings, our project team will reflect on data from this system and use it to inform conversations with principals and ongoing coaching of teachers.

Mechanisms for Dissemination. New Visions' knowledge management team will disseminate learnings from our *Personalization at Scale* pilot, including practitioner guides and screencasts, issue briefs (some with MDRC), and MDRC evaluation reports. In the past, we have successfully shared best practices by publicizing report releases, blogging for major publications and presenting nationally. For example, our 2012 report on digital early warning systems has been widely cited, including in federal research reports; our 2015 guest blogging series for Education Week reached national audiences; and we regularly field requests from districts like Dallas and New Haven for specialized support.[25] We will use these materials as a basis for engaging in dialogue with strategic partners around systems implementation, including teachers unions, professional organizations and other curricula developers, and engage with districts that already have plans to switch to GAFE, such as Boston and Chicago. Finally, for innovation to take root, teachers need to take ownership of the process. We will cultivate advocates of our approach by building the leadership skills of pilot teachers; leveraging *Doctopus*' existing user-base and other GAFE enthusiasts (e.g., New Visions' GAFE Google+ group); and building upon our relationship with *Google Classroom*'s team. As urban schools gradually come online, they will join a larger virtual community, ripe for rapid uptake of digital tools.

C. PROJECT EVALUATION

[25] Fairchild et al., 2012; US ED Office of Educational Technology, 2013; Fairchild, 2015.

MDRC, our independent evaluation partner, will analyze whether the implementation of the proposed program leads to the changes outlined in the project theory of action. We begin with our proposed analysis of student outcomes and then work backwards through the theory of action to explore implementation questions. In this section, we describe our evaluation questions, starting with topics for which we will collect data in program and comparison schools and then moving to implementation questions within the program schools (summarized in Figure 9).

Research Design. We propose a school-level RCT wherein approximately 20 schools participating in the lottery will have in common New Visions Global History curriculum (with Hochman literacy pedagogy) and access to GAFE tools. Added to this foundation, the 10 schools assigned to the treatment group will receive intensive PD and coaching in using GAFE tools, including *Doctopus, Classroom,* and *Goobric*, as well as tech PCK instruction to support personalization of assignments and daily use of tools. The *service contrast,* or *treatment differential,* will come from how well and how much teachers use the GAFE tools resulting from the PD and coaching on tech PCK supported by this grant. A cluster RCT like the one proposed meets WWC standards without reservations for cluster-level (i.e., school-level) inferences.

Confirmatory Impact Estimation. Because students will be nested within schools, and school is the unit of randomization, we propose a two-level model to account for dependence of observations within schools. In each school, we anticipate only one global history teacher (9th grade) and one ELA teacher per school (10th grade), which allows for a two-level estimation model for each grade (students within teachers/schools). See Appendix J for equations and an explanation of parameters. During the grant period, schools will continue with the curriculum and tools, even when there is teacher turnover. Such turnover is not a problem for cluster-level inferences, but may reduce fidelity and quality of implementation. Key outcomes include test scores for the written section of the New York State Global History Regents exam, course literacy assessments (pre and post), student course grades and student survey self-report about their self-efficacy with writing.

We recognize the proposed design may be under-powered for the effects we are likely to observe. With approximately 100 students per school and 20 schools participating in the lottery, the minimum detectable effect size for writing would be 0.45 in a cluster RCT (assuming an alpha of 0.05 in a two-tailed test, power of 0.8, and ICC of 0.2 per Hedges and Hedberg, 2007 and an R-squared of 0.5 at the student and school levels).[26] Given the limited sample of schools – and challenges in finding a large effect on writing scores – we are supplementing our RCT analysis of student test scores with a *comparative interrupted time series analysis* to increase our understanding of the program and see if a different methodology yields similar findings. We would use a different set of comparison schools, obtained through a matching process using propensity scores. If the program and comparison school baseline trends are comparable, and the trend deviates after introducing the technology PD and coaching, we could confirm that targeted support for teachers is responsible for some change in outcomes.[27]

Exploratory, Intermediate Analysis. We will then explore changes in teacher practice, with an analysis of whether the added PD and coaching have an impact on the *amount* and *differentiation (personalization)* of writing tasks that teachers assign to students. Data on the number of assignments and the differentiated assignment templates distributed through the digital system will be available for program and comparison schools; data on paper-based

[26] In Graham & Perin's (2007) *Writing Next* meta-analysis, the eleven most effective practices in improving student writing ranged in effect sizes of 0.23 to 0.82.

[27] Somers et al. (2013).

writing assignments will be reported in a teacher survey of all study schools. This analysis will address the hypothesis that increasing the number and personalization of assignments, with student response and revision, can improve student writing. To that end, we also will explore the relationship between the number of writing tasks assigned and student marking period grades, and whether that relationship differs between the program and comparison schools. This will help us understand whether writing and revision tasks in the program schools are more "productive" in helping students improve and shaping teacher differentiation of student tasks.

Figure 9. Research Questions, Outcomes & Analysis

Research Question	**Outcomes and Measures**	**Comparisons/ Analysis**
10 program vs. 10 comparison schools (unless noted)		
Service contrast		
Is there increased use of digital tools to manage course writing in program schools, relative to comparison schools?	Google Analytics data; self-report from teachers via surveys (e.g., number of assignments, number days of digital tool use)	Mean differences in aggregated data from program vs. comparison schools in each year of implementation.
Student impact: With use of digital writing and revision tools, do students in program schools...		
Attain better writing scores on the written section of the state GH exam, relative to comparison students? Attain better literacy levels, relative to their own literacy levels at the beginning of the school year?	Test scores in written section of the 10th grade, CCSS-aligned GH state exam. Pre- and post-scores on course literacy assessments, with common CCSS-aligned rubrics (including scale score, percent passing, percentage of students in top category or top quartile).	For RCT, program vs. comparison in each implementation year using two-level school RCT estimation model and covariates for both teacher/school and student: • differences in mean writing scores, • differences in student growth in literacy during the school year. For CITS, compare deviation from trend in state test writing scores between program and matched schools post-implementation.
Improve their course grades, relative to comparison students?	Course grades for marking periods.	RCT analysis only, same model as above: program vs. comparison student differences in grade improvement between marking periods.
Improve their self-efficacy with the writing process, relative to comparison students?	Self-report on confidence from student survey.	RCT analysis only, as above: program vs. comparison student differences in growth in writing confidence during the school year.

Teacher practice: Does teacher training in collaborative digital writing and revision tools…		
Increase the number of writing tasks assigned by program teachers/schools, relative to comparison schools?	Count of tasks assigned, as recorded in the digital system; Teacher logs; Self-report via teacher surveys.	RCT analysis only: program vs. comparison differences in each project year using two-level school RCT estimation model.
Increase the extent of differentiation (personalization) in writing tasks assigned by program teachers/schools, relative to comparison schools?	Teacher survey; Teacher logs; *Doctopus* data on assignment templates used.	RCT analysis only: program vs. comparison in each project year using two-level school RCT estimation model with teacher/school characteristics & student beginning-of-year writing or literacy scores.
Increase the amount and timeliness of teacher feedback to students on writing tasks, in year 3 vs. year 1? Increase the amount and timeliness of teacher feedback to students on writing tasks, relative to earlier marking periods?	<u>Only for program schools:</u> Count of tasks assigned, timeliness of feedback, count of student comments and revisions, as recorded in the digital system. Self-report on teacher surveys. Teacher and student focus groups.	Change over time in program schools: • across teachers in program schools, between years (school-level improvement in instructional practice). • for a given cohort of students in each year, growth in feedback from 1st vs. 2nd trimester, and 2nd vs. 3rd (teacher-level improvement for a given cohort of students).

School- and Teacher-Level Implementation. Our proposed implementation analysis in the 10 program schools includes assessing school-level fidelity to the program, as well as changes in teacher practice over time. The implementation plan to set up adoption involves several efforts: i) organization of school systems, including policies, scheduling and course programming to accommodate more writing revisions and feedback; ii) organization of summer and in-year professional development, which includes design and delivery of coaching by specialists in literacy and technology (to inform pedagogy), a tech coordinator (to inform tool use and resolve tech problems), as well as content specialists (to provide GH and ELA content expertise to program and comparison schools), and iii) structures to support actual use of digital writing tools by students and teachers. Data sources for this implementation assessment include each school's: course scheduling and programming data, Google Analytics, data from the tech resource inventory, PD logs and attendance records, and support structures discussed during scheduled strategy meetings between New Visions staff and school leaders throughout the year.

Our proposed fidelity measures reflect whether the tools are adopted and used as intended, since the added value of the PD and coaching presumably manifests as new or increased use of digital tools. We suggest four *school-level fidelity measures* corresponding to usage: i) Proportion of students using the digital platform for writing; ii) Proportion of comments and feedback that teachers deliver within a minimum timeframe; iii) Proportion of writing assignments with feedback that teachers deliver via the digital platform; and iv) Proportion of writing assignments with feedback that teachers deliver via the digital platform that prompted multiple student revisions. These provide a picture of schoolwide use of digital tools. Data would come from GAFE tools, including *Doctopus* and *Goobric*. We would use the planning year to set thresholds for each of these measures that represent adequate fidelity for a school, and determine how best to create a composite variable or index that might create an overall fidelity score.

Beyond fidelity, however, the goal of the digital tools, PD and coaching is to increase the *quality of use*. A higher level of use, for example, would involve teachers analyzing their own metrics of number of writing tasks assigned and distributed via *Doctopus*, and the number of comments provided in order to improve subsequent instructional practice. Therefore, we propose several key indicators to assess each teacher's quality of use: (i) Does the teacher analyze these metrics? (ii) Does the teacher use New Visions-provided templates to help differentiate assignments; (iii) Does the teacher use CCSS-aligned rubrics (through *Goobric*)? and (iv) Does the teacher use the comment function to exchange ideas with the student (rather than for one-way interaction)? We recognize that *student quality* of use may not necessarily correlate with quantity of revisions, but may be reflected in the focus of revisions toward structure and depth.

We will measure the *dosage* or intensity of specific writing and revision tasks each year, including metrics described earlier such as: length of writing tasks assigned, total word count and revision actions, total number of teacher comments, number of differentiated tasks distributed via *Doctopus*, and timeliness of feedback within a minimum time period. Changes in dosage will be measured to determine: (a) is there an increase over time in the amount and timeliness of teacher feedback on writing tasks? and (b) do program school teachers improve their level and frequency of differentiation of writing tasks? Both (a) and (b) will be assessed within each year (two periods of growth for each teacher's students from trimester to trimester) and across years (two years of growth for a school's group of teachers). New Visions will collect baseline measures of level of use of GAFE tools before PD begins. Along with descriptive plots illustrating intensity of use by teachers and student cohorts over time, by random assignment group, we will consider a repeated measures model in which measures at different time points are nested within teachers.

Resources Required. We have budgeted nearly $540,000 for this evaluation, which provides adequate resources to complete analysis and reporting, based on MDRC's experience with these types of evaluations and ongoing collaboration with New Visions. MDRC benefits from knowledge of New Visions' data systems and variables, and an existing suite of joint research projects to understand replication of innovations.

Summary. We propose both confirmatory and exploratory impact analyses. In addition, we will conduct an in-depth descriptive analysis of the treatment differential, ways to measure implementation dosage and fidelity in the program schools, and change in outcomes over the project years among program teachers and schools. This combination of analyses will allow us to understand and inform other schools on how to operationalize digital tools and supports in curricula with high-stakes exams.

References

Bereiter, C. & Scardamalia, M. (1987). The Psychology of Writing Composition. Hillsdale, N.J.: Lawrence Erlbaurn Associates.

Carter, E. (2015, July 6). Google announces Classroom API. *ProgrammableWeb*. Retrieved from: http://bit.ly/1I5fOKB.

Darling-Hammond, L., Zielezinski, M.B. & Goldman, S. (2004). Using technology to support at-risk students' learning. Retrieved from: http://stanford.io/1r3k4jM.

Decker, G. (2014, September 15). [bit.ly/1GW8DDw]. State officials discuss allowing high schoolers to swap history Regents test for a career exam. *Chalkbeat*. Retrieved from: http://bit.ly/1IADSlM.

Fairchild, S., Carrino, G., Gunton, B., Soderquist, C., Hsiao, A., Donohue, B., Farrell, T. (2012). *Student Progress to Graduation in New York City High Schools. Part II: Student Achievement as Stock and Flow: Reimagining Early Warning Systems for At-Risk Students.* New York, NY: New Visions for Public Schools. Retrieved from: http://bit.ly/1z60EvH.

Fairchild, S. (2015). Never give up on students: Schools need 'grit,' too. *Education Week* (blog). Retrieved from: http://bit.ly/1AqOmRO.

Google for Education, n.d. *Google for Education Case Studies.* Retrieved from: http://bit.ly/1HCTFfX.

Google for Education, 2009. *Academy for Careers in Television and Film Unifies School Community and Increases Operational Efficiency with Google Apps.* Retrieved from: http://bit.ly/1vGwukT.

Graham, S. & Perin, D. (2007). Graham, S., & Perin, D. (2007). *Writing Next: Effective*

Strategies to Improve Writing of Adolescents in Middle and High Schools – A Report to Carnegie Corporation of New York. Washington, DC: Alliance for Excellent Education. Retrieved from: http://bit.ly/1We3Vq9.

Hedges, L.V. & Hedberg, E.C.. (2007). Intraclass correlation values for planning group-randomized trials in education. *Educational Evaluation and Policy Analysis,* 29(1), 60-87.

Hochman, J. (2009). *Teaching Basic Writing Skills: Strategies for Effective Expository Writing Instruction.* Sopris West.

Kim, S. H., & Bagaka, J. (2005). The digital divide in students' usage of technology tools: a multilevel analysis of the role of teacher practices and classroom characteristics. *Contemporary Issues in Technology and Teacher Education* [Online serial], *5*(3/4). Retrieved from: http://bit.ly/1HCROYu.

Koehler, M. J., & Mishra, P. (2009). What is technological pedagogical content knowledge? *Contemporary Issues in Technology and Teacher Education*, *9*(1). Retrieved from http://bit.ly/1NmAgVz.

Kosner, A.W. (2014, December 12). Google unseats Apple In U.S. classrooms As Chromebooks beat iPads. *Forbes.* Retrieved from: http://onforb.es/1vbcyoW.

Moeller, B., & Reitzes, T. (2011). *Integrating Technology with Student-Centered Learning.* Education Development Center, Inc. (EDC). Quincy, MA: Nelle Mae Education Foundation. Retrieved from: http://bit.ly/1HCT6Tv.

National Governors Association Center for Best Practices & Council of Chief State School Officers (2010). *Common Core State Standards.* Washington D.C. Retrieved from: bit.ly/1ixvvZD.

New Visions for Public Schools (2014). Regents Exam Results for the New Visions Network, June 2014.

NYC DOE, 2014. *New York State Common Core English Language Arts (ELA) & Mathematics Tests Grades 3 – 8*. Retrieved from: http://on.nyc.gov/1gwdeRp.

Obee, N. (2014, December 2). Personal communication. Department of Technology Services, Denver Public Schools.

OECD, 2013. *United States: Survey of Adult Skills.* Retrieved from: http://bit.ly/1ohV2J1.

Park, S., Hironaka, S., Carver, P. & Nordstrum, L. (2013). *Continuous Improvement in Education.* Carnegie Foundation for the Advancement of Teaching. Retrieved from: http://bit.ly/1MlJt3s.

Puentedura, R.R. *SAMR and TPCK: Intro to Advanced Practice*. Retrieved from: http://bit.ly/1UzNeDP.

Roschelle, J., Tatar, D. , Shechtman, N., Hegedus, S., Hopkins, B., Knudsen, J., & Stroter, A. (2007). *Can a Technology-enhanced Curriculum Improve Student Learning of Important Mathematics? (SimCalc Technical Report 1)*. Menlo Park, CA: SRI International. Retrieved from: http://bit.ly/1Mh9I9L.

Somers, M., Zhu, P., Jacob, R.T., & Bloom, H. (2013). The Validity and Precision of the Comparative Interrupted Time Series Design and the Difference-in-Difference Design in Educational Evaluation. MDRC: New York. Retrieved from: http://bit.ly/1huowGy.

U.S. Department of Education, Office of Educational Technology (2013). *Expanding Evidence Approaches for Learning in a Digital World*. Washington, D.C. Retrieved fromt:

http://1.usa.gov/1AfOhxz.

Wagner, T. (2008). Rigor redefined. *Transforming Education* (blog). Retrieved from: http://bit.ly/1JMGFux.

Wall, P. (2013, November 14). Tougher diploma rules leave some students in graduation limbo. *Chalkbeat*. Retrieved from: http://bit.ly/1TnenXZ.