REPORT

The Research Alliance for New York City Schools

Bridging the Gap

How the NYC DOE Is Working to Bring Ed-Tech and Classrooms Together

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June 2016

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Find this report online at:
http://steinhardt.nyu.edu/research_alliance/publications/bridging_the_gap

CHAPTER 1: INTRODUCTION

The education technology (ed-tech) market is booming, valued at more than $8 billion in the 2012-2013 school year.[1] Ed-tech offerings include content-specific software to aid instruction, testing tools, class-scheduling systems, personalized learning systems, online courses, and more. School districts across the country are increasingly seeking out these kinds of digital tools to support the work of classroom teachers in the hopes of improving students' academic achievement.

A case in point, in 2010, the New York City Department of Education (NYC DOE) established the Office of Innovation—known as the iZone—to support new uses of technology in schools. The following year, with funding from a U.S. Department of Education Investing in Education (i3) grant, the iZone created the "Innovate NYC Schools" division, which was aimed at fostering relationships between ed-tech companies and NYC teachers, parents, and students. One important function of Innovate NYC Schools was to promote "user-centered design," an approach that puts the needs and preferences of these end users front and center in the development and procurement of new technology.

Since 2012, the iZone has issued a series of "challenges" to ed-tech companies soliciting products intended to solve problems in and around NYC classrooms. The first of these was the Gap App competition, described in detail in a previous Research Alliance report, *Connecting Teachers and Ed-Tech Developers: Lessons from NYC's "Gap App" Program* (2016).[2] Three other challenges launched by the iZone—the School Choice Design Challenge (SCDC), #SharkTankEDU events, and the Short-Cycle Evaluation Challenges (SCEC)—are the focus of this report. Based on interviews with the Innovate NYC team, as well as companies and users involved in these three initiatives, the report describes the strategies the NYC DOE used to implement these initiatives, challenges they faced, and recommendations for how to strengthen similar initiatives in the future. We hope the lessons learned in NYC will help inform other districts that are trying to match ed-tech tools with the real needs of teachers and students.

The next section of this report describes the three initiatives. Subsequent sections present practical lessons drawn from the experiences of those we interviewed. The lessons are organized into four phases of work aimed at bringing ed-tech companies and the users of their products together: 1) defining the problem, 2) selecting users and ed-tech companies, 3) implementing pilot-based initiatives, and 4) evaluating products. While each of the three programs we examined had a unique design, we believe that, as a set, they provide valuable insight about the multiple steps involved in a user-centered approach to ed-tech development and procurement.

CHAPTER 2: iZONE INITIATIVES

The iZone has launched several initiatives designed to connect educators and the ed-tech community. In Spring 2013, the iZone offered the Gap App Challenge, which asked developers to design apps for computers or mobile devices that could enhance teaching and learning for NYC students. Thirteen companies that had entered the contest were then each paired with an iZone school to pilot and collaboratively refine their products.[3] Since then, the iZone has undertaken a series of related initiatives to better connect ed-tech companies with NYC educators and public school families. The three initiatives outlined below all seek to increase communication between education stakeholders and ed-tech developers. Broadly speaking, the goals of these efforts are to create products that better meet the education system's needs and to elevate the voices of teachers, students, and families in the development process.

The NYC DOE designed these initiatives to address a number of challenges in the procurement of education technology. First was a perceived gap between teaching and learning demands on one hand, and companies' supply of tools and services on the other. This gap is likely due, at least in part, to a lack of communication between companies and educators. For example, educators are not always fully informed about available tools, while developers may not clearly understand the challenges that students and teachers face. The iZone aimed to address this problem by instituting a development process that relies on a feedback loop between educators, who use a product and report on their experience with it, and developers, who then iterate (i.e., make changes to) the product, reflecting educators' input.

In addition, the NYC DOE's traditional procurement process—issuing Requests for Proposals (RFPs)—was seen by iZone staff as a potential barrier to keeping up with available technology. The RFP process is lengthy, so technology that was brand new when an RFP was released is often outdated by the time it reaches classrooms. There were also concerns that the slow pace and "red tape" of the traditional RFP system left many developers with a negative impression, particularly smaller vendors new to working with the NYC DOE. The iZone sought a faster, more efficient way to procure ed-tech tools—one that would result in a positive working experience for developers and possibly continued collaboration. The iZone initiatives also have the advantage of enabling the NYC DOE to collect feedback from users about their experience with a product before purchasing it or implementing it widely and in time for staff to request adjustments to the product if needed.

School Choice Design Challenge

In September 2013, Innovate NYC Schools launched the School Choice Design Challenge (SCDC), an effort to develop apps that would help students explore and narrow down their choices of high school programs. Since 2004, NYC has used a universal high school choice process. Incoming high school students are asked to rank their 12 preferred high school programs. The NYC DOE then uses these preferences and various school admissions criteria to place students in high schools. Each year, approximately 80,000 NYC eighth graders must choose among New York City's 700 high school programs, traditionally relying on the NYC DOE's official High School Directory (a book that in 2016 was over 600 pages long), school fairs, and word of mouth to choose their top schools.

To inform the development of apps to support the high school choice process, Innovate NYC Schools, the NYC DOE's Office of School Enrollment (OSE), and the Public Policy Lab (PPL)—a nonprofit organization that uses design and ethnographic research to improve public services—conducted a series of focus groups with City students, parents, and guidance counselors in the spring of 2013. These meetings were intended to help the OSE and iZone better understand how the school choice process was playing out for families, students, and counselors, and then to generate ideas for new types of tools to support the process (e.g., mini-directories organized by school characteristics or a matchmaking website). Based on the focus groups, PPL staff authored a report highlighting the experience of students in the high school choice process, which later proved to be a valuable resource for participating companies.

iZone staff developed a list of 80 companies and invited them to participate in the SCDC. Twelve companies expressed interest. From these, iZone and OSE staff used a rubric to select six, who were then asked to design web-based applications (or update existing ones) for desktop computers or mobile devices to help students and families compare high school programs. The companies were offered a $12,000 stipend and the opportunity to work with the NYC DOE on a high-profile project.

The NYC DOE then gave the companies access to the data compiled in the high school handbook (school-level data including program descriptions, graduation rates, and district rating) via an application program interface (API), which is the underlying structure that allows two different pieces of software to communicate.[4] By providing direct access to the API—one of the first instances of this type of public access of its kind between any school district and the private sector—the NYC DOE ensured that participating companies had the most up-to-date school data. The breadth of data provided via the API was also notable. One company, FindTheBest, said that the NYC

DOE provided over 1,300 pieces of information about each school, a massive trove of information that students and parents could potentially explore.[5]

After eight weeks of initial development, the iZone held two demo sessions, where students and families tried out the apps while representatives from the developer teams observed and asked questions. The sessions allowed companies to learn what information and functions were important to students and families.

In November 2013, the NYC DOE unveiled all six mobile apps through its website. The NYC DOE then began integrating the apps into their outreach about high school admissions, including sending information about the apps by email to guidance counselors, who could then share them with families. The app considered "most helpful" by a panel of New York City high school students, created by FindTheBest, allows users to make side-by-side comparisons of all 700 high school programs. Another app, Noodle, allows users to search for schools near a particular subway line—a feature added based on parent feedback at a demo sessions. As of Spring 2016, three of the original six apps are still on the NYC DOE's website and in use by students and parents.[6]

#SharkTankEDU

Since 2013, iZone has been conducting regular #SharkTankEDU events,[7] named after a television show in which entrepreneurs pitch a company to potential investors and seek to engage one of the "sharks" as a business partner. During iZone's #SharkTankEDU events, ed-tech developers present a product to a small group of "sharks"—educators, principals or students—who provide feedback on the product. The events provide companies with expert feedback from their target users and give potential users agency in the development of a product.

Prior to participating in a #SharkTankEDU event, a company representative must attend "office hours" with an Innovate NYC team member, where the company representative gives a seven-minute product demo followed by a 20-minute discussion. These meetings allow Innovate NYC staff to vet companies for their product knowledge and openness to feedback.

Each #SharkTankEDU event involves three companies and approximately five to seven "sharks" chosen by iZone staff. Typically, each event has a theme holding together the three products, such as math instruction or classroom management. A representative from each company gives a product demo. The sharks observe the demos, and hold a 20-minute Q&A session with the company representatives.

Following the event, sharks provide feedback about each product through an online form.

The participants we interviewed largely agreed that #SharkTankEDU events were a useful exercise. Teachers and principals appreciated being able to take part in the product development process and being given a platform to voice their expertise. Company representatives reported that they received helpful feedback and insight in the early stages of product development, and some were able to improve the products based on feedback they received. As one NYC DOE staff member explained:

> *We've also seen folks that have come into office hours, done a Shark Tank, got railed by all the educators, "This is useless," pivoted and then had the same educators see them a year later…and say, "This is a product that I will use."*

#SharkTankEDU events have continued into the 2015-2016 school year.

Short-Cycle Evaluation Challenges

In 2014, the iZone began the Short-Cycle Evaluation Challenges (SCEC). The aim of the SCEC was to create a classroom-based semester-long pilot that would 1) allow for ongoing communication between educators and developers and 2) identify and measure outcomes that the apps were expected to affect. While classrooms pilot a SCEC product, outside evaluators observe participants, survey students, and collect other data. iZone staff viewed these short evaluations as a promising way to test products and "provide timely information to educators and school leaders so they can make more informed decisions about implementing technology tools that support student achievement."[8] SCEC pilots were held in the fall and spring semesters of the 2014-2015 school year. Beginning in the 2015-2016 school year, the NYC DOE decided to hold one cycle per year, in the fall semester.

Each year, approximately 12 schools have participated in a SCEC (in 2014-2015, half started in the fall and half in the spring; more recently, all schools began in the fall). Schools initiate the process via an application submitted by a team of teachers, including information about their school's specific needs, goals, and technological capacity. For example, one school sought a tool that would make it easier to manage classroom-based differentiation (i.e., tailoring instruction to meet individual student needs). The iZone then sends out a request for ed-tech companies to respond to a specific team's challenge. Officials use a rubric to rank each applicant on education potential, program readiness, and capacity in order to narrow down the pool of potential companies to two or three for each teacher team. Many of the finalists were

companies that had participated in #SharkTankEDU and/or the office hours described above.

Before a pilot begins, each teacher team has the chance to engage virtually with the companies shortlisted by iZone as part of an event called "Match Day." The teams watch product demos and have 20-minute discussions with company representatives. Teacher teams also receive a two-week trial account for each potential pilot product, after which they select their first and second choice products.

To help secure buy-in to the initiative, the iZone asks school leaders to sign letters of support, which confirm that students would have access to necessary devices and that teachers would be allowed to participate in in-person workshops and planning opportunities.

Teacher teams and company representatives meet at three events organized by the iZone throughout the semester long-pilot: The first is "Launch Day." The second is a mid-pilot workshop where teacher teams and company representatives have an opportunity to discuss and, if necessary, adjust the pilot's implementation. The third is a final meeting where participants reflect on their experiences. Company representatives also visit teacher teams at their schools two or three times throughout the pilot. The external evaluators (in the first year, a research team from Johns Hopkins University, and in the second year, the Center for Children and Technology) visited schools at least twice during the pilot.

Nearly all of the participants we interviewed believed that the SCEC provided reliable feedback for companies to improve their products, and provided teachers and schools with greater discretion in choosing which products best fit their specific needs.

SECTION 3: LESSONS FOR USER-CENTERED ED-TECH DEVELOPMENT AND PROCUREMENT

It may be helpful for districts to consider the distinct steps involved in bringing a used-centered approach to the development and procurement of education technology. In this section of the report, based on NYC's efforts, we walk readers through four distinct stages of this process: 1) defining the problems, 2) selecting users and ed-tech companies, 3) implementing pilot-based initiatives, and 4) evaluating products. Each section highlights lessons learned from one or more of the initiatives described above, particularly in regards to how districts can improve the flow of information between users and ed-tech companies and promote more fruitful collaboration.

Defining the Problem

For technology to be useful in classrooms, it must address a real challenge facing educators or students. In all three iZone initiatives described here, teachers, families, and students themselves—rather than developers or district staff—played a central role in problem identification. The iZone's user-centered approach starts by eliciting information from potential users about the problems they are facing and then involves them (to varying degrees) in the design and development of the solution. As one member of the Innovate NYC team described, "You place the needs, and preferences, and desires, and interests, and pleasure of the user first…all other decisions and activities flow from that."

Developers, educators, and NYC DOE staff we interviewed cited numerous advantages to user-centered problem definition. First, they told us, it improves alignment between ed-tech products and the needs of educators. One iZone staff member described how developers often create products with only a limited notion of what teachers might actually need or want to use in their classrooms:

> *One of the biggest problems in the ed-tech ecosystem is that a lot of times entrepreneurs have some version of a problem, something that they identified as a problem. Sometimes it could be a problem, but it wasn't defined correctly or accurately, should I say, and missed the boat on what the problem really is and how it manifests in schools and classrooms…. A lot of times you hear entrepreneurs say something like, "My wife's a teacher, my mom was a teacher." Therefore, a lot of people think they're an expert on education. If you're not a teacher or principal or somebody here now, or a student for*

that matter, you're really not actually that relevant to the here and now challenges in education.

Without intimate knowledge of classrooms, developers run the risk of producing tools teachers will never use. Even when producers of ed-tech have consulted with educators, their perspective is limited to the communities of educators they have access to. One developer said, "We wanted to be sure that our perception wasn't biased, because we tend to hear more from certain communities than others. We wanted to have supporting research that didn't come just from us, so have an outside organization take a look at the things that we have been considering for a couple of years." Having the district facilitate the process of problem identification may help ensure that a more representative number and type of respondents are weighing in.

Second, our conversations with educators suggested that when they play a role in identifying the problem that an ed-tech tool is intended to solve, they may be more invested in implementing the new product. One iZone staff member said:

In that sweet spot, teachers felt that they were being heard, and so they were really invested if they could see products being changed based on their insight. They described it as this magical experience where this cool developer, someone they never thought that they could be useful to, they were all of a sudden an expert to them. There was one elementary school teacher who said, "I've been doing this for 20 years, and I've never felt as appreciated and that my opinion mattered outside of my classroom. There's never been an instance where that has happened." I think it made them feel valued, and I think it increased their buy-in, then actually their implementation was better because they were more vested in the process.

Some educators told us that they had felt left out of the development process for so long that opportunities to help identify problems and provide meaningful feedback about potential solutions were intrinsically motivating and engaging.

Finally, participants we spoke with argued that relying on actual users to define problems helps ed-tech companies develop better products. One staff member pointed out that the input of educators is "more of a valuable commodity than I think anybody really understands." Educators' experience and expertise make them reliable sources of information for developers creating ed-tech products that are intended to help solve everyday problems in schools.

How it Works: Problem Definition in the School Choice Design Challenge

When the SCDC launched, the Innovate NYC Schools team had only a general sense of the problem—the NYC high school system is so large that it can be difficult for families to decide which schools 8th graders should apply to. The Innovate NYC team set out to develop a more nuanced sense of this challenge by talking to families and students in the midst of the high school choice process, as well as middle school guidance counselors who support families through the process. As noted above, the NYC DOE engaged Public Policy Lab (PPL) to conduct a series of conversations; these included 15 NYC DOE staff members, 8 school employees involved with enrollment, 22 students, and 5 parents. A PPL staff member emphasized how important it was for this stage of "discovery" to begin very broadly and remain open to whatever answers emerged from the conversations:

> *Our responsibility, as we understood it… was to investigate the experiences of students, families, and front-line service providers in the context of school choice, and to generate a series of recommendations and findings about people's experiences, specifically around how school choice could be easier and more meaningful.*

Based on conversations with potential users, PPL catalogued 30 recommendations that could improve the school choice process for families (e.g., one recommendation was for developers to offer tools that would allow families to sort schools based on specific criteria), as well as sample design options to consider (e.g., a matchmaking website).

Challenge: When User-Identified Problems Don't Match a Project's Goals

Sometimes, the problems identified by users might be at odds with the solutions developers or project sponsors (in this case, the NYC DOE) are focused on producing. A PPL employee reported:

> *We have learned that it is incredibly important to make sure that the agency actually wants the kinds of findings that are going to come out of doing this kind of work…. I think it's best to go into a discovery process not with a predetermined conclusion, but rather saying, "What will we hear? What will we learn?" What we heard and learned was people need all kinds of things, which are not necessarily digital applications.*

This PPL employee explained that initially, PPL did not know that the NYC DOE was specifically seeking an app-based solution. If they had known this, PPL staff told us they would have developed their discovery process very differently (or not at all). PPL approached the discovery process with the goal of generating many different types of ideas, not just apps. For example, one user-generated suggestion was

something like a deck of cards with different schools' information, while other ideas focused on having easy access to a person who could help. In fact, PPL staff noted, many of the recommendations they developed were not necessarily a good fit for an app-based solution, particularly for low-income families who may have limited access to technology, or individuals who are not native English speakers.

The School Choice Design project demonstrates the role users can play in the identification of a problem. At the same time, it highlights the importance of remaining open to the idea that users may identify issues that technology cannot solve. Clear communication among all stakeholders, from the launch of a project, can help prepare for this reality.

Selecting Users and Ed-Tech Companies

The three iZone projects described here depend on ongoing input from users (i.e., teachers, students, or families), as well as developers who are receptive to feedback. The NYC DOE recognized that for these initiatives to succeed, they would need to establish clear criteria for selecting participants. For example, in the SCEC and #SharkTankEDU, teachers provide a critical perspective as to what goes on in the classroom and what tools and resources are needed to successfully implement new interventions, initiatives, practices, and policies. If participating teachers are not invested in this form of participation, developers miss out on the opportunity to gain critical insight about what is and is not working in classrooms, and schools may end up rolling out tools that are not useful for improving the quality of teaching and learning. Thus, it is important to select a cohort of users who have an interest in exploring the use of technological learning tools.

Likewise, developers offer technical expertise in product development as well as the ability to modify their products. If developers are not truly interested in understanding how users experience their product and making changes based on users' feedback, teachers and schools miss out on the opportunity to partner with the developers to address a need in the classroom or school. For this reason, it is important to select a cohort of developers who are committed to a collaborative development process.

In some NYC DOE initiatives (e.g., the SCEC), it was particularly important to identify strong cohorts of both teachers and developers in order to create effective teacher-developer pairs for the pilot phase. According to the NYC DOE, effective teams demonstrated a shared understanding of their roles in the pilot and worked

collaboratively to address a common problem in the classroom or school. Strong pairs were able to communicate effectively about additional supports needed for a successful pilot and make adjustments to the product or its implementation to optimize its utility.

How it Works: User Selection

Before selecting users to take part in an initiative, the iZone staff created criteria for participation. The NYC DOE learned that having clear criteria was important to ensure that users had the capacity to implement an ed-tech initiative and were interested in addressing the defined problem. Some of the criteria included:

1. **Interest in ed-tech**. Both teachers and respondents from the NYC DOE emphasized that successful teacher participants should view technology as a potential solution to problems in the classroom. One user stated:

   > *Well, the first thing is that they should actually believe fundamentally that technology has a place in the classroom, and that place is in the learning experience of the students….I think it really helps if you go in with that perspective, because if you're not coming in with that perspective, I think it's really hard to give valuable feedback to an ed-tech company because, theoretically, that's what they're trying to do.*

2. **Familiarity with technology.** Educators should be comfortable using digital tools, and have the capacity to integrate technology into their classroom. One NYC DOE staff member explained that it's important for teachers to have a basic understanding of technology so that the developers don't have to spend time educating teachers about general technology use, but rather how to use their specific product. This NYC DOE team member listed some factors to keep in mind during this process:

   > *What kind of training do teachers have, what you can expect, what you can't expect. What type of on-boarding is going to be necessary for any technology tool? Because, I mean, a lot of… the early-stage entrepreneurs are coming into schools and finding that they're doing tech support, troubleshooting that's not even related to their product necessarily, but [about] why it isn't working in the school.*

3. **Appropriate technical infrastructure**. Participating schools and teachers should have access to the necessary hardware, software, and technical support. Important questions to ask include: Do all participating teachers have access to computers or tablets for their students? Is scheduling computer time a challenge? Does the ed-tech product need to interact with other systems to operate, and if so, what permissions

need to be put in place? This information is key to understanding a school's capacity to actually implement new tools.

4. **Support from school leadership**. Without principal buy-in, it can be challenging for teachers to gain access to appropriate supports, such as laptop carts or iPads, or to make needed changes to instructional practices. Early on, the NYC DOE reflected—and teachers we interviewed agreed—that pilots in certain schools weren't successful, in large part because the school's leadership or overall environment was not conducive to supporting this type of work. Subsequently, the NYC DOE had each principal at a school participating in the SCEC sign a letter of support in order for teachers to participate. One educator described what it took for a school to implement a successful user-centered design project:

> *Well, I would tell them that they needed to first have a strong team of teachers; not one particular teacher, but a strong team of teachers from various disciplines, various subject areas. I would say that they needed to [engage the] principal in the early steps of the process, so that the principal was sure that the application that his team selected or her team selected was aligned to the vision of the school and supported the immediate instructional needs.*

How it Works: Developer Selection

The NYC DOE also learned the importance of identifying ed-tech companies willing and able to work with educators and direct attention toward a specified problem. Selection criteria for developers included:

1. **Understanding of the initiative and the developer's role.** First, ed-tech companies had to understand the goals of the initiative they would joining and the role they were taking on. All of the initiatives described in this report were designed to be collaborative, and asked developers to respond to a challenge identified by educators. Developer buy-in to these goals was essential for creating a collaborative working relationship with schools.
2. **Appropriate stage in development.** Through earlier Innovate NYC initiatives, such as the Gap App challenge, the NYC DOE team learned that when companies with less developed ideas participated in a pilot, both they and their teacher partners gained little. Therefore, for the three initiatives described in this report, the NYC DOE sought out products whose developers could demonstrate a comprehensive theory of action for the product, how the product was intended to improve student outcomes, and in some cases, evidence to support the product theory. The purpose was to discover companies with products in a developmental state that maximized the

ability to receive and incorporate feedback. One staff member explained the importance of selecting products that are not over- or under-developed.

> *Some of the products in the Gap App [pilot] were just way too early. There wasn't enough content, and their team wasn't big enough to make the changes. Then some were platforms where there were already hundreds of thousands of people on it, so they weren't going to change it just based on a handful of New York City teachers. [For SCEC] we cut off the beginning and cut off the end and said the more appropriate companies are the ones in the middle.*

3. **Receptivity to feedback.** The NYC DOE also sought developers who were receptive to feedback, had products that could be customized to fit classroom needs, and had the capacity to incorporate changes within the timeframe of the initiative. For instance, throughout the SCEC initiative, users offered feedback to developers, and developers were asked to use that input to strengthen their product. Similarly, users in the SCDC and #SharkTankEDU initiatives offered developers feedback on aspects of a product that could be added or improved. For this exercise to be valuable, developers needed to have some interest in and willingness to consider users' input.
4. **Familiarity with the user community**. Lastly, a member of the NYC DOE team expressed the importance of developers who have some prior knowledge of the school communities they plan to work with. Understanding the school community and their available resources allows the developers to see how their product will be integrated into the classroom and what might be required for successful implementation (e.g., additional technical support or hardware support).

Challenge: When Users and Companies Don't Match

Despite efforts to find strong users and developers, much of the success of recruitment and selection depends on "the match"—or the dynamic relationship between users and developers. Participants in SCEC reported a number of challenges that revolved around misalignment of pairs. In some cases, the developers overestimated schools' technical capacity and their access to hardware and software needed for the pilot. Not all developers are well suited to providing technical support and hosting professional development sessions for schools and teachers on how to use a tablet computer. Furthermore, developers were expected to be receptive to feedback and make changes to their tool during the pilot. However, sometimes users and companies had a different vision for the type of feedback being solicited and in a few cases, developers objected to feedback that did not align with their own vision for the product moving forward. Our interviews suggest that districts should keep

these factors in mind, and screen for them as much as possible, when creating partnerships across groups of users and developers.

Implementing Pilot-Based Initiatives

One of the central components of the Short-Cycle Evaluation Challenges (SCEC) was to allow users to consistently engage with a new ed-tech product during a semester-long pilot. The pilot aimed to provide an opportunity for each company to improve its product and better align it to teachers' needs and to allow teacher teams an extended opportunity to try a new tool. Below, we draw on the SCEC experience to explore aspects of implementation that are important for an effective pilot.

Above all, implementation in SCEC hinged on the strength of the *feedback loop* between companies and users. According to developers, a key reason why they participated in initiatives like SCEC and #SharkTankEDU was to receive feedback from the target users of their products. However, in order for companies to improve their products, users must be equipped to explain what about it does or does not work. To do so, users need adequate exposure to the product, technical training on how to use it, and the opportunity to discuss their experience using the product with developers. A pilot period, aimed explicitly at developing a strong working relationship between developers and educators, provides an opportunity for richer, more in-depth and iterative feedback.

How It Works: Implementing a Strong Pilot in the Short-Cycle Evaluation Challenges

1. **Keeping track of product usage**. When running a pilot, it is important to keep close track of how much a product is being used, so that user feedback can be put into context (e.g., feedback from a teacher who used a product once might carry different weight than one who uses a product daily). The iZone employed several methods to collect usage data. During the first year of SCEC, iZone staff tracked usage through bi-weekly surveys filled out by teachers (usage information was cut from later surveys to make them shorter). Some apps collected usage data automatically, which was shared with the NYC DOE. When Johns Hopkins researchers conducted the evaluation, they also tracked overall product usage though classroom observations and surveys.
2. **Supporting users.** The iZone provides training opportunities to teachers participating in SCEC. For example, the launch workshops held at the start of each pilot included two to four hours for teacher teams to receive initial training on the

product they would be piloting. Individual teachers also received compensation for up to four hours of professional development and planning time with companies per month. Currently, SCEC schools are self-selected (teachers, some of whom have a prior affiliation with iZone programs or personal interest in education technology, choose to apply), which increases the likelihood of a certain degree of technological capacity.

3. **Fostering strong working relationships**. In order to support collaboration between companies and educators, iZone creates multiple opportunities for developers and educators to meet over the course of the pilot, including three iZone-sponsored meetings and two school visits by company representatives. A developer explained:

   > *The school visits are key because they really served as the reason to talk, and so in advance of the first school visit in November, we did have a video call where we went through kind of a slide deck and what would be expected of us when we got there, what we would need to do.*

4. **Soliciting feedback.** As described above, one of the goals of the SCEC was to provide developers with ongoing feedback about their product, from real users. Participating company representatives spoke positively about the feedback that teacher teams provided. Teachers often sent comments or questions via email to companies over the course of the semester. Companies also received feedback during the classroom visits. A developer described some of the contributions provided by students and teachers:

   > *They used a cart model, where they transported iPads around different classrooms…. Because of that, we now sync student data across [devices]. We changed one of the scoreboards in one of the games just to make it clearer to students. We also provided some supplementary material that the teachers asked for to help integrate the games into the classroom.*

Challenge: When Pilots Falter

Even if a product is well aligned to a classroom's needs, implementation can still be difficult. To succeed, programs such as SCEC rely on schools' adequate technological and staff capacity, and on good working relationships between teacher teams and outside companies. Challenges can emerge in any of these areas.

Teachers participating in the SCEC had to devote some of their already scarce time to mastering a new tool. Competing demands on their time, both during and after school hours, sometimes made it difficult for teachers to be sufficiently trained on the

product they were being asked to use, and to incorporate it into their classroom practice.

Most of all, the SCEC depended on healthy relationships between teacher teams and companies—relationships that could withstand frequent criticism through user feedback, as well as frustration on both sides about potentially limited technology capacity. Individual personalities and the unique dynamics that emerge between educator teams and developers also play a role in the success or failure of the relationship. To some extent, the pilot depended on things that were unpredictable. However, our interviews suggested that delineating clear roles and responsibilities, supporting ongoing communication, and encouraging a spirit of mutual respect can go a long way toward fostering productive working relationships and fruitful pilots of ed-tech tools.

Evaluating Products

A central challenge of pilot-based initiatives is generating evidence that can *both* inform ongoing product improvement *and* answer questions about whether the product, as it currently exists, is achieving its intended goals. A formal evaluation, in addition to ongoing communication between users and developers, can help supply this information. Evaluations can provide important context that allows developers to know how to interpret user feedback (e.g., how often were users interacting with products? were they using the products as intended?). Evaluations can also help schools and districts identify target outcomes and learn whether a product is actually making a difference for students—information that is essential for making smart choices in how to allocate resources. In designing an evaluation, schools and districts need to take stock of what they want to learn (i.e., the goals and purpose of the study), as well as the feasibility, timing, and costs of various evaluation approaches.

For the SCEC, the Innovate NYC team sought an evaluation method that was (1) appropriate for the short time frame of the initiative and (2) had a structure that was flexible enough to accommodate users providing continuous feedback to developers, and subsequent changes being made to the apps. The team decided to utilize Design-Based Implementation Research (DBIR), "an emerging approach to relating research and practice that is collaborative, iterative, and grounded in systematic inquiry."[9] As used by the NYC DOE, DBIR is focused on building the capacity of developers and educators and encouraging continuous improvement of particular tools.

How It Works: Evaluating Ed-Tech Tools Using Design-Based Implementation Research

The NYC DOE's evaluation strategy for the SCEC focused on being attuned to the needs of the participating developers and educators.

1. **Identify appropriate metrics.** When measuring the efficacy of an ed-tech tool during a pilot, it is important to focus on outcomes that a) can realistically be changed within a short timeframe and b) teachers have identified as a priority (e.g., homework completion). Targeted outcomes should also reflect what the product is specifically designed to improve. In describing SCEC, an iZone staff member reported that the Johns Hopkins evaluators worked with the ed-tech companies "to customize [metrics] and make sure that the metrics that we were using to evaluate that product made sense for that product, that we weren't trying to do a one size fits all." Examples of useful metrics might include survey-based measures of student engagement or motivation, teacher engagement or utility (e.g., did the tool make teachers' jobs easier or save them time?), and a product's rating on the "net promoter scale" (i.e., whether a participating teacher would recommend a product to another teacher). Using these outcomes allowed developers to clearly understand users' perceptions of their product. One developer, for example, reported two specific outcomes from their pilot: Nearly 90 percent of participating students said that their product "helped them understand math," while teachers said it simplified their practice. The developer also learned through the implementation evaluation that teachers were able to adapt the product to their own individual teaching styles, technological capacities, and time constraints—valuable feedback for a company that is trying to create user-friendly tools.

2. **Align evaluation timeframes with school calendars.** For evaluations to be useful to principals, in particular, they must produce results in time to inform decisions about the next school year's budget. One NYC DOE staff member described the disadvantages of a longer-term evaluation that had been used in a previous iZone initiative:

> *At the end of [the two-year project], it was over, and the schools were supposed to make a decision about what to do the next year, if they were going continue using the program. However, it took another eight months to get data on whether or not it worked. We've seen that repeated in a number of our different research projects where it takes too long, or the information is not available from the state on these outcomes.*

SCEC pilots now include time for at least two months of implementation research (October-December) and at least two months to synthesize data (January-March).

This allows principals to receive results by March, when they plan their budgets for the following school year.

3. **Document implementation challenges.** It is also important to understand what obstacles, if any, might have interfered with pilot implementation. For example, challenges identified in the SCEC included lack of teacher time and buy-in, limited usage, and inadequate technological capacity. These types of issues can be illuminated through classroom observations, interviews, and surveys. The Innovate NYC team recommends that evaluators conduct 5-10 site visits over a semester-long pilot, and keep in regular contact with users, in order to develop a clear picture of what is and is not working. When using this resource-intensive approach, evaluations may have to be limited to a small number of schools. The NYC DOE decided that in the early development of a product, it's more important to gain an accurate view of implementation, rather than having a broad data set. At least one developer reported that the data collected from student surveys and weekly feedback from teachers was more useful than data they had received through a previous, large evaluation. This developer specifically appreciated receiving nuanced information about implementation challenges and successes in a specific school context.
4. **Share results early and often.** In some cases, researchers wait until after a study is over to release evaluation findings. However, developers spoke of the importance of using formative assessments during a pilot to allow for improvements to the product and the user experience. Ongoing reporting can also provide documentation of how a product changed over the course of the pilot. For example, in the Fall 2015 pilot, the SCEC external evaluator, Center for Children and Technology, wrote regular memos in addition to a final report.

Challenge: When Evaluations Yield Limited Information About a Product's Impact

Districts should be realistic about what this kind of short-cycle evaluation can achieve and the types of questions it can answer. Indeed, for several reasons, short-cycle evaluations may not provide definitive information about how an ed-tech product affects student outcomes. First, it can take some time for a teacher to integrate a new product into their class. In a short pilot, initial implementation challenges may make it difficult to discern the impact of a product. Second, short-cycle evaluations can't, by definition, provide information about the *longer-term* impact of a product. It is possible that using a product for an extended period of time would produce results that are different than using it for a few weeks or months. Finally, the SCEC evaluation was missing an important aspect of rigorous evaluations: a control or

comparison group, to help determine how students likely would have performed *without* the tool.

When districts want reliable information on a product's impact or want to understand how a product is being implemented over time, they will need to invest in longer-term, more summative evaluations.

SECTION 4: CONCLUSION

If trends persist, districts across the country will continue to seek out ed-tech products designed to support classroom teachers, in the hopes of improving students' academic achievement. The initiatives described in this report highlight some of the promise and challenges in a user-centered approach to procuring and developing ed-tech products. Initiatives like the School Choice Design Challenge, #SharkTankEDU, and the Short-Cycle Evaluation Challenges are unlikely to succeed without multiple support systems, including a proactive central district office that is able to build ties with the ed-tech community and a cohort of educators willing to integrate new products into their work. Above all, the individuals involved need to embrace a collaborative method of discovering problems, identifying potential solutions, and testing out those solutions under real-world conditions.

Through the initiatives described in this report, the iZone has been able to foster dialogue between ed-tech companies and educators, students, and families. The hope is that this dialogue has led to products that better meet these stakeholders' needs, while providing them with a voice in the design process. At a minimum, the iZone has demonstrated the possibility of approaching procurement in a different way.

Future research will be needed to determine whether and how these initiatives have affected student achievement—the ultimate goal of any classroom innovation. While many questions remain, we hope this report provides districts with a useful starting point when considering new ideas for designing and procuring ed-tech products that align with the needs of their teachers and students.

Notes

[1] Richards, J. & Stebbins, L. (2014). *2014 U.S. Education Technology Industry Market: PreK-12*. Washington, D.C.: Software & Information Industry Association. http://www.siia.net/Portals/0/pdf/Education/SIIA2014Report_PreK12_FINAL%201%2031%202015_Exec%20Summ.pdf

[2] Villavicencio, A., N. Siman, C. Lafayette, & D. Kang (2016*). Connecting Teachers and Ed-Tech Developers: Lessons from NYC's "Gap App" Program*. New York, NY: The Research Alliance for New York City Schools. http://steinhardt.nyu.edu/research_alliance/publications/gap_app_report

[3] iZone began with 81 schools in 2010, but now numbers nearly 300. These schools have participated in a variety of innovation and personalized learning initiatives. To learn more about the iZone, visit http://izonenyc.org/

[4] Proffitt, B. (2013). "What APIs Are and Why They're Important." ReadWrite. Retrieved from http://readwrite.com/2013/09/19/api-defined/

[5] Herold, B. (2013). "N.Y.C. Turns to Open Data to Help With High School Choice." Education Week. Retrieved from http://blogs.edweek.org/edweek/DigitalEducation/2013/11/nyc_turns_to_open_data_to_help.html?r=1314570343

[6] The three other companies were removed for different reasons. Two didn't make edits requested by the NYC DOE or did not update the app after a function broke. Another company made a business decision not to update the app with the most recent NYC DOE data release, so a mutual agreement was made to discontinue its use.

[7] The events do not take place during winter and summer breaks from school.

[8] NYC DOE (n.d.), "Short Cycle Evaluation Challenge." Retrieved from http://izonenyc.org/short-cycle-evaluation-challenge/

[9] Design Based Implementation Research. (n.d.). Retrieved from http://learndbir.org/

APPENDIX A: DATA SOURCES AND ANALYSIS METHODS

This appendix describes the data sources and analytic process used to develop the findings in our report, *Bridging the Gap*.

Data Sources

The Research Alliance team collected data about the three initiatives described in this report through semi-structured interviews and document reviews. One researcher from the Research Alliance interviewed:

- Five NYC DOE staff members (two in the Office of School Enrollment and three in the iZone);
- Six individuals working at education technology companies whose products were used in one of the three initiatives;
- Two school principals and three teachers, each of whom who participated in at least one of the three initiatives; and
- One staff member each from Public Policy Lab, Nexus Works (a consulting agency involved in the Short-Cycle Evaluation Challenge), and the Center for Children and Technology.

All interviews were audio recorded and later transcribed. The conversations were semi-structured, in that the researcher was expected to cover a defined set of questions, but was also encouraged to depart from the protocol if they felt it would yield valuable data. Our protocols included questions about key components of the Innovate NYC Schools initiatives, as well as its goals, main challenges, opportunities and recommendations for other districts.

We also reviewed documents and other materials produced for the three initiatives (mostly provided by iZone staff), such as project descriptions, meeting agendas, recruitment material, and external evaluations.

Data Analysis

We used an iterative, multi-step process to analyze the interview transcripts. Using the transcripts, a team of researchers developed an initial set of codes based on key themes that they identified. We piloted these codes by having each member of the research team analyze one interview using the preliminary codes, and then used insights gleaned from this pilot to refine the codebook. Our final codebook included

22 codes. We analyzed the transcripts using this codebook, and used our results to create an outline of "lessons learned" from the three initiatives. We then coded the transcripts a final time with a focus on "lessons learned" within four phases: *problem definition*, *user/developer recruitment*, *implementation*, and *evaluation*. Insights gleaned from this analysis became the outline for this report.

The documents we analyzed provided additional details, context, and background information. For the most part, we used the documents to verify initiative events and timelines against what statements made during interviews.

This analytic process was developed to efficiently lead researchers from initial reflections about how the three initiatives attempted to engage the ed-tech community to the identification and deeper analysis of themes across initiatives. This allowed us to focus on important insights and identify patterns highlighted in this report.

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The Research Alliance for New York City Schools conducts rigorous studies on topics that matter to the city's public schools. We strive to advance equity and excellence in education by providing nonpartisan evidence about policies and practices that promote students' development and academic success.