Organizing to Innovate: Workshopping New Product Concepts at Panorama Education

Share Your Story

Organizing to Innovate: Workshopping New Product Concepts

at Panorama Education

Doctor of Education Leadership (Ed.L.D.)

Capstone

Submitted by

Robert E. Wessman

To the Harvard Graduate School of Education

in partial fulfillment of the requirements for the degree of

Doctor of Education Leadership

May 2016

for Dawn

my Morning and Spring

and

for the Little Ones

whose music, spark, and bounce

carried me home

The entire Panorama Education team who has provided me a model of a high-functioning, thoughtful organization, with collective desires to impact education. I am grateful to call them colleagues and friends. To Aaron Feuer, for example of servant leadership, and for pushing me to be clearer and simpler and providing space to explore while being a member of the team. I am in constant admiration for the skill and care with which he and the team have built Panorama Education.

The Capstone SuperTeam ™: Sarah Glover, who has been a constant source of support. Beyond feedback and mentorship throughout the project and writing process, her humanity and care have inspired me to be a better person. Jim Honan, whose unique organizational perspective was invaluable and added a critical dimension to this work, influenced me to take this project from mere technical work to adaptive leadership. I am grateful for his humor and perspective. Matthew Shaw, whose January feedback session inspired the overhaul that this capstone needed. I am grateful he took time from his busy doctoral studies to provide that service.

My advisor Kathy Boudett, whose strength, mentorship, and example have been an even keel through challenging conditions. I so appreciate the energy, action, and collaboration she embodies. Every time we work together I come away a stronger professional. I am immeasurably grateful she asked me to participate in Data Wise three years ago.

As I reflect on the learning in Utah that laid the foundation of this work, I am indebted my dear friend Emily Parrish, who was my first mentor as a new teacher and became a trusted colleague and lifelong friend. I am grateful also to Mary Ward, who opened her practice, classroom, and curriculum for my use in the early days and offered her friendship and support during difficult times. I also thank my

former students, who taught me to listen first, then teach. To Jerry Haslam, my principal mentor and colleague, who took a risk on an uncertified teacher, and again as an intern assistant principal, making it possible for me to choose the career I chose. To my colleagues at Taylorsville High School (some of whom were my own teachers) who helped me explore my own teaching voice and to recover from mistakes and setbacks. To my colleagues at Granger High School, who accepted me warmly and with grace as a teacher and administrator during a challenging time.

Any acknowledgements would be incomplete without considering the family who raised me.

My first teacher: Annette Wessman, marvel of mothering, and educator in the most fundamental sense; unbending example of nurture, humor, patience, conversation, faith, and support. I owe her everything for raising and educating me in a loving home.

My father: Ernest Wessman, who teaches me through gentle stoicism, quiet stability, resolute strength, and love for my mother; modeling a selfless, servant leadership that I hope to emulate.

My six siblings and their companions: Coralee and Corey, Alan and Shannon, Scott and Julie, Derek and Kiyomi, Randall and Katie, and Kevin and Miranda. As kids we learned, played, sang, laughed, worked, and celebrated together. Now, they teach me how to raise children, live life richly, and honor family.

My children, Robyn, Holly, Michael, Jonathan, and Christopher, who have given up far too much daddy time over the past three years, but unconditionally love. They keep me young and curious and teach me more about learning than I could hope to gain through any books, articles, or lectures.

Finally, this is for Dawn, with whom I have built a life in equal partnership, and without whom none of this would have been possible. I am grateful for the grace, the effort, the vigor, and the love with which she tackled these last three years, and for her steady, powerful presence.

Table of Contents

Abstract

Leaders of education organizations must determine how to positively impact students, staff, and families while ensuring organizational strength. Innovative leaders and entrepreneurs seek to develop and roll out new ideas to dramatically advance students' achievement. However, the need to innovate does not supersede the need to execute on a core business while maintaining high levels of quality; this paradox makes it challenging to know how to allocate resources and people toward innovation.

In this capstone, I describe and analyze my experiences leading a strategic project for supporting innovation and experimentation at Panorama Education, an education technology company focused on school improvement through data analytics. I developed a framework for promoting innovation, workshopping, and experimentation in order to support the organization to make evidence-driven product decisions. I describe the theoretical foundations for the framework and literature documenting the leadership challenge of implementing it at a fast-paced, rapidly growing organization.

I argue that by deliberately allocating resources and effort toward ideating and designing, aligning to company strategy and vision, and prototyping and testing, a growing organization can prepare for ongoing innovation and adaptability. I also find that change management on the part of the implementer is a necessary part of innovative change, so I reflect on my successes and challenges as a leader developing and implementing the new system at Panorama Education.

Introduction

When assuming stewardship over an education organization, leaders accept twin key responsibilities: to ensure positive impact and to strengthen their organizations. For district superintendents, this means ensuring that each student in the district has access to quality academic programs in each school (impact) while simultaneously ensuring proper budgeting and resource allocation (organizational strength). For a school principal, this means ensuring that each student progresses according to learning needs, while ensuring strong professional development for teachers, well cared-for facilities, and effective hiring practices. Similar responsibilities exist for non-school education organizations. For an education non-profit, this means ensuring a particular mission is carried out (impact) while obtaining funding and support for that mission (organizational strength).

In mission-driven for-profit education companies with schools and districts as their clients, the charge is the same. It means providing tools or services that positively impact learning and produce enough revenue and growth for the organization to be sustainable. The CEOs of these organizations face big decisions in determining what exactly to build and develop. Which products and services will provide the best value to educators? Which will ensure long-term growth and strength?

A barrier to answering this question lies in the uncertainty and messiness inherent in prediction. It may not be clear which products will create the kind of outcomes that are important to the mission of the company, nor may it be clear what problems schools are trying to solve and whether or not they are willing to invest in solutions to those problems. Lastly, it may be unclear which offerings will produce

revenue. Companies must actively execute on their mission while ensuring that they are growing in the best ways possible, and there are very few sure bets.

This leadership challenge of advancing growth, change, and innovation in the face of uncertainty captures my attention as an educator, entrepreneur, and academic. Because the challenge spans many educational contexts, I sought to focus much of the self-directed coursework and activities of my three-year Ed.L.D. experience at the Harvard Graduate School of Education on studying and practicing innovation and entrepreneurship. This effort has culminated in this strategic project, in which I explore how to lead innovative practices.

What I have learned is that rather than attempting to predict the future, the leadership challenge is to actively define a future state and take informed bets on which solutions will move an organization toward that state. This creative process takes abstract concepts and turns them into concrete realities. That is innovation. Leaders develop a vision and execute real actions to lead to the realization of that vision. Successful innovation has the ability to bring about societal change, creating, as PayPal founder and Stanford lecturer Peter Thiel puts it, a different, better future and making something new instead of "doing what we already know how to do" (Thiel, 2014). Innovators seek to solve the intractable "wicked problems" of the world (Rittel & Webber, 1973), problems that at once resist clear definitions and escape easy fixes. Bringing about a different, better future requires creative, new solutions, and there is perhaps nothing more in need of a better future than the world of education.

But significant barriers stand in the way of enacting a successful innovative vision. For example, a startup may consist of a small team with limited resources working to discover which products or services provide impact and produce

enough growth to ensure survival. Roughly 80% of startups fail to discover this before they run out of "runway" and fold (C. Christensen & Raynor, 2003). Mature organizations, paradoxically, fall into the opposite problem with similar results. They may have a larger team with greater capacity, but over time processes tend to become calcified and inflexible, inhibiting a culture of exploration and growth. They focus on execution and incremental improvements, while bigger, important innovations are kept in check.

The leadership challenge of helping an organization take better innovation bets captures my attention because of experiences I had as an administrator in 2010 implementing innovative programs as a part of a high school turnaround process. Toward the end of a tumultuous first year characterized by 47 physical fights, disproportionate numbers of students of color punished for misbehavior, and 2200 periods missed due to suspension, we knew we had to urgently revamp our discipline system. We needed an innovation that was many times better than what we had, rather than one that would tinker with the problem. However, we faced great uncertainty about how to put the right systems in place. In the midst of such uncertainty, we still had to keep breaking up fights, enacting consequences we knew were ineffective, and mollifying teachers who faced disruption and struggled to manage their classrooms. The stakes were high: we had to change what we had been doing, but we were uncertain about which changes to make and how to make them. At the heart of the matter is that education leaders must simultaneously handle today's issues, which are often more urgent than innovating for tomorrow's outcomes. In our school, we could not simply stop everything and install a new discipline program. We had to discover a way to handle the urgent and develop the new.

Fortunately we stumbled our way into a satisfactory solution. After identifying a discipline intervention that had solid research backing, we experimented with it on a smaller scale. From our small-scale roll-out, there were indications it could be successful at the school level. We took those indications as data showing that we should move forward. As a result, the next year saw significant improvement in which fights dropped by 60% and suspensions by 50%. This outcome was evidence of a good bet.

This successful experience and other less-successful ones piqued my curiosity as an Ed.L.D. candidate entering a ten-month leadership residency: How should a leader build organizational capacity and culture for producing successful solutions to wicked problems? What leadership moves beyond following instinct can help an organization successfully predict which innovations can result in impact and growth? Over the course of the residency, I conducted a strategic project focused on organizational innovation at Panorama Education, the ideal place to engage these questions.

Panorama Education Background and Context

Aaron Feuer and Xan Tanner founded Panorama Education in 2012 with the mission to improve education through access to good feedback data. Feuer's interest in education improvement dated to his time as high school student in Los Angeles where he supported legislative efforts to incorporate student representation in local boards and governance. While undergraduates at Yale, he and Tanner shared a mutual interest in data and developed a way to elevate student, family, and teacher voice through perception surveys, with a strong emphasis on presenting data through elegant, informative reports. During their startup phase, they successfully

applied to be a part of Y-Combinator, a prestigious San Francisco startup incubator, and established partnerships with their first school districts. Their responsive attention to districts' data needs and their ability to deliver excellent service allowed them to grow quickly. Their ability to clearly communicate the benefits of feedback data and the potential for growth secured initial funding, allowing them to relocate to Boston and develop the company.

In 2013, Tanner engaged Harvard Graduate School of Education professor and survey researcher Hunter Gehlbach to design a set of valid and reliable perception survey scales, which Gehlbach designed, tested, and implemented. The scales were then released open-source on Panorama's website. Schools and districts now had access to excellent survey scales as an alternative to surveys of their own design. Panorama engineers continued to develop technologies to support reporting and analytics. The next year was characterized by rapid growth and technical advancements, during which Panorama established a strong reputation for providing excellent, inexpensive survey administrations.

The latest phase of Panorama's development has been characterized by further expansion of technologies and rapid organizational growth. Panorama developed a self-service survey platform, opening the possibilities for greater scale. In early 2015 Panorama launched Playbook, a product developed by Ed.L.D. resident Brian Rainville, that recommends teacher actions based on survey results. Playbook is a platform that houses instructional strategies submitted *by* teachers *for* teachers. This product is structured to add value to teacher reports, answering the question "what do I do now that I've received survey results?" It also hints at the answer to another important internal question for Panorama: "Are we content to be an excellent feedback company, or do we aspire to something beyond surveys?" In

its company values, Panorama communicates the desire to improve education not by incremental change, but by exponential (or "10x") change, going for the "moonshot" in education. As a result, company leadership has established a vision for becoming a multi-faceted data-driven education improvement platform (Feuer, 2015). This aspiration requires a clear vision and dedication to the development of innovative products, features, and platforms that go beyond surveys.

As an Ed.L.D. resident at Panorama, I joined the newly formed Product and Research team to address the need to develop promising innovative ideas that go beyond surveys. In this role, I focused attention particularly on ideas that have not made it to the product roadmap because they are immature, unclear, or based on questionable assumptions. My guiding question was this: How can we at Panorama develop and validate innovative ideas in order to improve the odds that we will produce strong growth and create impact? In other words, is there a way to improve the odds we'll make strong product bets? As a young company, our approach to developing products is still forming and malleable, now is the right time to explore this question.

In this capstone I describe a framework I developed and put into use at Panorama based on innovation-focused academic literature, models in practice, and prior knowledge. This framework holds at its core a key assumption that product decisions should be based on evidence. It is at the intersection of big, imaginative thinking and evidence-driven experimentation that long-term, ongoing innovation occurs. I describe the initial outcomes of having put the framework into place and analyze results according to their impact on the product development process. Finally, I step back to reflect on the leadership challenges I faced and distill these

reflections and analyses into observations relevant to other innovative education leaders.

Review of Knowledge for Action

This section surveys scholarly literature, practical models, and prior experience that serve as a foundation for the framework I developed at Panorama. I begin by exploring how successful organizations nourish a space and culture of ongoing innovation while maintaining quality in execution. Then, I share the framework I developed for innovating at Panorama and explore the literature that serves as the foundation of each of its three key elements: 1) ideate and design, 2) align to vision and strategy, and 3) prototype and collect evidence. Finally, I challenge some of my assumptions upon which the framework is founded by noting criticisms of its underlying theory.

Organizing for Innovation

The first big insight I gained from innovation literature is that a significant part of leadership is ensuring that an organization is able to both execute and innovate. Overreliance on execution leads to inability to grow and adapt, while overreliance on innovation leads to neglect of existing users, clients, or constituents and places revenue at risk. This attention to opposing competencies is what Harvard Business School professor and theorist Michael Tushman calls the "ambidextrous organization" and forms the foundation for long-term organizational success (O'Reilly & Tushman, 2004). Tushman explains that these organizations are structured to both "exploit" existing assets and "explore" new opportunities. But developing an ambidextrous organization is easier in theory than practice. Tushman

notes that within the same organization, teams organized to exploit and teams organized to explore are often in conflict. He argues that these teams must be kept structurally separate, except at the executive level, citing evidence that 90% of organizations that functioned in this way were successful in their breakthrough innovations (p. 46). The part of the organization that explores new opportunities ought to be kept separate from the core business, argues Tushman, in order to allow the former to focus on discovery and innovation without being weighed down with day-to day concerns, and the latter to focus on improving quality, serving customers, and lowering costs. What makes Tushman's model attractive is that it protects innovators from the urgencies of the day-to-day and allows them to focus on discovery.

This idea of a fully autonomous organization within a larger organization may be most practical for a large corporation, but for a company the size of Panorama, with fewer than fifty team members, business theorist John Kotter's "dual operating system" concept is an attractive alternative (Kotter, 2012). In brief, this model advocates for running two operating systems simultaneously: one consisting of hierarchical structures that execute on the core business and another consisting of flexible networks to develop innovations. The first system, developed from more mature processes and responsibilities assigned to functional roles, is focused on quality and execution. The other operating system draws members across the organization on a volunteer basis and unites them to develop and advance an innovative idea. Where the ambidextrous organization separates people based on process, the dual operating system draws on the same people to both execute and innovate (Kotter, 1996). What makes Kotter's model attractive is that it requires a broader coalition of participants in an innovation process and saves

resources by not dividing people out into separate units. The challenge is that in most cases hierarchical structures have a certain gravity that pulls volunteers into the day-to-day execution. Operating a second system functions when individuals have agency and time to dedicate to innovation without neglecting operational duties of the organization.

The second insight I gained from the literature was that deliberate effort must be expended to champion innovation. Because innovation often requires different ways of organizing people, approaches of working together, marketing approaches, and marketing strategies, it requires thoughtful leadership to help others cope with change. Organizational behavior expert and HBS professor Rosabeth Moss Kanter argues that successful change leaders clearly define the project (by identifying the problem, collecting data, and 'selling' the project), build coalitions (by pulling together the resources to make the project work from many areas of the organization), and move to action (by handling interference, maintaining momentum, revising and redesigning, and communicating externally) (Kanter, 2003). Kotter similarly places great importance upon persuasion and communication through his eight part "leading change framework," which includes 1) Establishing a sense of urgency, 2) Creating the guiding coalition, 3) Developing a vision and strategy, 4) Communicating the change vision, 5) Empowering broad-based action, 6) Generating short-term wins, 7) Consolidating gains and producing more change and 8) anchoring new approaches in the culture. (Kotter, 1996). These political and practical efforts are keys to individual innovation ideas, but are also to implementing a *system* of innovation.

A final insight to note here is that the mechanism of innovation is often mistakenly thought of as merely creative, imaginative and visionary. However,

successful innovators are often highly evidence-driven. Even famed IDEO designer Tim Brown points to testing and experimenting using prototypes, a concrete version of a hypothesis. In an exploration of entrepreneurship, business researcher Donald Sexton explains that organizations more consistently produce strong outcomes when they validate their effectiveness through measurement and data (Sexton & Smilor, 1986). Y-Combinator co-founder and entrepreneur Paul Graham says that effective innovators spend time "understanding how to delight their user" (Graham, 2009). In education organizations, it is all about measuring and understanding impact. Understanding users involves learning from them, not only in interviews or focus groups, but also in observation of their behaviors. This active learning, measurement, and evidence gathering is an under-appreciated part of successful innovation, but is foundational to how an organization develops products. As a result, it became the aim of the framework I developed at Panorama, which I later named the Product Workshopping Framework.

Developing innovative ideas

The Product Workshopping Framework has three key elements which I will explain in turn: 1) ideate and design, 2) align to vision and strategy, and 3) prototype and collect evidence.

Product Workshopping Framework
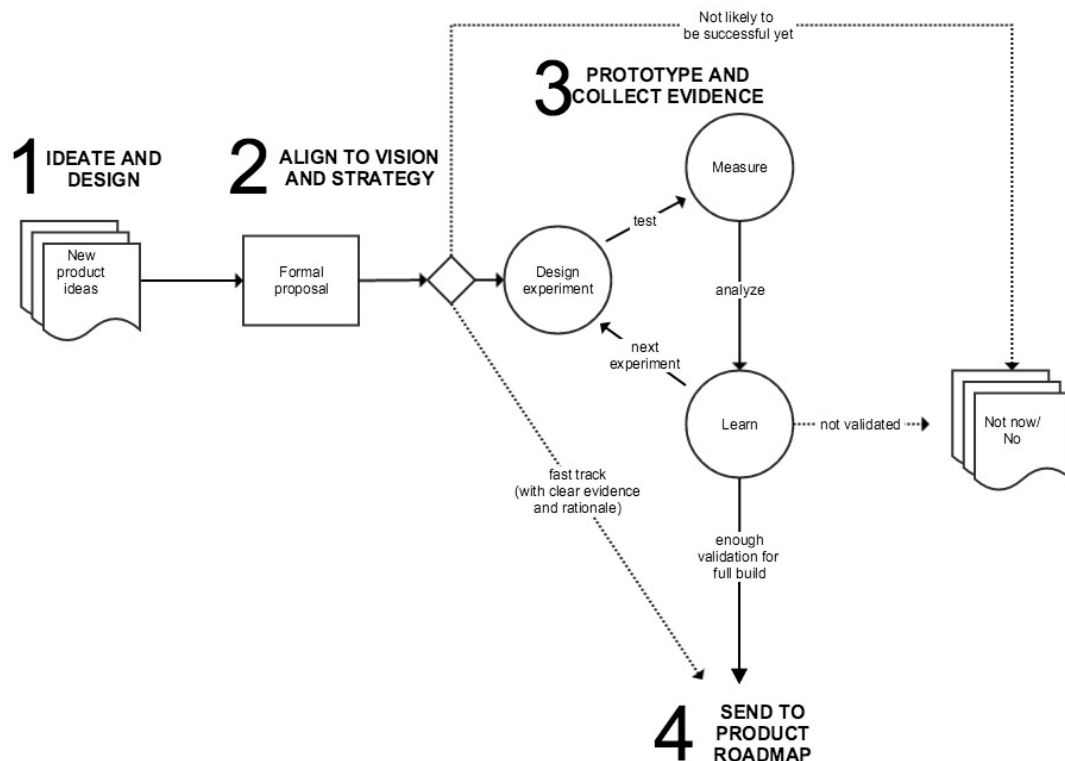
Fig. 1: The Product Workshopping Framework

The purpose of this framework is to answer the question "How can an organization develop and validate innovative ideas in order to improve the odds they will produce strong growth and create impact?"

1. Ideate and Design

Ideation and design involves empathizing with users and developing solutions and features to address their needs. The key element of ideation is to identify a user story, which consists of user, user need, and what the user wants to accomplish (Silva da Silva, Selbach Silveira, Maurer, & Hellmann, 2012). Panorama's product processes are heavily influenced by Agile Methodology, a software development approach that emphasizes developing discrete user stories and rolling out software that addresses the story. The Agile approach, which is rigorously empathetic to what the user wants to accomplish, allows the product designer to develop solutions around these clear user needs. As a simple illustration, if password reset functionality does not exist in our product and it interferes with a user's experience, a developer would write "I am a client who forgot login credentials and needs to reset password." The task would be set and solution built. Agile Methodology is highly efficient if an organization has a clear sense of what a user wants to accomplish.

A more intensive version of discovering and building around user needs is through design thinking. Popularized by the Stanford Design School and the design firm IDEO, design thinking is rooted in the idea that design ought to drive innovation because it focuses on the human experience, and companies should develop empathy with the user (Brown, 2008). Design is centered on human interactions and experiences and ideas emerge from following a qualitative process to identify a user's problem, determine where there may be inefficiencies or pain points, and thoughtfully design solutions (Müller & Thoring, 2012). The empathy one gains through observing and speaking with the user is invaluable in the process of idea generation. Design thinking is useful when a context for innovation has been

identified, but a specific problem has not. It involves observing and interacting with the problem before moving quickly to a solution prototype (Brown, 2008). Key to the design thinking approach is the idea of getting out of the office to begin interacting with users in their environment. If the user experiences pain points, then the observer notes the need. By interviewing and observing numerous stakeholders, concrete solutions can be prototyped.

The way I think of it, both Agile Methodology and design thinking focus on understanding user needs and innovating based on those needs, but where Agile is focused on software development and discrete tasks, design thinking is more geared toward a holistic user experience. Through the Ideate and Design phase, a user need and desired outcome have been identified and defined, and a solution mocked-up and proposed. However, neither the design thinking nor Agile processes align a particular solution to company strategy and vision (Blank, 2014b), nor validate assumptions, which leads to the next part of the framework.

2. Align the idea to company vision and strategy

As an innovative idea emerges from the Ideate and Design phase, it is important that it aligns with the organization's guiding vision and strategic direction so that it may provide value for clients and promote growth for the company. One of the first decision points in the framework, then, is to locate the innovation in the larger organizational context and discard the idea if it does not move the organization sensibly toward its vision. In this part of the framework, I focus on understanding how well an innovative idea fits the company vision, strategic direction, capabilities, and culture.

Company vision

One way of thinking about company vision is the way people in an organization see value it brings to the world. Investor Mark Johnson and colleagues call this the customer value proposition, which is the "way to help customers get an important 'job' done" (Johnson, Christensen, & Kagermann, 2008, p 58). This job is much more than a task, but it is the foundational need a person (or other entity) has to accomplish something. Successful companies are clear about the value they are providing to the world, and can often state that value in succinct and memorable ways. Stated in this way, Panorama's value proposition is that we provide tools to help schools and districts improve using data.

The challenge is determining how to check whether or not a particular idea is in line with a company's vision. An innovation idea can be thought of as a theory of action about how an idea will help fit the customer's value proposition. A theory of action, worded as if-then statement, offers a hypothesis about cause and effect. Our product theory of action is simply if we do X solution, then we expect to see Y result. Once framed in this way, we can determine whether or not the theory of action aligns with the overall company vision.

Once it is determined that an idea aligns with company vision, a team must determine whether the time is right to put resources and effort toward the idea. This sequencing and order of product building depends on the strategy for executing the vision. It's the *how* to get from vision to reality, and it depends on a number of factors.

Strategy

A company's strategy answers the question of how to enact the company vision. Among the many possible factors influencing the strategic direction, I want to focus on a company's phase of existence and product mix.

Company phase

When considering putting resources and effort toward a strategic direction, it is important to consider the company's phase in terms of size, market capitalization, and age of the organization. Stanford Business School professor Steve Blank, an expert on entrepreneurship, notes that companies are not simply larger versions of startups, and startups are not smaller versions of large corporations (Blank, 2014a). Marketer and entrepreneur Mitchell Harper (2014) breaks company life-cycles into three phases: startup, revenue and expansion. In the startup phase, founders search for and develop purpose and intention. The founders' key energies are devoted to validating innovative ideas and establishing a product/market fit (Blank, 2014) where they can identify customers willing to buy their product.

In the revenue phase, organization leaders have identified the product/market fit and focus on drawing greater and greater impact from their products (Harper, 2014) and refining their growth strategy and user base. This growth phase often fuels improvements to the product or service, which further spurs growth. Innovation at this phase is challenging because the focus is on rapid growth of the existing product.

In the expansion phase, a mature executive team guides the organization to expand into new markets and generate significant revenue and growth. They operate in a way that draws attention and attracts competition (Harper, 2014). And

yet, in business literature, researchers document case after case of large companies like Dell, IBM, the U.S. Army, and others who struggle to create cultures of innovation because their organizations focus so tightly executing on their existing model (C. Christensen & Raynor, 2003).

Since forces operate for or against innovation in different ways based on an organization's phase of existence, awareness of phase is an important preliminary step in deciding what to build

Product mix

That decision of what to build to drive impact and promote organizational strength influences the mix of products at any given time. HBS professors Steven Wheelwright and Kim Clark note that product ideas can be divided into groups according to the level of change needed to make them successful. That is, a proposed product may be significantly different than what the organization has built before, or it may be very similar. The greater the difference, the greater the scope of the innovation. Similarly, the proposed process needed to make a product successful may need to be significantly different from what the organization has done before, or it may be very similar. Again, the greater the difference, the greater the scope of the innovation. Wheelwright and Clark categorize these groups from least to most change as follows: derivative products, platform products, breakthrough products, and research and advanced development products (Wheelwright & Clark, 1992).

Successful managers then ensure developing a mix of each product type according to the needs of the company. A startup, for example, might spend the majority of their development energy in exploring breakthrough products, while an organization in expansion would spend over 50% of product development resources

on derivative projects while allocating 20% to new platform or breakthroughs and the remaining 10% on advanced research. Because the organizational needs are different depending on phase, the vision and plan for growth will require having a different mix of products in the pipeline as the organization matures.

Capabilities

After understanding how well a product idea matches the company vision and strategic direction, the next part of aligning the innovative idea to the company's context is to take stock of the organization's capabilities. "Capabilities" usually refers to an organization's resources, processes and priorities (C. M. Christensen & Overdorf, 2000) and represents an important stream of knowledge that can be tapped as an organization prepares to take on an innovation strategy.

Resources

Resources refers to the "people, equipment, technology, product designs, brands, information, cash, and relationships with suppliers, distributors, and customers" that an organization has at its disposal to fulfill its purpose (C. M. Christensen & Overdorf, 2000). Resources enable an organization to engage in an innovation strategy, but not always in the way one might think. It may seem preferable to have unlimited resources at one's disposal, which allows a company to pursue whichever product idea they want. But paradoxically, scarcity of resources may direct an organization to choose the most important need and the best innovation to solve that need. Entrepreneurship is the pursuit of opportunity "beyond the resources you currently control" (Stevenson, 2013). Perhaps for this reason the insightful Y-Combinator Playbook for new companies signals that for innovation, the most critical resources are not financial, but human: team members

and relationships with other stakeholders that provide motion and energy toward innovation. (Altman, 2015). This implies that as a part of the alignment process, leaders should direct significant attention to human resources at their disposal.

Processes

Processes refer to the ways an organization takes resources as inputs and transforms them "into products and services of greater worth" (C. M. Christensen & Overdorf, 2000). Processes determine how teams interact with one another, how information is shared and how decisions are made. A part of the Agile Methodology manifesto that I appreciate is "individuals and interactions over processes and tools" (Beck, Beedle, Van Bennekum, & Cockburn, 2001), which is itself an agreement about how to work together. That means it doesn't matter how resource-rich an organization is; if the processes for supporting innovation are dysfunctional, the odds of innovating successfully are low. But Steve Blank points out that even if the execution processes are completely functional and efficient, the ability of a company to successfully innovate is impaired by its own focus in carrying out the existing business model rather than pursuing new growth opportunities (Blank, 2012). High Tech High founder Larry Rosenstock described this phenomenon as the cause for founding a new school model rather than attempting to transform Cambridge Rindge and Latin School where he worked for eleven years, saying the 353-year-old school had developed processes and policies that "took the oxygen out of the room" (quoted in Hess, 2010). Established processes and policies serve to support an organization's established model, but as in the case of the Cambridge school, can also stand in the way of innovation.

Culture

Another element to consider in aligning an innovation idea with an organization is culture. In his seminal work, organizational behavior researcher Edgar Schein puts forward a definition of culture that focuses on the deep elements of group behavior:

> The culture of a group can now be defined as a pattern of shared basic assumptions learned by a group as it solved its problems of external adaptation and internal integration, which has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems. (Schein, 2010, p.18)

According to this definition, an organization's culture emerges as it establishes patterns and interactions by facing and solving problems. If an innovation requires an organization to solve problems in a new way, it may prove a difficult, counter-cultural task. A part of aligning an innovative idea to vision and strategy should include some thinking about culture and subculture that have emerged naturally throughout the life of the organization. Overlooking culture can cause innovation to stall, especially if the innovation requires a major change in how an organization solves problems.

3. Prototype and Collect Evidence

If an innovative idea fits the organization's strategic direction, capabilities, and culture, company decision-makers still may not know whether or not to take a bet and pursue the idea. In cases where an organization is unsure about whether the

underlying assumptions around the innovative idea are sound, the next step of the Product Workshopping Framework is to prototype and collect evidence.

Entrepreneur and writer Eric Ries' "Lean Startup" model is a nice foundation for how to prototype and collect evidence upon which to base an informed decision. What makes the Lean Startup approach to innovation attractive is that it seeks to validate that a solution will yield expected results over a "build, measure, learn" cycle (Ries, 2011). It tests major assumptions using an experimental process. "Mind the Product" writer Kunal Punjabi suggests three common categories of assumptions to test: 1) Market demand (i.e. a target group for your innovation actually exists); 2) User need (i.e. your target group experiences a pain point or problem to be solved); 3) Solution efficacy (i.e. this solution works to address the need better than what the user is already doing) (Punjabi, 2013). Lean Stack founder Ash Maurya calls this the "problem-solution fit" and attributes startup failures to spending resources and time to "build something nobody wants" (Maurya, 2012). To run strong experiments, my framework suggests four steps: identify assumptions, build a prototype to test, measure, and finally analyze results to decide whether to bet on the innovation idea or not.

Identify assumptions

Innovation ideas are rooted in some kind of "leap of faith" or "…then the magic happens" kinds of assumptions (Ries, 2011). A cautionary personal example comes from my own experience participating as an advisor of a startup team that hoped to drive micro-credentials and digital badges into K-12 classrooms (specifically in common-core subject areas). The team thought it would be a good solution for teachers to offer alternative ways to award credit outside of the

traditional Carnegie Unit (or credit hour). The team felt the idea would be a positive disruption to an antiquated, 100-year-old system and that teachers would be glad to sign up. Our assumption (which we did not do a good job of identifying at the time) was that teachers experienced enough frustration with the current system that they would want to offer alternative credit instead of Carnegie Units. After investing a lot of time and effort into a website and program for awarding badges and alternative credit, we finally realized that our underlying assumption was wrong and that teachers did not see a compelling need. After a few more attempts to reach out to users and adjust our design, we used up our time and resources (runway) and mutually agreed to move on to other projects.

Skillful organizations name these leaps of faith and then create metrics that capture what conditions must exist for the leap of faith to land successfully. In a business example, Eric Ries (2011) tells the story of Votizen, where the founder began work on a startup that sought to register voters and create a community of active citizens. He identified a few leaps of faith and then worked to check those assumptions through a series of tests. Over the course of a number of tests, he was able to refute some of his early leaps of faith. For example, at first he assumed *individuals* would be most interested in his innovation, but he later found that special interest *organizations* to get out the vote were more interested than individuals. He then made a pivot to adapt his product to the needs of special interest organizations (p 68). These pivots and adaptations are a necessary part of this process, but do not happen unless organizations identify assumptions underlying their ideas.

In order to make strong bets, an organization like Panorama needs to take each innovative idea and identify the big leaps of faith that would need to be true in order for the innovation to be successful. I think that the more explicit we can be

about the leap of faith the better, given that our predictions and product bets rely on testing our most questionable assumptions.

Build a prototype to test

At the heart of the innovation process is experimentation that results in clear direction for decision-making. Once a questionable assumption has been identified, the organization seeks to test out and learn explicitly about that assumption. The "Lean" in Lean Startup refers to the way the innovator builds a minimum viable product (MVP) to put in front of users. An MVP is a product that "maximizes return on risk," meaning that it is a low-risk, high return version of a product that meets minimum requirements to get the returns you want (Robinson, 2015). MVPs are common in product development as a first step in a larger development process, but the purpose in Lean Startup, according to Ries, is to use an MVP to understand whether or not an assumption or hypothesis is true. Each lean version of the product tests a particular, high-value assumption, and each round of feedback and measurement helps to validate or invalidate the assumption, providing valuable information for the next round of lean product development. At the conclusion of each test and after gathering data, results are gathered and measured and conclusions formed (Ries, 2011). Like the scientific method, the Lean "build, measure, learn" process involves research questions, experiment design, hypotheses formation, measurement and analysis.

Part of setting up the experiment is being specific about what an innovator hopes to measure. That is, from the outset, the experiment includes as part of the hypothesis specific metrics to validate. This makes the hypothesis testable. For example, an education technology company that markets directly to teachers (like

Class Dojo or MasteryConnect) might examine an online customer acquisition funnel, humorously called "pirate metrics" because of the acronym AARRR (McClure, 2004). The sales funnel measures success as it moves teachers through Acquisition, Activation, Retention, Referrals, and Revenue-generation (See Fig. 2). In this example, if an innovator were trying to see if a new web page design B created a better "happy first visit" than current version A, she might hypothesize that her innovation would convert 30% of new site visitors (meaning they viewed 10 pages, staying for over 60 seconds, with 5 clicks or more). The experiment would either validate or invalidate the hypothesis and would provide good information for the next version of the product and next design of the web page. The lean process presupposes measuring the right thing, and not "vanity metrics"-- measures that give the illusion of forward progress, but that do not reveal true cause and effect (Ries, 2011 p 134).

Startup Metrics for Pirates

Category	User Status	Conv %	Est. Value
Acquisition	**Visit Site** (or landing page, or external widget)	100%	$.01
Acquisition	**Doesn't Abandon** (views 2+ pages, stays 10+ sec, 2+ clicks)	70%	$.05
Activation	**Happy 1st Visit** (views X pages, stays Y sec, Z clicks)	30%	$.25
Activation	**Email/Blog/RSS/Widget Signup** (anything that could lead to repeat visit)	5%	$1
Activation	**Acct Signup** (includes profile data)	2%	$3
Retention	**Email Open / RSS view -> Clickthru**	3%	$2
Retention	**Repeat Visitor** (3+ visits in first 30 days)	2%	$5
Referral	**Refer 1+ users who visit site**	2%	$3
Referral	**Refer 1+ users who activate**	1%	$10
Revenue	**User generates minimum revenue**	2%	$5
Revenue	**User generates break-even revenue**	1%	$25

Fig. 2: Startup Metrics for Pirates (McClure, 2004, p. 5)

As we carefully gather qualitative and quantitative data through observation, interviews, surveys, usage tracking, A/B testing, and other experimental methods, we can base decisions on evidence rather than instinct or conjecture.

Learn and decide

Once the MVP of the product has been designed, put in front of users, and data has been gathered, the team faces a decision of whether to continue on or change course (persist or pivot in Lean Startup parlance). The way Ries (2011) describes it, when the hypothesis tested has been validated and shown to meet targets, a team would persist by moving to the next phase of developing the initiative or product MVP (p. 132). In addition, the team could continue to persist under their existing development cycle to collect more evidence if they felt the

results were inconclusive. However, if the hypothesis is not validated or it is clear

the current development process will not be productive, the team may decide to

pivot, changing course in a more dramatic way. The pivot encourages terminating

less impactful ideas quickly so the team can move on to more promising ones (p.

134). It is the part of the process that embraces failure, made less painful by keeping

the MVP lean and the learning cycles short.

As a Data Wise facilitator I have been a part of two summer institutes and one

January Term course. A powerful exercise comes at the end of the institute or course

when learners reflect on the question "I used to think X, and now I think Y" (also see

Elmore, 2011). It is powerful to step back and understand how thinking has

changed, and sharing those thoughts always moves me. The "learn" part of the

Lean Startup process lends itself naturally to this type of reflection. Because an

experiment identifies a clear hypothesis from the outset and measurement provides

the evidence, a team can collectively reflect on the direction their product needs to

go. The commitment to revision and adaptation, with a practice of abandoning bad

ideas, is a key part of this innovation strategy. It is similar to the Data Wise habit of

mind of having "a shared commitment to action, assessment, and adjustment."

(Boudett, City, & Murnane, 2013), and I believe is promising for the long-term

growth of a company.

Critiques of Lean Experimentation

Since landing in the entrepreneurial community in 2011, Lean Startup

vocabulary, approaches, and adherents have become ubiquitous. As such, it has

attracted some thoughtful criticism of its limitations. These critiques can be grouped

in two general categories: those which challenge whether it is best to build a lean,

minimal product and those which challenge the way it encourages entrepreneurs to pivot too quickly.

In the first case, critics interpret Lean Startup as being too broadly applied in practice to all types of entrepreneurship. Famed entrepreneur and Silicon Valley investor Marc Andreessen draws a distinction between the types of startups that require a more complete product and those that don't. Noting Apple's Steve Jobs' and Tesla's Elon Musk's ventures, he insists that many products should not be built lean, but should be built to "get the rocket off the ground," which requires greater research and development than those recommended by Lean Startup . Similarly, writer and entrepreneur Andrew Chen draws distinctions between a company's need for a minimum viable product (which is geared toward understanding the market), minimum feasible product (which is geared toward finding a particular solution that works), and a minimum desirable product (which is geared toward the human experience at the end of the process) (Chen, n.d.). This has implications for an education technology company like Panorama where education of students is at stake. It is worth understanding if education organizations require a minimum *desirable* product or minimum *feasible* product, rather than a minimum *viable* product.

Another criticism of the Lean Startup approach is that it may encourage abandonment of ideas too early. While Lean Startup advocates making fast decisions in order to evolve a product quickly, Andreessen cautions aspiring entrepreneurs not to pivot *too* quickly, and even suggests moving away from the culture that encourages failure so readily (Kern, 2012). Peter Thiel agrees and encourages the innovator to be a more "definite person" who favors firm convictions and who determines the "one best thing to do and then does it" (Thiel, 2014, p 65). The

concept of failing fast to inform learning is what undergirds the Lean Startup approach, but has also been criticized as encouraging entrepreneurs to move too quickly past ideas that were good all along. Like Edison's light bulb, sometimes great ideas demand persistence.

As the Product Workshopping Framework contains elements of the Lean Startup methodology, I will address these critiques in the analysis section.

Theory of Action

As a resident at Panorama Education, my role is to support the company in building products that have educational impact and promote growth. Written formally, my theory of action is as follows:

If I draw upon prior professional experience, academic research, and insights about current Panorama practices to develop an innovation framework; lead the implementation of the framework; deliberately test my assumptions, collect evidence of impact; and identify areas for adjustment,

Then in the near term, the product team will identify a few strong product ideas to develop and will discard weaker ideas; in the longer term, Panorama will be better positioned to innovate consistently; and I will have gained experience and insights about how a leader can help an organization create positive impact and organizational strength through innovation.

To test this theory of action, I describe in this capstone how I worked with the team to establish the framework and collected data about product ideas passing through the framework. I describe impact, in terms of product output and team interactions; I analyze quantitative and qualitative data and describe adjustments made as a result of that evidence. Finally, I report leadership experience and insights to reflect on my learning.

Description, Results, and Analysis of the Strategic Project

The implementation of this framework took place in a few phases. First, I prepared over the summer and through September as I became familiar with Panorama and planned for success. Then, I developed a prototype of the Product Workshopping Framework during the October Hackathon. Then, we implemented and began using the new Framework. Finally, we gathered data and determined what iterations we needed to make. What follows is a brief description of each of these phases.

Preparation

To prepare for this new process, I canvased academic research, and became familiar with Panorama's current product-development methods prior to developing the framework.

Academic research

Much of the theoretical framework for this process was covered earlier in this document, so I won't repeat that information here. However, it is worth noting an additional point that I found influential in preparing to develop the framework. Panorama has an informal team-wide practice of sharing and exchanging information, both within functional teams and across the company as a whole. Information is distributed widely and often provokes informal conversation at team lunches (every day we eat lunch together) or over our various communication channels. Because of this open sharing of theories and ideas, I had a number of conversations that inspired me to explore new directions. Sometimes these conversations came about through critiques and push-back. For example, early on in the process I was reading a book by a well-known HBS professor and struck up a

conversation with a colleague. Later, I received a note linking to a well-reasoned piece critical of the main theory from that book. By sending me the critique, this colleague added nuance to my understanding of the theory and, more importantly, gave me insight into theories that had gained currency at Panorama and those that had not. This happened at other times with different individuals and as a result, I began to identify theories and thinkers that were influential *and* that resonated with Panorama's founding team. I used this understanding to develop a framework that would fit into the theoretical DNA of the team, which aligns more with Silicon Valley than with Harvard Business School.

More important than knowing what the team thought about theory, however, was understanding how the team worked together to get things done. I needed a strong understanding of current product development processes.

Current State of Product Development

I gained an understanding of Panorama's product development process by learning about how existing products came about in early stages of the company (through company documentation and interviews with team members), by participating in product development over the course of the summer, and through active participation in the establishment of the product team.

History

During the early stages of the company, the co-founders and a couple of engineers managed all product development, which was driven by what their early adopter users needed. As they added personnel and grew, they continued to base much of their product development on early adopter needs, but then added enhancements based on a longer-term vision of Panorama as a survey platform.

Specifically, they built product enhancements to support the new Panorama Survey Scales and a rough administrative interface to support client services teams. In early 2015, with the intention to establish a more visible, priority-driven process, the leadership team implemented a more formalized product roadmap team and process. This formal roadmap team was focused on getting product ideas built. Ideas could come from anywhere, but in order to make it to the roadmap, they needed to be prioritized and slated for development according to potential for business growth or to prevent loss of business. Products that emerged from the roadmap were, therefore, typically closely related to Panorama's existing survey platform.
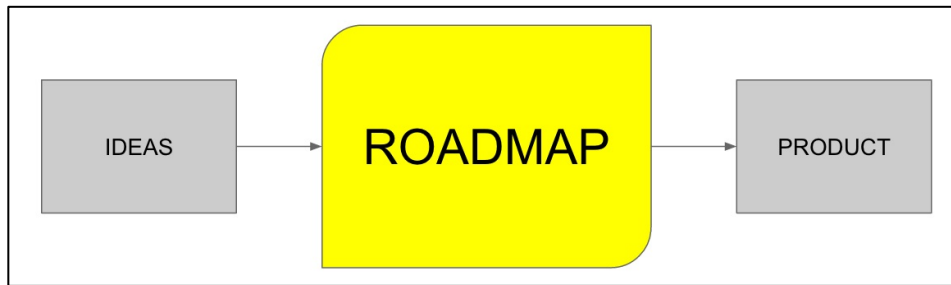
Fig. 3: Product Roadmap Process, February 2015 – October 2015

This team-based approach to product development involved virtual tools (through project management apps Jira and Asana and Google spreadsheets) and physical (on a wall) tracking of products in development, and made it possible to direct and distribute work among the growing technical team. It follows Agile Methodology closely, which allows the team to focus on a limited number of work streams at a time. By the time I arrived in June 2015, this roadmap process was functioning under the direction of the CEO, director of engineering, director of

marketing, and a lead engineer. As a member of the Client Success team, I was fortunate to participate in and observe the product roadmap process by managing a client information system project. I learned how teams worked together, got a sense of the weaknesses and strengths of the process, and identified ways to make it better through observation, conversation, and participation.

The Product Roadmap

As of the summer and early fall of 2015, the roadmap process worked as follows: First, anyone in the organization was free to generate product ideas. At its basic level, a team member could submit a proposal for a product idea to a virtual ideas bucket divided simply into "big ideas" and "small ideas." These ideas were kept in Asana, our task management tool where they could be reviewed.

At the beginning of this project, team members had submitted 197 unique big and small ideas to the list in Asana. I categorized them according to Wheelwright and Clark's definitions noted earlier: derivative products, platform products, breakthrough products, and research and advanced development products. I counted 118 derivatives, 43 platform products, 25 breakthrough products, and 10 research and advanced development products.

In order for an idea to formally enter the product roadmap process, it had to be submitted as a proposal, a Google Document with a number of prompts to describe the solution idea and how and why Panorama should take action now. (See Fig. 4)

Fig. 4: Product proposal form as of September 2015

Once the proposal was written, often accompanied by free-form document

explaining the solution idea in more detail, the roadmap team reviewed it for

consideration in its weekly meeting. The roadmap team considered which ideas to

implement based on the content of the proposal and a quantitative Cost of Delay

Divided by Duration (CD3) metric for Agile Methodology, developed by Black Swan

Farming founder Joshua Arnold (Arnold, 2015). CD3 was calculated by estimating

the value of an innovation in terms of dollars gained through increasing revenue or

saved by protecting revenue, reducing costs, or avoiding costs and dividing by the

duration of time it would take before full implementation. At Panorama, this

number was based on experience and instinct more than concrete research. To

balance that, the team drew on knowledge from the broader team and at times

consulted clients and trusted users. Though not perfect, CD3 allowed the team to

prioritize products against one another using a quantifiable metric. With that

number as a basis for decision-making, the roadmap team said no (or not now), requested more information, or added the proposal to the roadmap.

The product roadmap allowed Panorama to allocate time and resources to a development process in a way that minimized wasted time and effort. Each product on the roadmap moved through a sequence: Backlog, Next Up, In Progress, Client Testing, and Recently Released, a chronology fairly common in Agile Methodology (Stellman & Greene, 2014). A new product awaited action in the "backlog," then was slated to be "next up" for development. Development began with a before-action review meeting, involving individuals (designers, marketers, engineers, client success team members, etc.) necessary for a successful launch. During its development process, the product was labeled "in progress" on the roadmap. Toward the end of the development cycle, it would be rolled out for "client testing," and then during a monitoring period, it would be categorized as "recently released." Each of these areas was constrained to a limited number of items at one time, which incentivized product teams to focus and move the items along at a consistent pace until they reached clients' hands.

It is notable that not all products went through this process, even after the roadmap team was established early 2015. Products developed outside the roadmap can be divided into three categories: First, products developed as free tools with either research or marketing purposes in mind. These tools were generally built quickly and rolled out broadly to the public in order to generate positive impact and drive interest in Panorama's offerings. Second, products emerging as small independent engineering projects. Usually these projects were features emerging from client feedback, internal requests, or the interest of a particular engineer. Third, products built during Panorama's biannual 24-hour "Hackathons," where business

operations ceased, and informal teams developed something new in a limited period of time. Product prototypes emerging from this process were generally not ready to ship to clients, but sometimes gave way to a longer development process.

In the absence of a dedicated product team, the cross-functional roadmap team guided Panorama's formal product development process until October 2015, when a new product team was installed in its place.

Roadmap team reflections

Prior to the transition to the new team, the outgoing team reflected on the strengths and weaknesses of the roadmap process and their recommendations for the next group. In their reflection, they identified that the establishment of the roadmap process "achieved their original goal of creating a visible, prioritized product roadmap process that we follow and can evolve over time," helped them make a lot of "progress in terms of clarifying our thinking and adding some quantitative rigor," and established a "framework for discussing differences of opinion." Areas of improvement they identified were that "high-level strategy wasn't explicitly reflected in the process," that it didn't "balance allocation between different types of projects," and that it lost track of "non-engineering projects," and notably that there wasn't a "place in our process to allocate resources to experiments (or acknowledge things that we would build in a hacky way)." One key recommendation that emerged from this reflection, was noted as follows: "For ideas that we want to validate before building 'for real,' we could establish a small board for experiments in progress…I think there is value in formalizing this so everyone knows what's going on across the team" (Product Roadmap Team, 2015).

My observations were consistent with the reflections of the roadmap team. Though Panorama's stated goal was to develop products "beyond surveys and reports," the culture of the organization in the early days addressed the direct needs of users of current products better than the needs of users who would benefit from new types of products. With one notable exception (Playbook), the product development process had not produced products beyond surveys. The product roadmap process presented two key challenges: 1) it was better at moving forward derivative product ideas (those closely related to surveys) than it was at moving forward platform, breakthrough, or research and advanced development ideas and 2) it did not provide for a systematic way to evaluate and develop ideas that were promising.

Learning the current product development process was an important step in developing the Framework. I identified areas that could be strengthened and began work on what a workflow might look like that would be complementary to the strengths of the existing system.

Developing a Prototype of the Framework

In late September 2015 I joined the product team and began to work on designing the Product Workshopping Framework. As it emerged, I called it the "Framework," expecting that the framework would either validate or invalidate product ideas.

Hackathon

In October 2015, Panorama held a Hackathon, which produced a number of prototypes of product ideas in a limited time period. I saw this as a good opportunity to try a prototype of the Framework. Since Hackathon participants

would work on solutions of interest to them, I would have a number of opportunities to use the Framework for validating new ideas. The prototype became my Hackathon project.

In building the Framework, it was important to me to ensure that whatever we built fit into the way members of the team already interacted with one another. Therefore, "validation" would be a supportive part of the product roadmap process rather than a replacement for it. With a strong Framework in place, the roadmap team could benefit from pressure-tested product ideas. The place where problems seemed to arise was after ideas had been generated but prior to roadmap team analysis (see Fig 5). Therefore, I focused first on building a new proposal.
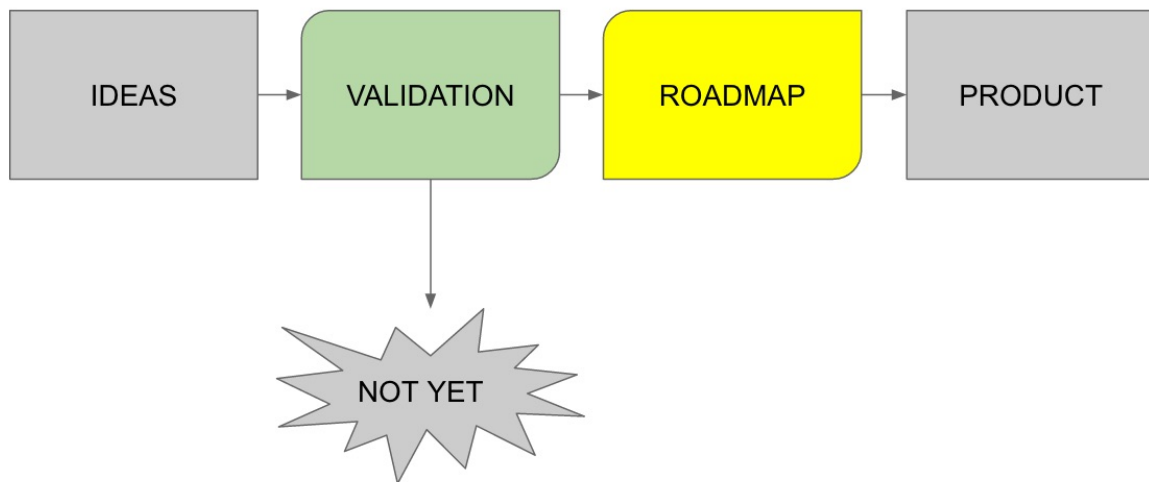
Fig 5: Validation in the Product Development Life-Cycle

Panorama Proposal Canvas

During the Hackathon, I developed a document that would be an alternative to the proposal template. The goal was to provide more reasoning and justification for a product idea by naming the user need, product theory of action, and big assumptions as part of the decision process. While the original four-prompt

proposal (See Fig. 4) had elements that were important to determine cost of delay, it neglected other critical questions. My intention was to provide a proposal template that was geared more toward our theory about the impact on the end education user and organizational growth, and that would surface big assumptions about that theory. The revised proposal template included the following sections:

1. A statement of user need (i.e. "What pain point is your main user experiencing?")

2. A theory of action (i.e. A description of the solution and its desired outcome, formed in an If…then… statement)

3. Identification of assumptions about that theory of action (i.e. "In order for the theory of action to be true, what would also have to be true?)

To build those elements, I developed a Google Document called the Proposal Canvas and began using it with other team members (See Fig 6).

Fig 6: Panorama Proposal Canvas version 1, October 2015

During the Hackathon, I set out to test that the canvas would be user-friendly and able to be completed in 20 minutes or less. To do that, I interviewed a representative of each Hackathon team and filled out the canvas with them. I noted that each took me between 15-18 minutes to complete. I also received feedback from interviewees that the questions were helpful to push their thinking. One individual told me she would not have thought of these elements without the interview. This was strong incentive to continue to develop the idea.

Implementing the Framework

After the Hackathon I made adjustments to the canvas to simplify some elements and to incorporate elements of the original proposal document that were important for the roadmap team to make Panorama-centric decisions (see Fig 7):

1. A statement of the problem that Panorama is trying to solve

2. A statement about urgency (why should we act now)

With these changes, the product team adopted the new proposal format.

TITLE: *INSERT TITLE*   PANORAMA PROPOSAL CANVAS v3 (keep to one or two pages)

USER PROBLEM	SOLUTION PROPOSAL:	THEORY OF ACTION:
Describe the problem in terms of what your main user struggles with	*Briefly describe the solution proposal. Link to longer specs documents as well if applicable.*	IF WE... *Insert description of our solution idea* THEN… *Insert desired outcome we expect as a result*

WHY SHOULD PANORAMA ADDRESS THIS NOW? *Why we shouldn't wait another week to start on this project and what the cost of delaying is.*

3 BIG ASSUMPTIONS: *List three big assumptions based on the theory of action.* 1. 2. 3.

KEY USERS: *Describe the main user of this product*

OUTCOME DESCRIPTION: *Envision wild success and how you will measure it*

PANORAMA PROBLEM *Describe the problem in terms of a problem Panorama is trying to solve*

and/or

Fig 7: Panorama Proposal Canvas as of December 2015

First Decision Point

After putting the Proposal Canvas into place, I established some guidelines for actions we could take when we received a proposal. We want to simultaneously advance good ideas and filter out ideas that do not fit with our strategic direction. Because the original roadmap process had no systematic way to align a proposal to vision or strategy, I designed the Framework to fill those needs. Therefore, the Framework included a decision point after a proposal was made to determine whether or not the idea was worth advancing. I built this first decision point to include four options.

1. Fast-track the decision to the roadmap team: In this case, the proposed product is a strong fit with vision and strategy, fits into our capacity, and is timely enough to fill a particular demand to be prioritized immediately into the roadmap.

2. Place on hold: If the product idea does not fit our current product vision or strategy, or if it is outside our current ability to build, but we consider it may possibly later fill an education or business need, we would route the idea to the "not now" list, to revisit at a specific date later.

3. Discard: If the product idea does not fit current product vision or strategy and is not likely to fill an education or business need, we discard the idea.

4. Test out the product idea: If the product idea seems likely to fit our strategy and vision, but we are not sure it is a good bet, or is based on a number of questionable assumptions, we would run it through a test.

As a product team, we also decided that a product proposal could be submitted directly to the roadmap team and then routed back to the Framework. That way,

submitters could exercise their own judgment about the fast-track decision in order to keep the process moving along quickly.

Build, Measure, Learn

The final part of the Framework reflects the Lean Startup build-measure-learn cycle. Designing tests using this cycle ends up varying in execution from idea to idea, and as such does not lend itself to a strict process. However, there are some common threads we put into place

1. Build a prototype for testing: The first part of build-measure-learn is to identify a questionable assumption to test, and a small-scale, "hacky" way to test it. The test is built to yield a yes/no answer. For example, if we were testing a proposal for a social-emotional learning (SEL) dashboard, with the big assumption that districts would see the value for their schools, the product team may design a mock-up of the dashboard, identify ten potential district users to whom we could show the dashboard, with the intention of having five of them commit to signing up. Such an experiment would not require engineering resources, but would allow us to validate the idea.

2. Measure results: In this part of the cycle, the product team measures the results of the experiment. Using the previous example about SEL, the team would measure results by showing the prototype to identified users, gathering feedback (both interview-style and survey-style), and recording data from those meetings.

3. Learn: In this part of the process, the validation team would analyze the results to determine whether the proposal's assumptions proved valid or not, or if the experiment proved inconclusive.

The regular cadence of experimentation and decision-making is the heartbeat of the Framework and has as its output good information upon which teams can take action. To manage this process, I created an Experiment Canvas that identified important parts of an experiment and tracked results, allowing us to reflect and learn (See Fig 8):

TITLE: *INSERT TITLE*		*PANORAMA EXPERIMENT CANVAS v2*

ASSUMPTION TO TEST:
Write one or two sentences about the big assumption you are testing in this experiment

HYPOTHESIS:	DESCRIPTION OF THE EXPERIMENT:
Write a hypothesis to test	*Describe the experiment here*

RESOURCES NEEDED:
List any talent resources, materials, other assets needed to run this experiment

VALIDATION CRITERIA:	RESULTS:	CONCLUSION:
Write the criteria that will determine whether or not your hypothesis has been validated	Link here to separate document tracking results	☐ VALIDATED ☐ NOT VALIDATED ☐ INCONCLUSIVE

Fig. 8: Panorama Experiment Canvas – As of December 2015

Subsequent Decision Points

The main question to answer at the end of the build-measure-learn cycle is whether the most questionable assumptions have been resolved enough to proceed to the next phase of the product build, or if they need further testing. Since each additional test may require more time and resources, the Framework aims to resolve those assumptions as completely as possible, then move quickly to the next version of the prototype. In practice, there is a decision-point at the end of each build-measure-learn cycle.

1. Send to the roadmap team: If the experiment validates the assumption and the next phase of the product development process involves engineering resources (outside the product team) and a more extensive build, the workshopping team will send the proposal and evidence collected to the roadmap team for prioritization.

2. Conduct another experiment: If an experiment validates the assumption, the next phase of the product development process may involve testing a different assumption. If so, the workshopping team will repeat another build-measure-learn cycle with a different experiment.

3. Change course: If an experiment does not result in confirmation of the hypothesis, or if new information is learned during the experiment that causes the team to reject their original theory of action, the team may choose to revise the proposal with a new theory of action based on new information.

4. Not now/No: If the experiment does not validate the original assumption, the team may choose to place a proposal on hold or to abandon it altogether.

I hoped these decision points would give product proposals a clear path to adoption to allow our decisions to be based on good evidence, whether the product was adopted or not.

Rollout and Communication

This prototype was adopted by the product team at the end of October and I presented it to the company in a weekly team meeting in early November. After the presentation in November, I surveyed the team to check for understanding about the process and to gather questions from which to make recommendations. I then got into a pattern of weekly meetings with my supervisor and the product team to

collect feedback on a regular basis. The data collected for this first iteration of the

Framework spans the time from launch (end of October) to mid-December. I used

my own canvas and experimentation process to track progress.

Results of Initial Weeks of Implementation

As the time period for this strategic project was limited, I gathered data about the first cycle of my build-measure-learn test from October to December 2015 and determined what I would need to change. I sought to measure the effectiveness of the Framework by gathering evidence around two questions: 1) To what extent did we advance products using the Framework? and 2) What evidence can I look at to understand my leadership role in its implementation? For the first question I categorized and tracked product proposals from beginning to end, tracking total time in the process. For the second question I solicited feedback through surveys and individual interviews.

Question 1: Did we advance products using the Framework?

The desired outcome of my strategic project was to develop and validate ideas before sending them to the roadmap and committing resources to a build. I hoped that the process we put in place would improve upon the process that we had been using previously. After a period of time using the Framework, results were mixed, reflecting that Ideate and Design and Align to Vision and Strategy were strong while Prototyping and Collecting Evidence was not yet developed.

Product ideas in the Framework

At the time I introduced the Framework, 197 unique ideas were in the ideas list (down from 252 after removing duplicates and incompletes). We selected ideas to route through the Framework over the course of time from October to December. On December 15, I tallied the following results: 4 ideas had not yet had proposals written, 6 ideas with proposals were routed to the "not now" category, 3 were fast-tracked to roadmap, and 16 were routed through the prototyping and

experimenting framework. Of these 16, 9 were being prototyped, 1 was being measured, and 1 was in the learn stage (meaning that we had not yet talked about evidence). In addition, 2 were placed on hold, and 3 were validated and sent to roadmap for a build (See Fig 9). At a glance I would be able to tell which product proposals were delayed, and which product proposals were moving and developing. This tally was important for me to understand strengths and weaknesses in the Framework.
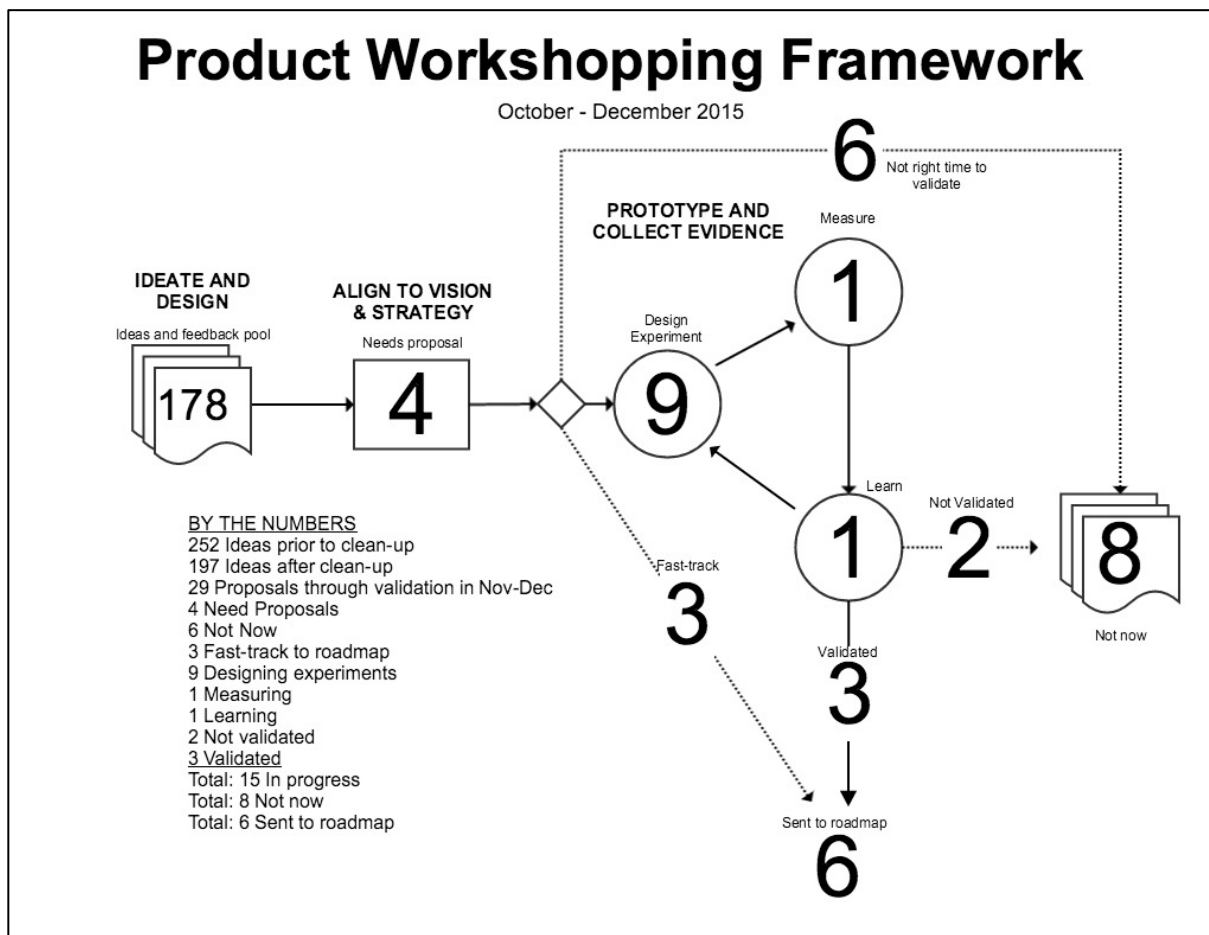
Fig 9: Product Workshopping Framework in action, October through December 2015

Types of products in the Framework

In addition to the tally of product ideas and proposals in process, I wanted to check the product mix to see the extent to which the Framework was successfully identifying and developing ideas beyond surveys. Ideally, the Framework would be a space to experiment and learn from these exploratory ideas. To learn more, I categorized the 29 product ideas in the Framework into the areas suggested by Wheelwright and Clark: derivative products, platform products, breakthrough products, and research and advanced development products. Since the majority of our product ideas routed through the product roadmap had historically been in the derivative category, my hope was that the Framework would help more products in other categories get off the ground. Of the proposals in the validation pipeline from October to December, 10 were derivative, 10 were platform, and 6 were breakthrough and 3 were research and advanced development. It is worth noting that of products on some stage of development in the roadmap during this same period, 18 of 20 were derivative ideas. See Exhibit 1 in the Appendix

The types of products we were putting into the Framework *were* different from those on the roadmap: they were more exploratory and represented more ideas and products beyond surveys.

A closer look at projects

To illustrate the initial impact of the Framework, it bears looking more closely at the projects in the pipeline. Of the three products that made it through the Framework without being fast-tracked, two were Hackathon projects that we were able to get in front of users (Book of Data and State of Data). These projects had

already been prototyped and had therefore advanced to the point we could collect feedback and validation of their potential.

Taking the Book of Data product idea as an example, the Hackathon team built their theory of action on the idea that users want to display their data publicly and that a physical copy of their survey project results could be a way to strengthen client commitment to Panorama. They designed and developed a large glossy book using Panorama results that included information about a survey project, insights about a sample district, and details about the survey. By the end of the 24-hour Hackathon time period, they had developed a full prototype for a mock client. Within the next two weeks I followed up with the team to create a validation plan in which we tested the assumption "school leaders will want to buy this data book for their district" by printing out additional copies of the book prototype the team produced for the Hackathon and having our sales team show it at conferences and in one-on-one sales visits.

In a short amount of time, we were able to validate that our assumption held, at least on a limited scale of ten sales prospects. We also collected feedback about which sections were most meaningful to them and which ones needed to be changed. With the concept validated, the Hackathon team chose to continue to develop the project further to determine what steps needed to be in place to automatically generate some of the text. It will be a longer development process, but the initial validation gave it momentum to move forward. Since the product is not something clients were clamoring for (it's not even on their radar), it needed to go through a testing process to measure and collect feedback.

In another Hackathon example, one of our engineers developed a prototype that allowed users to transfer SurveyMonkey surveys to Panorama. The user need

was that SurveyMonkey clients wanted continuity with their old survey data, which often lived in that product. The theory of action was that if SurveyMonkey users were able to easily transfer survey data to Panorama, they would be inclined to move to the Panorama platform. Our engineer developed a working prototype. Our big assumption was "there is a significant enough group of users who want this integration to make development time worthwhile."

To validate this assumption, we used our website to post a banner that said "New: See your SurveyMonkey data in Panorama." Clicking this banner led to a page with a form to fill out when the product would be ready to go live. Even though we were not ready to go to market, we measured the number of banner clicks and forms filled out. We set our validation criteria at 100 clicks and 10 sign-ups from market-qualified leads (a term describing an end user that fits our criteria, which is a fairly low number based on previous campaigns) in a week's time. In the end we had only 67 clicks and 3 sign ups (with only one a quality lead). Based on those data, we set the SurveyMonkey project aside in the Not Now category. We may have arrived at the same result (i.e. not to build the product more extensively) through the CD3 product roadmap calculation, but through the workshopping process we had concrete evidence to support that decision.

These results indicated that we were on the right track answering the question of whether or not we advanced product ideas using the Framework. We did advance product ideas and diversified the product idea mix. We were not, however, able to run many experiments.

Question 2: How effective was I in leading the implementation?

Rosabeth Moss Kanter's change management writings describe the criteria for how I wanted to roll out this change. These include 1) Clearly define the project (by identifying the problem, collecting data, 'selling' the project), 2) Build coalitions (by pulling together the resources to make the project work from many areas of the organization), and 3) Move to action (by handling interference, maintaining momentum, revising and redesigning, and communicating externally) (Kanter, 2003). Throughout the course of the project I have collected evidence of my effectiveness in these three areas.

Clearly define the product

First, I sought to define a clear problem and communicate it with key individuals and the team. Beginning with my supervisor and then working with the CEO, I laid out a plan for what a Framework might look like. Because implementing the plan would require me to change my role to the product team and to set the scope for the project, it was important to be clear about the problem. At first, I flow-charted the entire roadmap process, and sent it to these individuals. I received feedback that I needed to simplify the process. As I worked to simplify, I better defined the problem and identified what needed to be changed first (the Proposal Canvas). In early November, to introduce the Framework to others, I presented it in a company-wide team meeting and collected comments to gauge understanding.
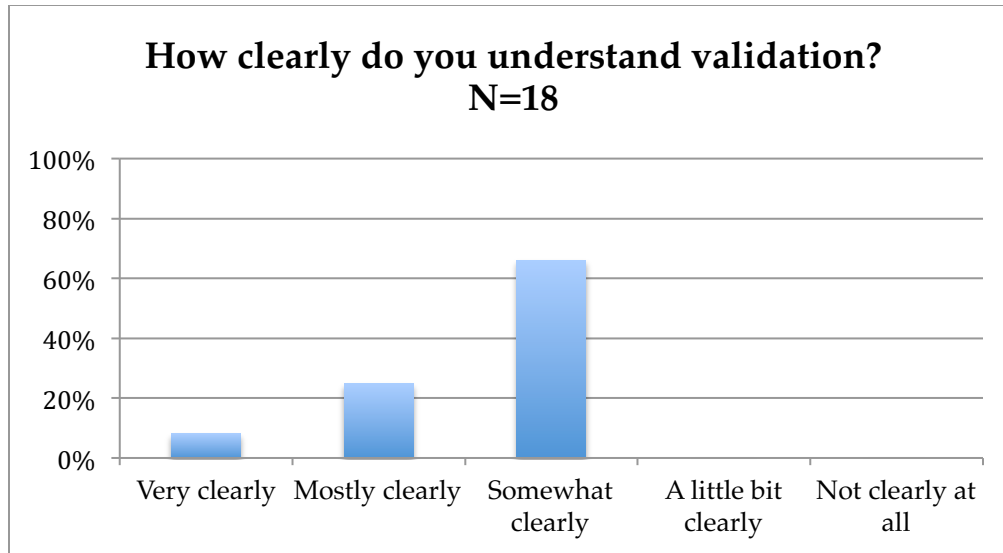
Fig. 10: From a post team meeting survey, gauging understanding of validation

The majority of respondents indicated that they understood the overall process very clearly, but they responded not understanding the idea of validation, with 66% of them only suggesting somewhat clear understanding of the process I had just described (See Fig. 10). Comments after the presentation included questions about how and where users would participate in the process (which technology we would use), which metrics we would use to validate a product idea, and a request to see a more detailed example. From this data I learned that while my presentation was easy enough to follow, there was a desire for more concreteness about how to understand and participate in the process. I took the opportunity to have conversations and involve people in parts of the design process as a result.

Building a coalition

For any change to be implemented fully, it requires a coalition of individuals who understand and support it. My strategy for building a coalition was to work with other individuals to develop particular parts of the Framework. First, I shared the Proposal Canvas I developed as part of the Hackathon with others to get

feedback. Because I had used the canvas and showed it during Hackathon, team members were supportive and willing to engage with the new process. I emailed a revision to fellow product team members for feedback, asking these four questions:

1. <u>If you were to receive the canvas, what additional information would you want to have to be able to get a high-level understanding of this product?</u> Four of four responses indicated that there was nothing else needed to get a high-level understanding of the product.

2. <u>Is the format of the document easy to scan and read? If no, what about the format could be improved?</u> Three of four responses made suggestions about the order of the items in the box. I incorporated suggestions in later versions of the canvas.

3. <u>Is any content of this document unnecessary or confusing?</u> One suggestion was made to clarify the difference between the "Panorama Problem" field and the "Why should we do this now" field. Another asked for clarification on the "Big Assumptions" square.

4. <u>Generally speaking, do you like this? Does it feel right in light of how we currently do business (and how we aspire to do business)?</u> One suggestion was that the information would be more accessible to non-product team users if I used a question rather than a title for each section. Another suggested a place to indicate how the product is related to a larger vision or quarterly goal. Another suggested having the canvas require explanation of how a product gets us into more schools (our overarching goal).

After the first two weeks, I solicited feedback from the product team again and received the following feedback: "The proposal canvas is kind of like an assignment where a professor makes you go through a thinking process that ends up being

really useful." With that encouragement, I sought to build coalitions for the rest of the process by organizing interactions to help the process become successful.

My strategy for building coalitions was to work as a member of the newly formed product team to lead the implementation of the Framework. We worked during formation of the team to establish norms, processes, and communications channels for managing our work. We organized our work streams as a team and set goals and priorities for working together. We determined that we would work together on common goals and in reviewing client feedback. However, because the "validation process" functioned independently of the roadmap process, we created product team subgroups, one managing the "validation process" and the other managing the roadmap process. We chose to use an app, Trello, to track project progress and to solicit feedback from other teams. By February, both the "validation" and roadmap teams were functioning well in their respective areas of expertise.

Moving to action

A drawback to building coalitions with new teams was that laying the initial groundwork was a long process. Though the Framework had been functional for almost two months, as of mid-December it hadn't yet developed the kind of impact I hoped for. Moving to action (and more specifically, moving toward productivity) was a tougher process than I had thought. By the end of December, I was not sure it would continue on at all.

Initial feedback about the Product Workshopping Framework was not overwhelmingly favorable. On the plus side, a member of the leadership team said "The process shows promise as a professional growth tool for the team members

involved." However, another said "Is there really a need to run experiments? We can already make a lot of decisions based on our instincts, client feedback, and internal expertise. Is there another way to validate faster?" By late December, the perceived lack of products emerging from the process inspired the following observation: "The Framework has taken a ton of energy across Panorama and created a ton of work, but it hasn't actually accomplished anything important yet. It's had a high cost but the value to Panorama so far has been 0 or close to 0." I disagreed with this assessment, but heard the legitimate concern behind it. Our ramp-up to getting our process and interactions implemented successfully did not yield immediate prototypes and products, and I think the urgency to produce created some tension.

The challenge was framed by my supervisor as follows: "What are our next benchmarks for this Framework? Perhaps more directly, we're going to need to make a call in February, probably, as to whether or not we scrap the Framework altogether or keep/improve it. What are the milestones we want to hit?" The perceptions reflected in these comments reflect a degree of impatience with the process to develop high-leverage ideas into actual products, and most likely also reflected my underestimate from the beginning of the amount of time the Framework takes to move product ideas through. As Kanter suggests, I needed to move to action by handling interference, maintaining momentum, revising and redesigning, and communicating externally (Kanter, 2003).

In January and February I made the following pivots in order to implement more effectively. First, I sought to strengthen the coalition around the process by making a physical validation project tracker on the wall in our common area. I also set up post-its for team members to post questions, comments, and upvotes for

product ideas. This gave teams a way to interact with the product team and share responsibility for the product process. Next, I began to figure out how to prototype quickly without committing too many resources outside the small product team. I learned how to use design software (Balsamiq and Sketch) that allows for easy communication of web interactions. I learned that the first prototype is often simply the way to communicate an idea for feedback. As a result, as prototyping has improved, we have been able to advance more ideas. In the two months following the December 15 reflection, we had advanced an additional eight projects to the roadmap team, and as of February 15, had five major projects in prototyping and testing. Likewise, the product roadmap team sent a number of products back for workshopping and prototyping.

Finally, in an important move, at the end of February, we renamed the Framework in order to create greater clarity. All along I had called the process "validation," which had generated a lot of questions. When team members asked about validation or expressed confusion, I typically explained that we are validating ideas to gather evidence of whether or not we should build a particular product. I seemed to get this question a lot, and the term never gained much clarity. In an interview with my supervisor, we noted with satisfaction with how the process was working and looked at the various prototypes and tests in process, but as we stepped back we realized that what we were doing was not *validating* ideas, but *developing* ideas. The difference is similar to the difference between a workshop and a laboratory experiment. A workshop is more a process of tinkering and adjusting, where a laboratory experiment seeks to control conditions and strictly measure. Ours was more workshop than laboratory.

Happily, the term workshop is clearer than validation, so we changed both the name of the process and our emphasis. Now, we take product ideas and develop them, still collecting evidence of impact and growth, but taking the view that product ideas often need workshopping before we know enough to even begin to gather evidence. Workshopping also allows us to determine needs according to the product and user need we are trying to solve. A workshop often includes experimentation and is not without clear metrics, but it is more accurate to say that our process of taking products from idea to build is developmental rather than experimental.

Analysis

I choose to use the Framework I developed at Panorama to analyze my strategic project. Because it has elements of ideation, alignment, prototyping, and testing, and is drawn from innovation literature, the framework lends itself to analyze any innovative process. After roughly four months of implementing the process, I have good information to make some preliminary observations and reflections.

1. Ideate and Design

As I developed and designed the validation/workshopping process, there were clear areas of strength. The work I put into preparing and getting to know the product development process well was valuable. As a result, I had excellent information moving into the Product Team to create impact. It was fortunate that I was not immediately on the Product Team, but was a member of the Client Success

team, which gave me better insights into a client's experiences. That directly influenced how the framework was built with the user need as one of the first steps.

Another thing that worked well with ideation and design was that during Hackathon I was able to develop and use the proposal process and observe immediately how my colleagues responded. By using my earliest versions of the proposal as an interview tool, I was able to design the proposal and use it a number of times with a number of groups. It was helpful to iterate and redesign actively over the 24 hours of Hackathon. A tight, compressed, and focused design sprint is a powerful strategy for implementing the ideation and design phase.

However, I did not execute other elements of the ideation and design phase as effectively. For example, while the proposal process got a lot of design from the outset, the prototyping and experimentation part of the Framework was not as thoroughly designed with the user in mind. Prototyping and testing was by far the most difficult part of the process and I hadn't determined the best ways to test prototypes. Throughout the project, this part of the process was less clear. If I spent the same kind of energy designing prototyping/testing as I had spent on the proposal, chances are good that experimentation on the validation/workshopping process would have been more efficient and produced clearer results.

Another element of the ideation and design phase that I would do differently is to involve more team members. While I made an effort to collect feedback and get buy-in, I came up short in bringing people into the room to actually build the process. By working more or less independently I could work faster, but I made it more difficult to "sell" the process to colleagues later on. By leaving collaboration out of the initial process and pushing it to later, it slowed the production process down and led to some confusion about what the process was trying to accomplish.

2. *Align to vision and strategy*

In order to align this process to our company's vision and strategy, I used the proposal canvas to document the theory of action for what the validation/workshopping process was trying to accomplish (see Fig. 11).

TITLE: *An organizational strategy to validate and test new ideas*		
USER: *CEO, Executive Director, Superintendent*		

USER NEED	SOLUTION DESCRIPTION:	THEORY OF ACTION:
I am a CEO and want my organization to provide good products and services to our clients and expand our impact through serving more schools. Some ideas we have are no-brainers because they make us more valuable and allow us to create impact. Other ideas we have are clearly not things we will do because they are outside the scope of who we are and are suited to do. *However, many innovative ideas we have are more questionable. We simply aren't sure which ideas are winners and which are losers. How can I as a CEO lead my team to learn quickly which ideas we should develop without committing major resources to the process?* *and/or* ORGANIZATION PROBLEM *Growth and impact*	*Add a validation part of our product development process that allows us to test questionable ideas, collect evidence, and analyze impact* - *Revamp our proposal process* - *Use flexible, network-style organization* - *Build prototypes* - *Conduct tests* - *Measure and analyze results* - *Enhance communication* OUTCOME DESCRIPTION: *Panorama will be organized to roll out products that have been developed and tested prior to an organizational commitment to build. Products that emerge that way will have stronger evidence of value than if they hadn't. Panorama will have organizational capacity to workshop promising ideas.*	IF WE... *Develop a validation part of the product development process that allows for design, prototyping, and testing (lean)* THEN... *Panorama will be organized to roll out products that have been developed and tested prior to an organizational commitment to build. Products that emerge that way will have high likelihood of success.*

WHY SHOULD THIS PROBLEM BE ADDRESSED NOW?	3 BIG ASSUMPTIONS:
Panorama Education is forming a product team. They are moving into the "revenue" phase (past startup) and have big goals for growth and impact. This is the perfect time to establish a way to move ideas forward.	-*Panorama can allocate resources to validation* -*A process like this does not slow down product development* -*There is political will and legitimacy to put this process into place* -*This strategy will produce better product ideas*

Fig. 11: The proposal canvas filled out for the Product Workshopping Framework

There were strengths to the process of aligning my project to the greater company strategy. As I moved from ideation and design to aligning with company vision, this canvas gave me a chance to step back and identify the key focus need and a theory of action of how that need would be addressed concretely. My first iteration had the "validation" focus rather than the workshopping focus, but it gave me a clear theory of action and assumptions to test. In this proposal, the user need was framed in a story, which actually feels more empathetic and concrete than

telling about a particular pain point. I didn't do that in subsequent proposals, but it is a strong practice that allows for empathy with the user.

3. Prototype and test

The most problematic part of the Framework, as evidenced by where proposals get "stuck" in our process, is in designing an experiment that gives us good information upon which to base decisions. As I reflect on this, I think it can be attributed to two things. First, experiments rely on building the right kind of prototypes to put in front of users. For example, if we are hoping to test whether or not we should use a new type of calculation and display for a change over time metric, we need to design an MVP that doesn't take a lot of time to put together, but that also conveys the kind of changes upon which a user could base his or her feedback. We have not yet hit the sweet spot of quickly building the right kind of MVP that can provide good actionable information. I think that is a result of our not taking the time to clearly understand the user need from the outset (or even what we collectively understand education improvement to be), and therefore the learning goals of the experiment are ambiguous.

Second, experiments rely on having close contact with users to ensure a strong feedback loop. For education technology companies that are open to all teachers, are set up on a "freemium" basis, or that are social network driven, new products can be released into the market easily and usage data or feedback data collected quickly. However, in Panorama's case, our platform is largely marketed to district representatives who are managing a large survey implementation. It is not as easy, then, for us to release a "low-fi" product into the marketplace to measure

results. To get better feedback, we need to build infrastructure to gather feedback more frequently.

During the first two months of having the Framework in place, I was testing the assumption that there was enough political will on Panorama's part and personal legitimacy on my part to implement such a process. See Fig 12 for details of the test.

EXPERIMENT #1	TARGET END DATE: Oct-Dec
ASSUMPTION: *there is political will and legitimacy to put this in place*	
PROTOTYPE: *Form the team* *Carve out space in the process* *Set up clear interactions* *Develop technologies* *Begin executing*	**EXPECTED RESULT:** *people in the organization will support the concept and interact with it*
DETAILS OF THE TEST: *Rob will set up the idea of validation by documenting organizational need, by proposing the idea to key stakeholders, by communicating and refining with the Product Team, by developing the new proposal framework, and by rolling it out to the broader company-wide team.* *After a month, Rob will collect evidence that multiple people in the organization use the process, and will collect evidence of how products move through the process, as well as the types of products that emerge from it.*	

Fig 12: The experiment canvas for validating the Framework

This first experiment was validated as the team actively used the Proposal Canvas and followed the Framework. There was good political will (and by extension personal legitimacy). However, as I found was the case in other experiments, this experiment lacked clear metrics to define success. I wondered exactly how many interactions with the Framework would be successful? Validation criteria are straightforward in some cases, especially when metrics are quantitative, but hazy in others.

What I have learned in the few months of carrying out this project is that some prototypes lend themselves well to a traditional experiment. In our texting for family surveys project, for example, we ran a small pilot/prototype and collected

excellent A/B data to determine the impact of adding text messages on survey response rates. By the end of that project we could quantify the impact and value of building a more permanent version of texting functionality, as well as learn more about costs of adding the product. In other cases, experiments were not the best way to develop and build a product. For example, developing a new set of measures for equity in education requires much more design work to develop the product and therefore does not lend itself to testing. Only after a strong prototype is built can one validate its usefulness to clients. And then, it is only after a period of use that clients will see impact. This does not mean the project is not worth developing, but that trying to force an experiment where it doesn't fit is counter-productive. Moving our perspective from searching for product validation to engaging in product workshopping directly addresses this need.

Implications for Self

Reflecting on the efforts of the past months, I recognize major implications that I will take into my career calling to dramatically improve education organizations. Working as a Data Wise coach and teaching fellow over the last several years, I have been impressed by the "ACE Habits of Mind" of the Data Wise Improvement Process. The acronym stands for a commitment to *action, assessment, and adjustment*, intentional *collaboration*, and relentless focus on *evidence* (Boudett et al, 2013). As I developed greater skill and competency in these habits through deliberate practice, I have come to see them as important anchor points in my learning across a number of different contexts. The habits of mind are an apt framework for understanding my learning over the course of this strategic project. Through the project I have experienced growth and confronted challenges in each of the ACE areas, and as a result am emerging stronger for having engaged in the project.

Prior to this residency, I recognized in myself the tendency to make quick-action decisions without testing the waters first. Both the process of developing the Product Workshopping Framework and my own testing of the framework gave me a more nuanced understanding of how to maintain the balance between action, collaboration, and evidence: areas that often seem to be in conflict. When I was at my most effective, I was able to use the three habits together to move the Framework forward. When I neglected one of the habits over another, I was less effective. What follows is a brief discussion of each habit with a concrete next action for further growth and development.

It is vital to commit to action, assessment and adjustment

My first learning is that commitment to action, assessment and adjustment is necessary to enact values. When one has a particular set of values that is important to them, it comes out in how actively they pursue innovation, champion ideas, assess impact, and make adjustments to their methods. This is true organizationally as well as personally. The Framework was the enactment of my value of creating impact. At Panorama, one of the first activities I participated in was an onboarding session where we discussed Panorama values. These values are the undercurrent of who we are as an organization. It was empowering to be in an organization that placed such value on making a difference. In fact, the entire Framework relies on an organizational commitment to taking action, measuring, and adjusting, but with the express, mission-driven purpose of improving education for kids.

I learned that as a leader, this commitment to action requires a strong, specific vision. The Framework in a sense was a way to fit product innovation in a larger company product vision. Where the organizational vision was squishy, it was difficult to focus on the right questions to answer and innovations to pursue. I observed the way teams coalesced around a strong product vision at Panorama, as they did over the summer when we developed our on-demand survey system. The focus over the summer of where we wanted to go with our product gave designers, engineers, and other team members a concrete ideal to work toward. I observed that action, assessment, and adjustment depend on strong vision for the direction of the company.

Leadership is collaborating wisely and intentionally

Some of my biggest insights about my leadership (both positive and negative) came as a result of engaging others in the Framework or leaving them out. I count this implication, therefore, as a rich area to explore in my future leadership practices.

First, it took me a number of weeks to determine with whom to work and how to involve them as I worked in my first role on the Client Success team and then for the first few weeks on the Product Team. I felt restricted by the desire to conserve and protect the time of others while striving to advance the organizational need to innovate. In the case of my strategic project, this played out with leaving important stakeholders out of the initial development process during Hackathon and the following two weeks as we implemented the Framework. I began the process working in a silo and it wasn't until a formal team presentation that I brought team members into the conversation. This is in contrast to January when I began involving more people in the feedback loop in order to accelerate work on prototyping. The January collaborative work made it possible for more prototypes to be ready for testing and experimentation and represented a more effective way to innovate.

Second, communication and clarity are enablers for intentional, wise collaboration. I recognize that my own limited grasp and communication of the Framework, including how we defined desired outcomes, was a key factor in times when it was less successful. As I had not used the Lean Startup or any other validation method previously, I was applying a theory to our practice that by all accounts could work, but was itself an experiment. I had work to do to figure out to what degree it fit into Panorama and to understand its nuances so I would know how to implement it successfully. It became apparent that the less clear my

understanding, the more important regular communication, progress updates, measurable outcomes, and cross-team collaboration became. I hadn't keyed into the fact that lack of clarity in my own thinking should signal to me that I need better communication and more intense collaboration. It's a lesson with strong implications for leading processes or teams in the face of uncertainty. I will do well to trust my instincts, but also use strong communication and collaboration. A next step I'm interested in taking is to deliberately develop a verbal "pitch" in order to understand where ideas are ambiguous and need refinement and to enlist the support of my colleagues.

Focus on evidence

Much of this capstone is about becoming more evidence-driven in innovation. Making strong product bets relies on a process that collects, interprets, and communicates evidence upon which decisions can be based. I have gotten much better at this at Panorama for a couple of reasons. First, our new Proposal Canvas has a place built in to name big assumptions, which caused me many times to step back and look at a product idea and recognize big assumptions underlying my theory of action. For example, if I want to run a pilot for text message notifications, the simplest approach would be to build out the prototype, recruit my users, and let them try it. The quality of my evidence will be limited because I haven't done the work to identify the big assumptions that ought to be tested. However, if I state my assumptions, I will see that I assume text message notifications for surveys will increase survey response rates. Based on that assumption, it becomes clear what I need to test and how to design the experiment, which may involve an A/B test to

see the difference between response rates with people who receive text message notifications versus those who don't.

Along those lines, I found that my prototyping skills and understanding have gotten significantly better. Creating prototypes is not necessarily a new thing for me. I have designed student intervention programs, discipline systems, assessment programs, and a number of other educational innovations, but have not approached them with a specific user story in mind. In my first month at Panorama, I participated in a design session that named and prioritized distinct user stories (framed as "As a [user type], I want to [action] so that [result]") based on the scope of the project. By designing prototypes with a particular user story in mind, I find my thinking to be more rigorous, empathetic, and focused. Narrowing in on and prioritizing user stories is a strong leadership practice as it builds empathy and problem-solving for those one serves.

My next step in strengthening evidence is to build early prototypes for use in developing or communicating a vision or pitch. Rather than saving a prototype for user testing, I hope to develop earlier prototypes that people can sense, hold, or touch in order to grasp the meaning of what I hope to do. Prototyping at once communicates a concept and allows people to critique it. Earlier prototyping challenges me to my focus to either fewer ideas (something I've always struggled to do) or a smaller scope, in order to accelerate the development of those ideas.

Change leadership

Finally, a note about my ability to lead the implementation of this process: As I alluded to earlier, according to Kanter's framework my task was to define the problem, build coalitions, and move to action. Upon reflection, I consider that my

ability to move to action, assess, and make appropriate adjustments represented a strength. I moved with clarity of purpose in developing the technologies, artifacts, and support structures to ensure that the Framework would be functional. I took an active role in team-building, norm-setting, goal definition, and strategizing in the product team in order to build effective coalitions. Then, after the Framework was implemented, I actively sought out feedback to make modifications and actively adjusted the prototype to increase the speed of experimentation and product flow as well as its ability to engage others.

On the other hand, there is compelling evidence from interviews and debriefs that I could have been clearer in defining and communicating about what problem the Framework was trying to solve, how it was going to solve it, and how we would know it was successful. In addition, my communication about the Framework was often abstract rather than concrete and specific, fostering confusion unnecessarily. As time went on and we moved to describing it as a workshopping process, with the subtle differences from validation, there is evidence that clarity in communication improved. The problem, I think, comes down to understanding clearly what certain words mean, and then communicating using the right analogies and specific examples. The word validation (which I had used liberally throughout the process) was problematic because of its vagueness, and the process often felt too abstract for others to grasp. The importance of clarity and specificity is a lesson I am taking away from this experience.

Implications for Panorama Education

Panorama Education is a young, fast-moving, fast-growing organization that is committed to strong values, to strengthening its team, and to creating impact. As I reflect on lessons and takeaways of this project for Panorama, I have to pause and consider Panorama generally. It is amazing how successful Panorama has been at becoming competitive in a challenging industry, building a positive company culture, developing a strong reputation for service, quality, and excellence, and securing funding and support from strong investors. It is by all accounts a success story, and holds the potential to be an even greater success story as time goes on. By way of implications for this project on Panorama, I have three recommendations for how Panorama can more successfully innovate and propose a possible next step to moving forward in each one.

Define impact

Because Panorama started as a survey company, clients and prospects may view its value in a narrower way that we do. Feedback surveys are used to engage communities, students, and staff in reflecting on the strengths and weaknesses of their programs. These surveys can be a proxy for community engagement, can help a district or school become more data-driven, can provide basis for professional development activities about data, or be used for evaluative purposes. The purpose of running a survey is often clear, but the impact on education improvement is not as clear.

As Panorama aspires to be an education improvement company rather than a surveying or feedback company, it is important to define the impact such a company would have in the world. What does it mean to be an education improvement

technology company? How does that make a student's classroom experience better? How does it impact a teacher at a school? How does Panorama fit into the day-to-day of school personnel? In the absence of these answers it is challenging to know the extent to which Panorama can influence education outcomes people care about. It is not necessary to be completely sure about all the ways an education improvement platform can help teaching and learning, but it would be a valuable exercise to clearly establish a testable theory of action that gets to specifics. Who specifically do we want to impact? Teachers? Administrators? Everyone? What do they experience as we attempt to become about improving education?

Once that philosophy about impact has been defined, it will become easier to define the outcomes Panorama hopes to see in student learning and organizational growth. Using that philosophy, a series of success measures can be defined, encouraged, and monitored on a regular basis in order to measure success, both of districts and of Panorama. Having said that, I do not recommend that team members sit around and philosophize about education impact as much as I recommend that we choose a few key education levers to pull using our strengths and competencies. For example, we may examine literature and decide that we want to help special education teachers use feedback and school-level data to make the experience of students with disabilities better. If we feel that will promote impact and organizational strength, we would have a clearer view of who we want to empathize with and which products to build for them.

I recommend that Panorama (either a subgroup or entire team) select a limited number education levers that they anticipate will be most impactful. Once those levers have been identified, then deeply commit to designing innovations around those levers. The work of selecting those levers should be done thoughtfully

collaboratively as a company, but I can offer my insight as a former educator and prospective education leader.

To me, impact is centered on the whole student as a developing learner: Social-emotional development, engagement in school, participation in project-based learning, logic and reasoning, interactions with others, behaviors, physical, mental, emotional, academic data, etc. Therefore, the role of an education improvement company focused on data is to find ways to measure multiple dimensions. It is neither possible nor desirable to measure everything, but with good information, elegantly presented and at one's fingertips, educators are able to be more thoughtful about putting sound strategies to work. Rich possibilities are found by measuring indicators for a number of dimensions and presenting them elegantly for educators who are organized to make use of these data. Now more than ever, holistic measures that draw from a variety of sources are available through technology. It won't be perfect or complete, but if Panorama can become the best at showing student progress in a variety of ways, we will be able to provide insights and measure interventions in ways that have not been possible until now. Measuring impact across multiple dimensions and taking action on these has the potential to improve education tenfold.

Strengthen product vision

The second implication for Panorama is that because product innovation relies on the presence of a strong strategic product vision, it is critical to refine and develop that vision. This involves deeply understanding the job the client is hiring us to do for them. In the Framework, after a proposal has been written, the product idea is aligned to the company's vision and strategic direction. That vision and

direction give clear guidance on whether or not to move forward on a product idea. At times I approached an innovative idea in the Framework under the impression that we had a well-defined product vision when in fact we were just beginning to come to agreement on it. The positive of putting effort to strengthening that product vision is that it will become much more clear to us what innovations we choose to create impact.

At the same time that we were implementing the Framework in November, I was part of a subgroup of the product team working on a document outlining the strategic product vision. The vision was sent back to the larger team and then edited over the course of the month with feedback from the CEO and director of Engineering. When it was rolled out for feedback company-wide, it attracted feedback, both positive and negative. It was surprising to me to see disagreement about what kinds of products we should be building. Some thought we should prioritize surveys alone, while others wanted to spend time and effort on building out Playbook, while still others were interested in growing the product in more exploratory ways beyond surveys. Though there have been moments when we've tried to narrow, there is still general haziness about what we want our portfolio of products to be. This has a direct influence on the kinds of prototypes we are willing and able to build, as well as the types of markets we want to explore and the users we will be impacting. This makes it more likely that product innovations will be derivative and incremental because it is safer to iterate on something certain than to champion big ideas that may be far afield from where Panorama is now.

Get the product closer to the user

One of the big lessons learned through my implementation of the Framework is that it is too difficult to get our product in the hands of users for regular feedback. This is due in part to some strategic decisions about how we sell and market Panorama. At present, the main way to become a paying Panorama client is for a district or school main point of contact to enter into a contract with a sales or outreach team member. This main point of contact at the district or school level makes most of the decisions on behalf of principals and teachers. Other than times we offer free resources, often behind a registration window, we don't generally allow people to freely interact with Panorama. This approach has the effect of limiting how users interact with us, and therefore limits feedback we receive from a broad group.

Our base of users who are exposed to Panorama's products is probably too restrictive, even when considering that teachers all receive reports. Because we often sell and interact with a few individuals at a district, rather than a lot of teachers across multiple districts, we generally don't have the ability to roll out prototypes for testing. Even our self-service technologies require a sales call or sign-up, which presents a significant barrier to opening up access. With our exposure to our clients limited to a main point of contact, we are left with fewer ways to collect widespread feedback or usage data across non-client users. This has implications for A/B testing, for measuring impact of feature rollouts, and for product versions or additions to our platform.

Any change that can open Panorama up more broadly to teachers for at least a limited version of Panorama would allow us to experiment with new product ideas and innovations, and would drive our ability to prototype and experiment

more broadly. As a concrete next step, I recommend opening up classroom surveys to any teacher who wishes to survey their students and perhaps a basic version of Playbook and a way to submit moves. This allows a key part of our product to develop, and it allows us to observe client usage a little more clearly. This will have the effect of providing a "sandbox" for new product ideas and a chance to learn from our users.

Embrace the Innovative and Incremental

Panorama seeks to position itself an early version of an education improvement platform rather than a mature survey tool. This signals a commitment to growth and innovation. However, it is instructive to see how powerful the gravitational pull of the core survey business is. In fact, in casual conversation, we often refer to ourselves as a "feedback company." Much of the engineering and design efforts are geared toward enhancing reporting features and insights from surveys. These innovations are fairly incremental, which reflects organizational priorities more aligned to becoming a mature survey tool.

I have wondered why it is so difficult to explore innovations beyond surveys at Panorama. After considering my experiences promoting non-survey innovations, I can point to three organizational strengths that are also inhibitors of innovation. First, our organization has a conception of growth that is based on factors other than net profit. This is a positive quality because it helps us focus less on the bottom line, and more on doing the right thing for schools. However, this mindset may prevent us from exploring new innovation. In our financial metrics, we talk about number of schools served, annual recurring revenue, and churn. We seldom talk about net profits. As a result, we do not challenge the assumption that our survey business

will eventually become profitable and that adding more schools will lead to that profitability. As a result, we continue to make incremental improvements to the survey platform and reports in order to increase the number of schools served and win deals with prospects that are looking for surveys. Engineering and product resources, then, are tied up in the survey business. If Panorama were to focus more on profitability, it may cause us to explore innovations, not out of passion alone, but out of urgency to survive. One possible way to address this inhibitor is to be more open and transparent about profitability and use profitability as a key factor in product decision-making. That could potentially open up new product ideas with different profit models.

The second inhibitor is our own growth. Early stage startups have the quality of hiring people to fulfill a number of tasks as needed to develop the business. They are flexible and light. Phase 2 companies, however, grow in a way that allows them to execute on their business model. The number of Panorama employees has nearly doubled in the past year and as a result teams have become divided into more functional areas. As functions and roles solidify to execute and provide high quality feedback surveys, or to develop or program excellent survey analytics, the pull of the core business makes it harder culturally for groups to explore beyond surveys and makes it difficult for leaders to allocate resources for potentially distracting rabbit trails. The answer is not to grow less, but to grow in ways that create space for innovation. Employing Kotter's dual operating system by encouraging all team members to spend 10-15% of their time on innovations could go a long way to encouraging innovation while growing.

Finally, a third inhibitor is our desire to make a great product. It is natural to want our survey platform to consistently wow and delight our users. Our survey

clients constantly ask for feature enhancements, our internal staff requests feature enhancements, our data scientists and researchers want feature enhancements, and our sales group wants feature enhancements. Each stakeholder group has the noble desire to make the platform more user-friendly and sellable. The big challenge is deciding which incremental changes can be shelved in favor of allocating resources to exploration. Our desire for a strong survey product may prevent us from making strategic trade-offs to use resources to explore innovation.

Implications for Sector

There is a valuable role in the education sector for mission-driven for-profit education companies. At times in conversations with colleagues and others, I have felt the need to defend that Panorama has investors and needs to show profit. My instinct and discomfort is strange, since I know the company is run by values-driven individuals who desire to make a real difference with students. Upon reflection, I think this discomfort comes from the fact that I used to tell the story that hard-earned public funds (in terms of taxpayer money) is being transferred to wealthy private interests. The opportunity to work with a company with strong values and different strengths from education organizations has led me to a different conclusion. I now see great promise that scrupulous education companies can accelerate innovation and provide solutions education organizations would be unable to produce.

The overwhelmingly positive response from schools and districts about their experience working with Panorama is a testament to the kind of private-public partnership that can be healthy. Districts and schools want to improve the experiences of their students, staff, and families, and often the best way to learn how to improve is to ask one's stakeholders. The problem is that conducting a major survey for an entire community is complex and cumbersome. It makes sense and is desirable for that district or school to partner with a group that has gotten so good at surveying and even offers tools to improve teaching and learning based on those surveys. The ability to outsource that study is highly beneficial to communities, and in turn any profits can increase the value that Panorama can offer to additional schools and districts. The value proposition is clear, and the sector writ large benefits from organizations that offer services and products of value. It is precisely

because businesses seek to sell products or services to schools or districts, that they can be more responsive to the needs of schools.

With that in mind, this project carries implications for the CEO or other leader in a mission-driven education company, especially one in either the startup or revenue phase. In order to drive impact in ways that benefit the whole child, companies will need to explore innovations that haven't been considered or even possible before.

The first implication of my project for an education company, especially at that first startup phase, is that developing a product or service to meet basic client needs is an effective strategy for initial growth. Establishing the right product-market fit using a lot of user feedback is often exactly the right strategy for a startup. However, as an organization locates that product-market fit, it grows and becomes concerned with servicing existing clients, entering into the revenue phase. Young companies in this phase can learn from the product workshopping activities at Panorama. Allocating time and resources for ideating and designing new solutions, aligning them to the company's needs, and prototyping to collect evidence can provide valuable data upon which leaders can make sound decisions. Getting organized to innovate can promote a culture of growth and impact.

Another implication for education companies is that there is strength in operating from theories of action. Each product or service idea represents a particular theory about how the world works and those theories are founded on assumptions. By connecting each product idea to an "if…then…" statement, an organizational leader can evaluate whether or not the idea makes sense in the context of its company's vision. It can also test big assumptions as needed to move forward with product development wisely. Through the process of identifying

theories of action, testing, and developing ideas, organizational leaders can set up a clearer, cleaner roadmap for product or services that support the whole child.

At its heart, education is about helping people develop and fulfill their promise. Stakes are high, and solutions to major challenges will not be confined to schools or districts. It will take creative and thoughtful individuals crossing boundaries of public, private, academic, and non-profit to solve the wicked problems facing education today.

Conclusion

I began this capstone by posing the challenge of how an educational organization can take better innovation bets to increase impact and promote organizational sustainability. With a significant failure rate of new ideas, entrepreneurs and education leaders alike seek to minimize losses and maximize possibilities for learner impact and organizational strength. I have argued that a Product Workshopping Framework that takes place outside a regular product development process is a way for an organization to build muscles around innovation and a habit of developing ideas and testing their viability. I worked to develop and test this Framework as if it were a prototype of a product being tested for viability. Initial results and impact on Panorama seem to indicate the Framework has promise, though it is not flawless.

Projects of such a short duration lead to inevitable questions and caveats. I have every reason to believe this project has been of use and value to Panorama, but whether it is sustainable or not is uncertain. However, since this process emerged at the same time as the formation of a new, most likely permanent team, chances are good that it will continue to grow and develop as a part of the organizational culture. Were I to continue this project, I would seek to collect more data over the coming year to determine which product ideas from the workshop made it through to the roadmap and into clients' hands. I would look at products developed to see if the mix includes both derivative and new growth products. Finally, I would seek out a larger organization or two to observe and inquire about their product innovation process. It would be fascinating to see larger organizations engaging in a product development process while executing on their core businesses. With a better understanding of the different market forces at work for organizations of that size, it

would add to my understanding of how innovation happens within large organizations and would serve as an opportunity to experiment with a workshopping process at a larger scale.

Over the course of the project I have shifted my view. I used to think that prototyping is mainly an opportunity to gather data through controlled experimentation; now I see prototyping as much more valuable conversation-starter, a feedback mechanism, and a learning tool for further innovation development. I shifted my focus from *validating* a product idea (by hypothesis testing) to a more flexible approach of *workshopping* and developing a product. The purpose of the workshop is to better understand how well a product in development creates the impact or growth expected by its theory of action. It sets out to test our biggest assumptions so we can confidently move forward with development or continue to workshop the idea until it's ready. This virtuous cycle of testing theories and collecting evidence is a valuable practice for organizational leaders who aspire to innovate successfully.

At Panorama Education, I have found a group of people deeply committed to values and impact. I have learned from organizational practices that promote culture and warmth. I have observed a team that works assiduously to provide a second-to-none experience for school and district clients. As the organization continues to develop its strengths and people while finding opportunities and practices to innovate, it has a tremendous opportunity to influence and improve education in a lasting way.

Appendix

Exhibit 1: Product Mix in the Product Workshopping Framework, Dec. 15

Proposal Title	Type	Status as of Dec. 15
Subscales in reports	Derivative	1 - Needs Proposal
Scores of high-performing teachers	Derivative	1 - Needs Proposal
Timer on survey-taking	Derivative	1 - Needs Proposal
Auto-save surveys	Derivative	1 - Needs Proposal
Playbook for Social-Emotional Learning	Platform	2 - Fast-track
Playbook for administrators & more topics	Platform	2 - Fast-track
Reminder emails using measure	Derivative	2 - Fast-track
Teacher Accelerator (supports for new teachers)	Breakthrough	3 - Not now
Student academic health dashboard	Research and Advanced Development	3 - Not now
Teacher retention system	Breakthrough	3 - Not now
Student Information System integration	Derivative	3 - Not now
Drop-down functionality for surveys	Derivative	3 - Not now
Attendance intervention dashboard	Research and Advanced Development	3 - Not now
Blended learning measures	Breakthrough	4 - Designing Experiment
Free principal accounts	Platform	4 - Designing Experiment
Texting for Parent Surveys	Platform	4 - Designing Experiment
Levers of outcomes	Platform	4 - Designing Experiment
Change over time improvements	Derivative	4 - Designing Experiment
Similar schools, similar teachers	Derivative	4 - Designing Experiment
Data cycle support resources/facilitator guide	Platform	4 - Designing Experiment
Measures of equity factors	Research and Advanced Development	4 - Designing Experiment
Personalized learning measures	Breakthrough	4 - Designing Experiment
Pulse – Frequent surveying	Breakthrough	5 - Measuring

Social-Emotional-Learning dashboard for teachers	Breakthrough	6 - Learning
SurveyMonkey integration	Platform	7 - Not Validated – Not now
Free response query dashboard	Platform	7 - Not Validated – Not now
Book of data	Platform	8 - Validated
State of data	Platform	8 - Validated
Engagement metric	Derivative	8 - Validated

Bibliography

Altman, S. (2015). Startup Playbook. Retrieved December 18, 2015, from

    http://playbook.samaltman.com/

Arnold, J. (2015). Cost of Delay Divided by Duration | Black Swan Farming.

    Retrieved from http://blackswanfarming.com/cost-of-delay-divided-by-

    duration/

Beck, K., Beedle, M., Van Bennekum, A., & Cockburn, A. (2001). Manifesto for Agile

    Software Development. Retrieved December 18, 2015, from

    http://agilemanifesto.org/

Blank, S. (2014a, March). Why Companies are Not Startups. Retrieved from

    http://steveblank.com/2014/03/04/why-companies-are-not-startups/

Blank, S. (2014b, July 30). Driving Corporate Innovation: Design Thinking vs.

    Customer Development. Retrieved from

    http://steveblank.com/2014/07/30/driving-corporate-innovation-design-

    thinking-customer-development/

Boudett, K. P., City, E. A., & Murnane, R. J. (Eds.). (2013). *Data wise : a step-by-step*

    guide to using assessment results to improve teaching and learning (Rev. and

    expanded edition.). Cambridge, MA: Harvard Education Press.

Brown, T. (2008). Design Thinking. *Harvard Business Review*, *86*(6), 84–92.

Chen, A. (n.d.). Minimum Desirable Product. Retrieved from

    http://andrewchen.co/minimum-desirable-product/

Christensen, C. M., & Overdorf, M. (2000). Meeting the Challenge of Disruptive

    Change. (cover story). *Harvard Business Review*, *78*(2), 66–76.

Christensen, C., & Raynor, M. (2003). *The Innovator's Solution: Creating and Sustaining Successful Growth*. Boston: Harvard Business School Publishing.

Elmore, R. (2011). *I used to think--and now I think: twenty leading educators reflect on the work of school reform*. Cambridge, MA: Harvard Education Press.

Feuer, A. (2015, December). *State of Panorama*. Boston. Retrieved from Company document

Graham, P. (2009, February). Startups in 13 Sentences. Retrieved September 12, 2015, from http://paulgraham.com/13sentences.html

Harper, M. (2014, April). Getting To $100M+ Revenue: Understanding The 3 Phases Of A Startup. Retrieved September 13, 2015, from http://thenextweb.com/entrepreneur/2014/04/15/getting-100m-revenue-understanding-3-phases-startup/

Hess, F. M. (2010). The Transformative Promise of "Greenfield" Schooling. *Phi Delta Kappan*, *91*(5), 49–53.

Johnson, M., Christensen, C., & Kagermann, H. (2008). Reinventing your business model. *Harvard Business Review*, 58–65.

Kanter, R. M. (2003). *On the frontiers of management*. Cambridge, MA: Harvard Business School Publishing.

Kern, E. (2012). Marc Andreessen: Not every startup should be a Lean Startup or embrace the pivot. Retrieved November 15, 2015, from http://blogs.anderson.ucla.edu/gap/2013/05/marc-andreessen-not-every-startup-should-be-a-lean-startup-or-embrace-the-pivot.html

Kotter, J. P. (1996). *Leading change*. Boston, MA: Harvard Business School Press.

Kotter, J. P. (2012). ACCELERATE! (cover story). *Harvard Business Review*, *90*(11), 44–58.

Maurya, A. (2012). *Running Lean*. San Francisco: O'Reilly Media.

McClure, D. (2004, August). *Startup Metrics for Pirates*. Retrieved from

      http://www.slideshare.net/dmc500hats/startup-metrics-for-pirates-long-

      version

Müller, R., & Thoring, K. (2012). Design Thinking vs. Lean Startup: A Comparison of

      Two User-Driven Innovation Strategies. Presented at the International Design

      Management Research Conference.

O'Reilly, C. A., & Tushman, M. L. (2004). The Ambidextrous Organization.

      Retrieved September 17, 2015, from https://hbr.org/2004/04/the-

      ambidextrous-organization

Product Roadmap Team. (2015, October). Product Roadmap Team - Feedback and

      Review.

Punjabi, K. (2013). Validate or Die: Using Validation to Build the Right Product.

      Retrieved from http://www.mindtheproduct.com/2013/09/validate-or-die-

      using-validation-to-build-the-right-product/

Ries, E. (2011). *The Lean Startup*. New York: Crown Business.

Rittel, H. W., & Webber, M. M. (1973). Dilemmas in a general theory of planning.

      Policy Sciences, *4*(2), 155–169.

Robinson, F. (2015). Minimum Viable Product, SyncDev. Retrieved December 17,

      2015, from http://www.syncdev.com/minimum-viable-product/

Schein, E. H. (2010). *Organizational Culture and Leadership*. San Francisco: Wiley.

      Retrieved from http://ezp-

      prod1.hul.harvard.edu/login?url=http://search.ebscohost.com/login.aspx?d

      irect=true&db=nlebk&AN=335269&site=ehost-live&scope=site

Sexton, D., & Smilor, R. W. (1986). *The Art and Science of Entrepreneurship*. University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship. Retrieved from http://ssrn.com/abstract=1496717

Silva da Silva, T., Selbach Silveira, M., Maurer, F., & Hellmann, T. (2012). User Experience Design and Agile Development: From Theory to Practice. *Journal of Software Engineering and Applications*, *05*(10), 743–751. http://doi.org/10.4236/jsea.2012.510087

Stellman, A., & Greene, J. (2014). *Learning Agile*. New York, NY, USA: O'Reilly Media. Retrieved from http://proquest.safaribooksonline.com.ezp-prod1.hul.harvard.edu/9781449363819

Stevenson, H. (2013). *A New Definition of Entrepreneurship*. Retrieved from http://bigthink.com/videos/a-new-definition-of-entrepreneurship

Thiel, P. (2014). *Zero to One: Notes on Startups, or How to Build the Future* (Kindle Edition). New York: Crown Business.

Wheelwright, S., & Clark, K. (1992). Creating Project Plans to Focus Product Development. *Harvard Business Review*. Retrieved from http://web.b.ebscohost.com.ezp-prod1.hul.harvard.edu/ehost/pdfviewer/pdfviewer?sid=ca9f90a9-827e-4e4c-9c79-5bf73711ae2d%40sessionmgr198&vid=1&hid=115