



Michael & Susan Dell
FOUNDATION

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Blended
Learning
in Practice:
Case Studies from Leading Schools

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featuring



summit
public schools

prepared by



Background

Summit Public Schools San Jose

Blended Learning at Summit San Jose

There's a race going on between kids and computers at Summit Public Schools San Jose. Every day in 9th grade math, students learn algebra and geometry skills through Khan Academy – a free online repository of videos and exercises. When students finish one exercise in Khan, they move on to the next in the curriculum sequence.

Teachers work with Khan's developers to determine which standards will be covered in the coming months and create exercises to be used in the classrooms. Yet half a dozen students are finishing exercises faster than they can be written. During self-paced class time and outside of school, these students are zooming past the rest of their peers.

Midway through the fall of 2011, Khan's developers held a sizeable lead on the school's fastest-progressing students. But despite the developers' furious efforts to craft new exercises, their lead shrank from several weeks down to two, and finally just to one. Near the end of the semester, one student caught up, and had finished every exercise available in the algebra/geometry sequence. Sal Khan, founder of Khan Academy, created a special award to mark the milestone. In 2012, a new semester dawns and the race begins again – teachers and Khan developers are collaborating and moving faster this time, but so are the students. Together they're constantly refining a new model for how technology can help personalize learning, and it's game on.

Summit at a Glance

CMO

NAME *Summit Public Schools*

FOUNDED *2003*

LOCATION *Redwood City and San Jose, CA*

NETWORK *4 schools serving 932 students – 2 schools use a blended model in math*

DEMOGRAPHICS *41% Free/Reduced Lunch, 15% English Learners, 12% Special Education*

GROWTH PROJECTION *14 schools serving 5,522 students by 2017*

FOUNDER & CEO *Diane Tavenner*

MISSION *To ensure that every student has the opportunity to attend, and succeed in, a four-year college or university, and to be thoughtful, contributing members of society.*

Schools Profiled

NAME *Rainier and Tahoma – together referred to as Summit San Jose*

FOUNDED *2011*

LOCATION *San Jose, CA*

STRUCTURE *204 9th grade students across Rainier and Tahoma; expansion at 1 grade/year*

DEMOGRAPHICS *47% Free/Reduced Lunch, 19% English Learners, 5% Special Education*

FOUNDING EXECUTIVE DIRECTORS *Diego Arambula (Rainier), David Richards (Tahoma)*

MISSION *To ensure that every student has the opportunity to attend, and succeed in, a four-year college or university, and to be thoughtful, contributing members of society.*

BLENDED LEARNING *Math classes use a classroom Station Rotation model¹*

Building a Blended Learning Model

Summit Public Schools operates four charter schools in California’s Silicon Valley. Home to technology, innovation, and vast wealth, the region also includes a growing, poverty-level immigrant population. In 2003, a group of parents and educators, led by CEO Diane Tavenner, established Summit Preparatory Charter High School in Redwood City to provide an innovative, replicable new school for the region’s diverse student body. Summit Prep combined a data-driven, high-expectations charter model with a focus on differentiated instruction, mastery, and personalized learning plans that pinpoint the needs of every student. It also emphasized mentorship and social and emotional supports. The results have been impressive. Since 2007, 96% of Summit Prep seniors have been accepted to at least one 4-year college, scores have soared on statewide tests, and the school was featured in the documentary *Waiting for Superman* (See *Appendix 1 for details on Summit’s results*).

Encouraged by the success of Summit Prep, school leaders expanded the model to nearby Everest Public High School in 2009, and in 2010 began to plan for two more schools in East San Jose. Using a facility leased from the National Hispanic University, Tavenner and Summit teacher-leaders David Richards and Diego Arambula set a vision for the new schools based on the best practices

¹The 2012 Innosight Institute report, *Classifying K-12 Blended Learning*, characterized different types of blended learning models; the “station rotation” model involves students rotating “on a fixed schedule or at the teacher’s discretion among classroom-based learning modalities. The rotation includes at least one station for online learning.”

of Summit Prep and Everest. In addition, the team placed special emphasis on learning tailored to the needs of a diverse student body, and began to explore multiple options – including the use of technology – to create a more personalized school model. To reflect the peaks they hoped their students would reach, David and Diego named their schools after mountains – Tahoma and Rainier.

Throughout 2010, David and Diego planned for two new schools that would share facilities, faculty, and an approach to education. At the same time, Summit had begun to examine the progress of its students after high school. Outreach showed that while recent Summit Prep graduates were attending college at impressive rates, just over half completed their degrees within four years.² While this number exceeded national averages for similar populations, it still fell short of the aspirations Summit held for its students. One obstacle in particular traced back to high school: students needed remedial support for college math, and in the time it took to get on track, students were dropping out. These reports from Summit grads matched the results of an internal college readiness test that likewise showed high school juniors struggling in math.³ Across the Summit network, leaders reviewed the data and knew they needed to do more.

As David and Diego began to hire faculty and weigh strategies to target math, the team hit a second roadblock. Deep education spending cuts in California meant that Tahoma and Rainier would

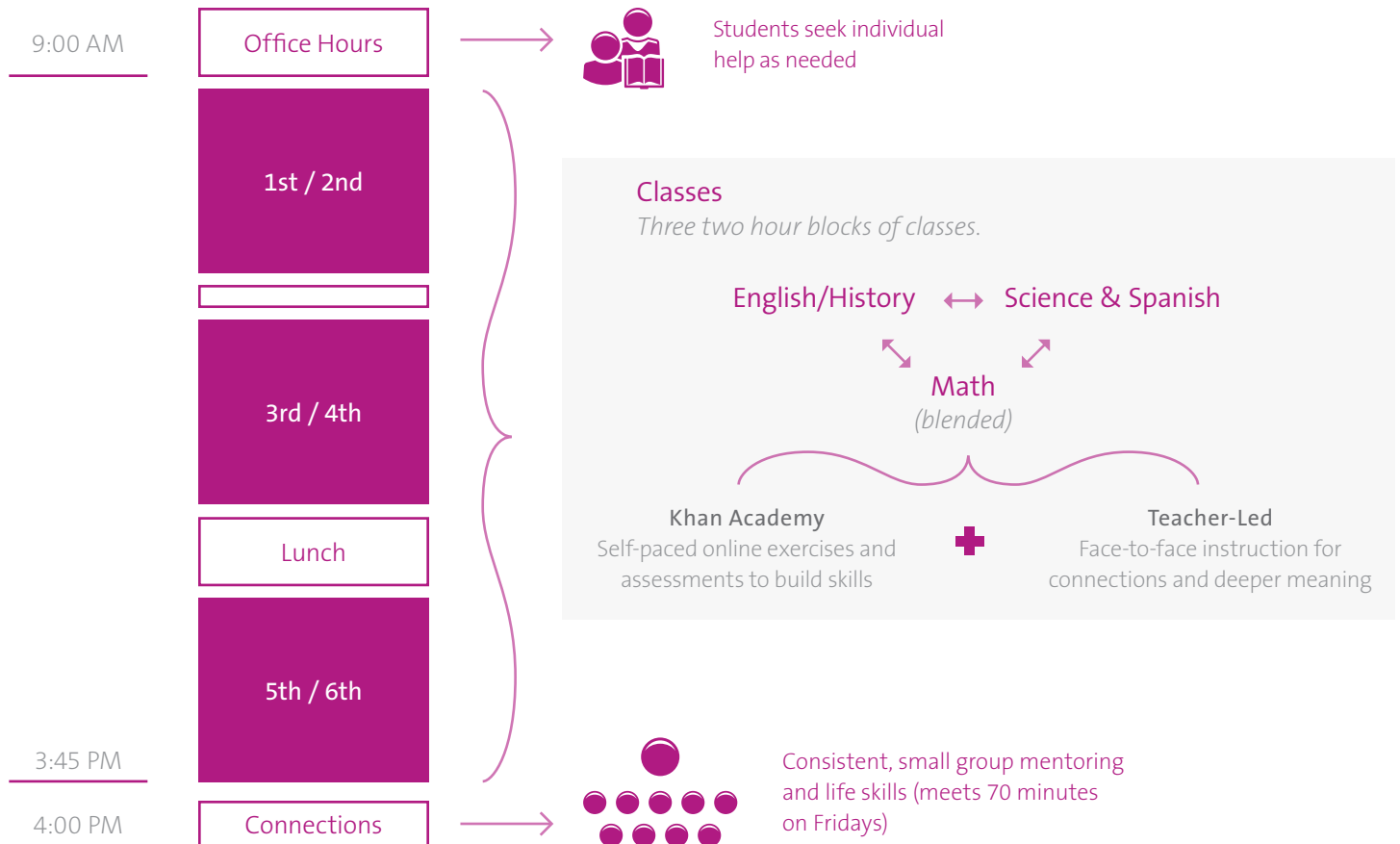
have tighter budgets than prior Summit schools. David and Diego realized they would need a new approach to maintain their vision of tailoring learning to student needs while also achieving financial sustainability. They returned repeatedly to advances in educational technology and soon decided that online math programs had sufficiently evolved to deserve a place in Summit's classrooms. With help from consultants at Alvo Institute, Summit's leadership probed deeper into combining online with traditional classroom instruction (*See Appendix 2 for project plan*). They came to believe that a blended learning model could drive gains in math, and could strategically spread limited resources to operate with just three 9th grade math teachers instead of the four used at other Summit schools. But to meet their instructional vision while maintaining sustainability, Summit would need to find the right technology partner.

As the team prepared for their Fall 2011 launch, a nearby nonprofit called Khan Academy was likewise gathering steam. Founded in 2005 by hedge fund manager Sal Khan as a way to tutor his cousin, Khan Academy had grown to include over 3,000 free, online math and science video lessons backed by hundreds of practice exercises. With a TED Talk, millions of YouTube views, and ample philanthropic backing, Khan Academy was thinking big, and looking to bridge its constellation of online content with brick and mortar classrooms. Summit applied to become a Khan pilot school, and stood out among hundreds of applicants for its data-

²Some other students were on track to complete their degree within six years.

³The Entry-Level Mathematics Test, originally from the California State University System

Fig. 1
Student Day-In-the-Life at Summit San Jose



driven culture, strong faculty and track record, and willingness to disrupt traditional school norms. Khan Academy saw the potential for a real-life laboratory in which to hone its innovations for a national expansion. At the same time, the team at Summit found in Khan Academy a partner that could deliver high-quality, modular content along with open access to student data and a desire to constantly improve its product. Just as important, Khan Academy and its team of implementation coaches were grant-funded and free.

During the summer before school opened, Summit San Jose and Khan Academy worked to craft a blended math model that would fit within Summit's existing structure and support a student's overall learning experience. Today, when students arrive at school they encounter an extended, 9:00AM—4:00PM school day organized on a rotational block schedule. Students rotate among two hour blocks of blended math, a joint English / history class, and either science or Spanish. Struggling students work with teachers during individual office hours

before school, and 18-student “Connections” cohorts meet with a faculty mentor each day to discuss character education, wellness, and personal issues. Every January and May / June students pursue one elective for a month-long “Intersession” with options ranging from art to technology to externships with local businesses.

Each of these structures, say Summit leaders, are designed to build personal relationships with students and provide in-depth learning experiences. This ethos extends to math, where teachers combine a mixed algebra and geometry curriculum with a clearly-defined role for Khan Academy’s technology. Teachers identify Khan lessons that map to Summit’s standards-based curriculum, and students set various online goals for what they will accomplish each week based on their point of progression. Both students and teachers receive real-time feedback, and teachers use data to target individual needs and to balance the use of Khan versus teacher-led instruction. As a result, teachers say, blended learning helps develop higher-order thinking along with basic skills, and has brought the school closer to its goals of tailoring learning to the needs of each student. “We’ve always believed in differentiated instruction,” said one school leader, “but technology has just made it easier. That’s why blended learning has been such a perfect marriage with our existing philosophy.” To illustrate how Summit’s use of blended learning has evolved over Year 1 and advanced the school’s overall vision, the following sections of this case study examine the instructional, operational, and financial dimensions of Summit San Jose’s model.

Instructional Model

Summit Public Schools San Jose

Instructional Model

At Summit San Jose (SSJ), blended learning consistently evolved over Year 1 to help teachers better target instruction to the needs of a diverse student body.

Instructional Quick Facts

BLENDED MODEL *9th grade classroom Station Rotation model*

PEDAGOGICAL APPROACH *Increasing personalization of learning – including demonstrating mastery, tailoring learning to each student’s zone of proximal development, and cultivating strong personal relationships in school.*

MATH CURRICULUM *Teacher-curated, integrated algebra and geometry curriculum using the open source tool GeoGebra as well as supplemental resources from across the Summit network.*

DIGITAL CONTENT *Khan Academy*

INSTRUCTIONAL TIME *115 minute math blocks Mon-Thu and 85 minutes Fri; the split between live and online instruction varies (See Figure 3)*

STUDENT TO ADULT RATIO *35 students: 1 teacher*

For Executive Directors David Richards and Diego Arambula, Khan Academy fills in content gaps for individual students, but just as importantly it lets teachers take existing instructional strategies – such as project and experience-based learning, mixed-ability grouping, frequent use of data, and more – and deploy them even more effectively in the classroom. The result, says Richards, is that “technology empowers our teachers to do what we’ve always been trying to do. We just have better tools to get us to what we think great teaching is.”

Empowering teachers to support students at multiple levels is engrained in SSJ’s approach from the beginning of the school year. To set high expectations for all students, SSJ designs its core curriculum to meet the “A–G” entrance requirements for California’s four-year university system. However, SSJ’s instructional vision also emphasizes mixed-level classes along with differentiated teaching strategies to promote college readiness while building individual and group learning skills. When 9th graders enter SSJ, the school randomly places them into classes of 35 students.⁴ All math students also take a background diagnostic – developed by IntelAssess – which measures 5th–7th grade algebra skills mapped to CA state standards.⁵ In addition, when SSJ launched in 2011, math teachers devoted part of each class to self-paced work on Khan Academy. Students started at the beginning of Khan’s math sequence with basic addition, and most progressed quickly

⁴Class assignment controls for some demographic variables to ensure each class reflects the diversity of the school.

⁵The diagnostic is co-developed by IntelAssess with Summit teachers. See Appendix 3 for details on assessments.

through topics like multiplication and division. However, teachers noticed gaps in skills once students reached pre-algebra, and this information along with data from IntelAssess helped teachers form a baseline across each math class.

Using this baseline, SSJ math teachers began to employ both Khan Academy and live instruction to fill in content holes for individual students while moving the full class toward college-ready standards. As Year 1 at SSJ unfolded, this dynamic process of gathering data and targeting needs through online and offline learning has evolved and improved to create the blended math model that exists today. The following aspects of the model – ranging from instructional delivery to the use of data and

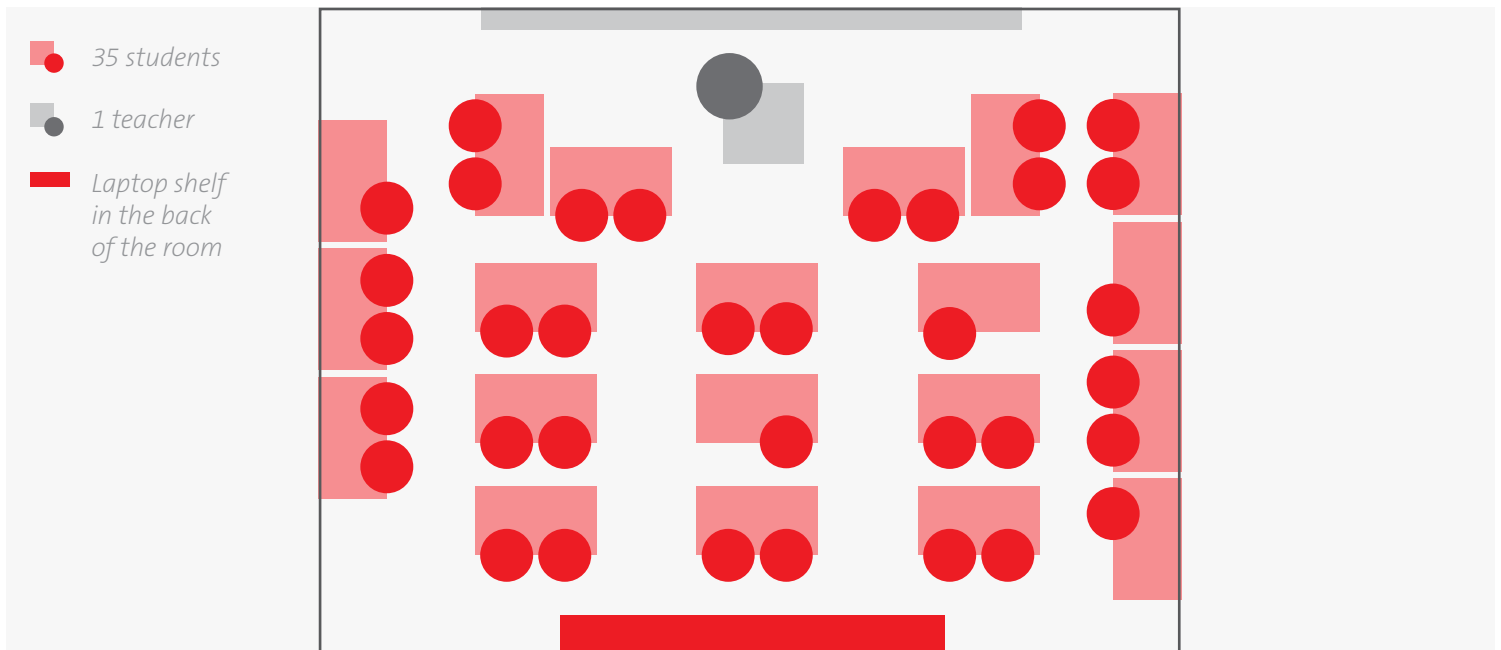
changing roles in the classroom – offer a deeper understanding of how blended learning supports SSJ’s instructional vision.

Instructional Delivery:

Students Gain Different Learning Experiences through Khan and Teacher-Led Instruction

At first glance, a SSJ math class might appear similar to any other “typical” 9th grade math class – the period might begin with a teacher at the front of the room, 35 ninth graders sitting in their seats, and the day’s goals written on the board. On a given day the teacher might start by explaining a new concept in the class’ standards-based, mixed algebra and geometry curriculum,⁶ or by reviewing the outcomes of a group-based project from the previous day. But

Fig. 2
Blended Classroom Setup, Summit San Jose



⁶SSJ uses the open source tool GeoGebra as well as multiple teacher-generated materials to create a blended algebra I / geometry scope and sequence. See Appendix 3 for details on curricular materials.

the scene shifts partway through the two-hour class when students stand to grab laptops from a shelf in the back of the room. Once they return to their seats they boot up Khan Academy. Each student logs in to Khan and sees an individualized “knowledge map” showing the different exercises they’ve completed (e.g., Systems of Equations) as well as the concepts Khan’s algorithm recommends they complete next (e.g., Graphing Systems of Equations). Teachers select clusters of Khan exercises that map to the scope and sequence of the curriculum, and guide students to set weekly goals for exercises they will complete based on each student’s zone of proximal development. Advanced students tackle exercises that go deeper into a concept or preview upcoming lessons, while struggling students work with teachers to set goals that fill in gaps in skills. Each exercise contains multiple types of practice problems, and students have to answer 10 problems in a row – a “streak” – to advance from one exercise to the next.⁷ Students immediately see whether their answers are right or wrong, and the graduated difficulty of exercises gives them a sense of their progression. They also earn “badges” for finishing increasing numbers of exercises or large numbers of problems correctly in a row, with space-themed badge names ranging from basic “Moon” badges to rare “Black Hole” awards.

Because students set goals and work through exercises at their own pace, their classroom learning experiences may vary significantly. In a given class, two students sitting next to each other might

work individually on exercises that are weeks apart in the curriculum sequence. Two other students might listen to a peer tutor explain a difficult concept. The teacher circulates, holding a laptop showing each student’s live progress – the number of minutes spent on different concepts, which students are pulling ahead, which are struggling and might need help, and which are not focused on the assignment. With this data teachers pause to work with individuals or small groups most in need of assistance, adjust seating arrangements to pair struggling students with more advanced peer tutors, or alter the lesson’s time allocation between Khan and offline learning based on the class’s overall progress. As students gradually finish their Khan exercises for the day they might return to work on group projects, tutor peers, or start a practice worksheet due the next day. Together, teachers say, shifting between different online and offline learning experiences allows them to target a greater range of learning needs. “With blended learning we have the opportunity to individualize education,” one teacher says. “Before this you had to teach to the middle. Now you can deliver 35 different experiences.”

Role of Online Instruction:

Khan Academy Reinforces Basic Skills and Allows for Flexible Use of Classroom Time

At the beginning of the year, Summit’s teachers were new to Khan Academy, and by default most split their math blocks evenly between Khan and traditional instruction. Teachers guided students

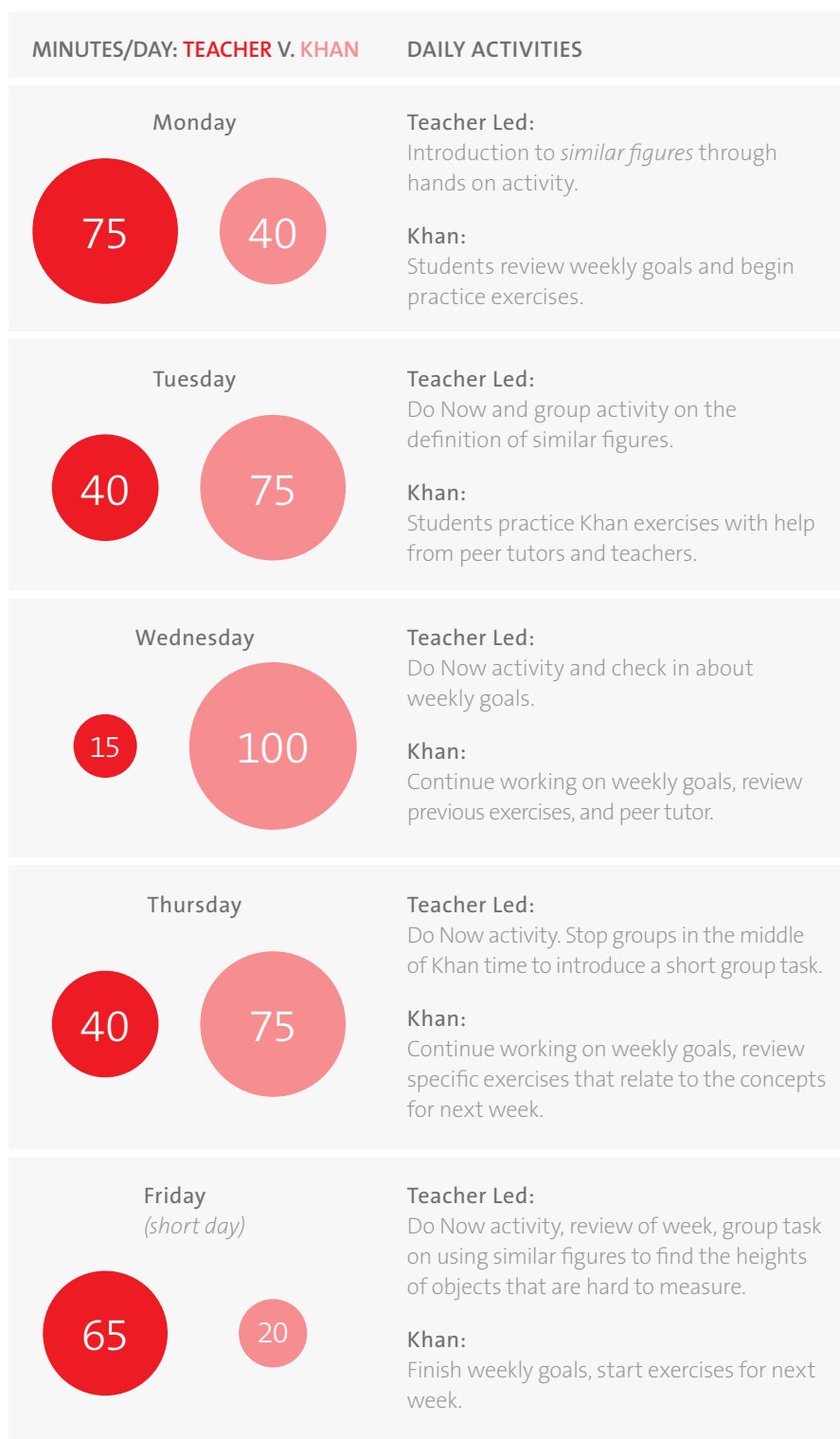
⁷At the end of 2011-12 Khan removed the streak function and substituted a series of “cards” that students must earn to move from one exercise to the next.

to Khan exercises that were loosely linked to the curriculum, but online and offline learning ran on largely separate tracks. As the year evolved, teachers began experimenting with how and when to use Khan based on the lesson at hand and a better understanding of the program's strengths and limitations. For example, while Khan is best known for its videos, Summit teachers noticed that students largely preferred the immediate feedback of exercises during class. Students reported that videos felt too similar to typical instruction, and teachers shifted the use of Khan toward exercises with videos as backup – gaining in the process a deeper trove of data with each exercise completed. As students worked through online practice problems and moved from one exercise to the next, teachers also realized that students were rapidly gaining basic and procedural skills. However, Khan seemed less well-suited for inculcating deep mastery of content or helping draw connections between topics.

Were Khan Academy used in isolation, this would have posed a problem. But teachers at SSJ saw Khan's strength in teaching basic skills as an opportunity to focus non-technology time on project-based learning, group work, and other strategies to stimulate higher-order

Fig. 3

Sample Use of Time in a Week of Blended Math Class – “Similar Figures” Lesson*



thinking and explore deeper meaning. As the year evolved, teachers have increasingly varied the balance of Khan and offline instruction depending on the type of learning they want to target with each lesson. Lessons intended to review skills or impart the basic knowledge needed to subsequently access higher-order content might revolve around Khan Academy. At the same time, the speed at which Khan teaches basic skills has freed teachers to focus a greater number of lessons on project or group-based learning.

In recent months, this mindset shift from parallel online and offline tracks to using Khan as a predicate to higher-order thinking has undergone yet another evolution. For some lessons, starting with complex thinking and group work has been necessary to prepare students and generate the curiosity needed for self-directed work on basic skills through Khan Academy. Today, rather than a linear progression through types of skills, SSJ teachers have come to view Khan, group work, teacher-led instruction, and other modalities as distinct tools that can be amplified or deemphasized within each lesson and across each unit. This flexibility, teachers say, has made each lesson more adaptive to the needs of the class. “Khan Academy has made me more group-oriented and creative because I’m not sacrificing time on rote skills,” said one teacher. “It helps teachers really teach.”

Innovation in Action:

Collaborating on a Blended Curriculum

Over Summit’s January 2012 Intersession, teachers spent the month learning new skills and planning a stronger blended curriculum. In the fall semester, teachers had been unfamiliar with Khan and at times struggled to blend it with their prepared lessons. The teachers had adapted, worked with coaches from Khan and improved with each unit, but soon realized they needed to get even more adept at planning for Khan’s role in the classroom. To help them do so, Summit’s leaders brought together two distinct viewpoints: curriculum experts from Stanford University – who had deep experience in differentiated instruction and small group work, but who held some skepticism about technology – as well as programmers from Khan who could build new lessons and tools, but brought less pedagogical experience.

Together, Summit, Khan, and Stanford backwards-planned the spring semester. While each teacher manages his or her own curriculum and materials, they share a scope and sequence and use Khan in addition to the integrated algebra and geometry tool GeoGebra and other supplemental resources. Once the team determined the semester’s standards based on the California State and Common Core Standards (Khan aligns to Common Core, SSJ’s curriculum to both), they outlined objectives for each month-long unit and began to map daily activities. The team from Stanford focused on

group projects and strategies for differentiation using GeoGebra and other resources. Summit and the Khan team worked to identify the clusters of Khan exercises that best supported the unit's daily, weekly, and monthly objectives. In some cases, the teams decided there were too few exercises to challenge a classroom full of students in a given area. The Khan developers took furious notes, and passed sketches back and forth with teachers of what new exercises could look like.

By the end of the January Intersession, Summit had arrived at a detailed sequence of lessons that mapped to standards and included a trove of new Khan exercises along with group and experiential activities. This mix of traditional and Khan-based activities as well as strategies for moving between them, teachers emphasize, has given them the confidence to experiment with new approaches and further adjust learning modalities based on the needs of the class and the lesson.

Role of the Teacher:

Teachers Make Greater Use of Data to Facilitate Student Progress

For teachers, making real-time decisions based on data, shifting how time is allocated across a unit, and supporting students to learn autonomously all while moving a class through a curriculum requires an enhanced repertoire of professional skills. In particular, SSJ's math teachers have found

that teaching successfully in a blended classroom hinges on an ability to use data and a flexibility to adjust instruction on the fly. During classroom time, teachers must be able to respond to the real-time data flowing to their laptops from Khan Academy. This might include coaching a student struggling with a particular problem, placing students in need of assistance with a peer tutor, or redirecting students who finish their exercises early. In comparison to a traditional model where teachers impart knowledge to an entire class, in a blended setting SSJ teachers act more as intervention specialists and facilitators to address individual challenges that prevent students from learning on their own.

After class is over, Khan Academy generates detailed reports and graphs that provide teachers with student performance data organized by standard at the classroom and the student level. Using Khan data teachers search for gaps in student progression, and compare student and class performance against State and Common Core Standards as well as against student progress from the school's other blended math classes. Teachers view this information alongside data from a range of additional assessments – including daily exit tickets, weekly quizzes, benchmark and unit tests, and other formative and summative data (*See Appendix 3 for details on assessments*). Based on class performance on both Khan and these other assessments,

* Note this is a "standard" division of time; teachers will recommend that some students spend more or less time in Khan based on their point of progression and learning style.

Engaging Struggling or Advanced Students

While Khan has been useful for many types of students, teachers highlight its value in targeting remediation. As discussed previously, the majority of entering 9th graders scored below basic or far below basic on the IntelAssess diagnostic for algebra readiness. For many of these students, SSJ teachers note, remediation isn't about re-teaching large gaps in content so much as filling in the unique pattern of potholes in skills that prevent students from accessing curriculum at grade level. By starting each 9th grader at the beginning of Khan's math sequence, teachers were able to more quickly diagnose content and skills gaps than would have been possible using traditional assessments alone. Furthermore, the rapid, student-level data teachers receive from daily Khan exercises has helped them recognize when students start to struggle before they fall too far behind. While SSJ does not operate

a formal Response to Intervention or similar system, school leaders feel that the real-time feedback from Khan combined with traditional assessments has created a more effective early warning process for students that may need additional supports.

For advanced students – like the student at the beginning of this case study – Khan provides a portal of content to explore. However, Khan's exercises also lack depth in some key areas (for instance, geometry) and some students have “hit the wall” and finished the subject-specific content faster than Khan's programmers can create it. Summit's teachers assign supplementary projects, tap students to be tutors, and have begun to explore other online learning options, but have limited capacity to dedicate to the handful of very advanced students. SSJ has identified this as an area for improvement in future years.

teachers adjust the upcoming balance between Khan activities and traditional class time to target foundational skills while pushing the class on deeper meaning and connections. Teachers also modify seating arrangements at their discretion (often on a near-daily basis) to group stronger students with peers who need more help, and use data to identify which students would benefit from office hours before school or tutoring in the afternoon.⁸

After nearly a year of piloting Khan, SSJ teachers are enthusiastic about what they can achieve in a

blended classroom. As one teacher said, “It's like having a magnifying glass on the progress of each student.” At the same time, they acknowledge that taking the time to utilize data, re-balance learning modalities, and plan for both teacher-led lessons and Khan Academy segments requires significant time and personal initiative. Even experienced teachers say that launching a blended classroom is like being in their first year of teaching all over again. Summit has sought to mitigate this challenge by offering support in data analysis, coaching teachers

⁸As will be discussed in the Operations section, the Khan and offline streams of data are not easily integrated, and so the level and frequency of integration between on and offline data remains a work in progress.

Student Engagement*

One year in to blended learning, SSJ faculty have begun to observe notable – and at times unexpected – changes in class culture and student engagement with their own learning. Math teachers, for instance, have seen an increase in peer tutoring and collaboration on difficult exercises compared to non-blended classes. School leaders visiting blended math classrooms have observed an unusually high number of students on task, and a greater proportion of class minutes spent working. For students, rather than waiting a week for quiz or homework feedback, they report that they like seeing their Khan results right away, and can more easily remember the concepts being targeted. For incorrect answers or difficult problems students can't skip ahead, but have to work through the problem with help from peer tutors, teacher feedback, or hints in the Khan program. Each week students set goals for the exercises they will complete, and can access real-time dashboards that show their progress against these goals and across the entire unit.

Together, teachers believe, this combination of goal setting and rapid feedback has given students an improved understanding of their learning progress and needs. “The great thing about blended,” one teacher said, “is kids knowing where they are and [knowing] ‘I’m pretty good at these six things, but I’m struggling with this [one] thing.’ Kids have a lot more capacity to do this than traditional models give them credit for.” After observing an increase in student engagement in Year 1, SSJ faculty are eager to corroborate their observations with further exploration of how engagement might affect achievement, and in what ways it can become a more intentional part of the school’s model going forward. In the meantime, said one teacher, “The most exciting thing I see about [blended learning] is that for the first time all students know they have to learn, they know that ‘at this moment I have to learn something.’”

**Note that perceptions of student engagement are based on faculty observations and informal student feedback as opposed to formally-collected data.*

in specific skills, and using the month-long January and May / June Intersessions to work on data use, technology competency, and blended lesson planning. Still, the workload can be daunting, and requires highly motivated teachers who are willing to set aside norms and established teaching habits in order to develop an additional set of skills (See *Appendix 7 for professional development detail*).

Operational Model

Summit Public Schools San Jose

Operational Model

Blended learning in Summit San Jose’s 9th grade math classes has become an important element of the school’s educational vision, but still exists as one piece of a much larger school model. For SSJ leaders, establishing the structures and processes that enable blended as well as other types of learning to thrive are just as important as emerging innovations within the classroom.

Among SSJ’s many operational supports, the following elements – including SSJ’s relationship with Khan, human capital structure, work on data integration, technology infrastructure, and CMO supports – are notably different from a typical model, and are critical to the success of blended learning. These areas are explored in detail below.⁹

Vendor Relationship:

The Summit / Khan Partnership Provides a Model for School and Vendor R&D

In addition to Khan Academy’s contribution to instruction, the working relationship between SSJ and Khan has been notably productive. Their partnership model of constant feedback and iteration has sped the development of both organizations, and also suggests a new paradigm for how schools can partner with vendors to innovate and improve within the rapidly changing blended learning field. Key attributes of this evolving, innovative relationship include:

1. High-Frequency Contact

A Khan “implementation” consultant spends at least a day per week at SSJ. This time might include attending math meetings, providing input on upcoming lesson plans, helping teachers analyze student data, or documenting features or exercises missing from Khan that teachers would find helpful.

2. Co-Planning of Instruction:

As noted earlier, SSJ and Khan staff met three times a week during the month-long January Intersession to co-plan upcoming lessons that integrate technology and teacher-based instruction. In these meetings Khan staff helped teachers better balance online with offline learning, but also learned from SSJ faculty and Stanford researchers how Khan’s offerings could better complement and support teacher-led instruction.

⁹While multiple operational variables can support blended learning successfully, the five presented here are the most notable within SSJ’s model. Variables such as facilities (SSJ leases conventional classrooms from the National Hispanic University) may be integral to the models of other schools but are not as material to the daily function of SSJ’s particular blended learning model.

3. Feedback to Improve Vendor's Model:

Khan, like SSJ, maintains a culture of constant improvement, and has enhanced its model based on student as well as teacher feedback. Over Year 1, Khan staff regularly sought input on what exercises were most needed to support SSJ's upcoming units, and raced to build these exercises before students reached them. The result has been a Khan progression that more closely maps to Common Core and CA State Standards, as well as additional online exercises for SSJ (and other schools) to use. In addition to deepening its content base through working

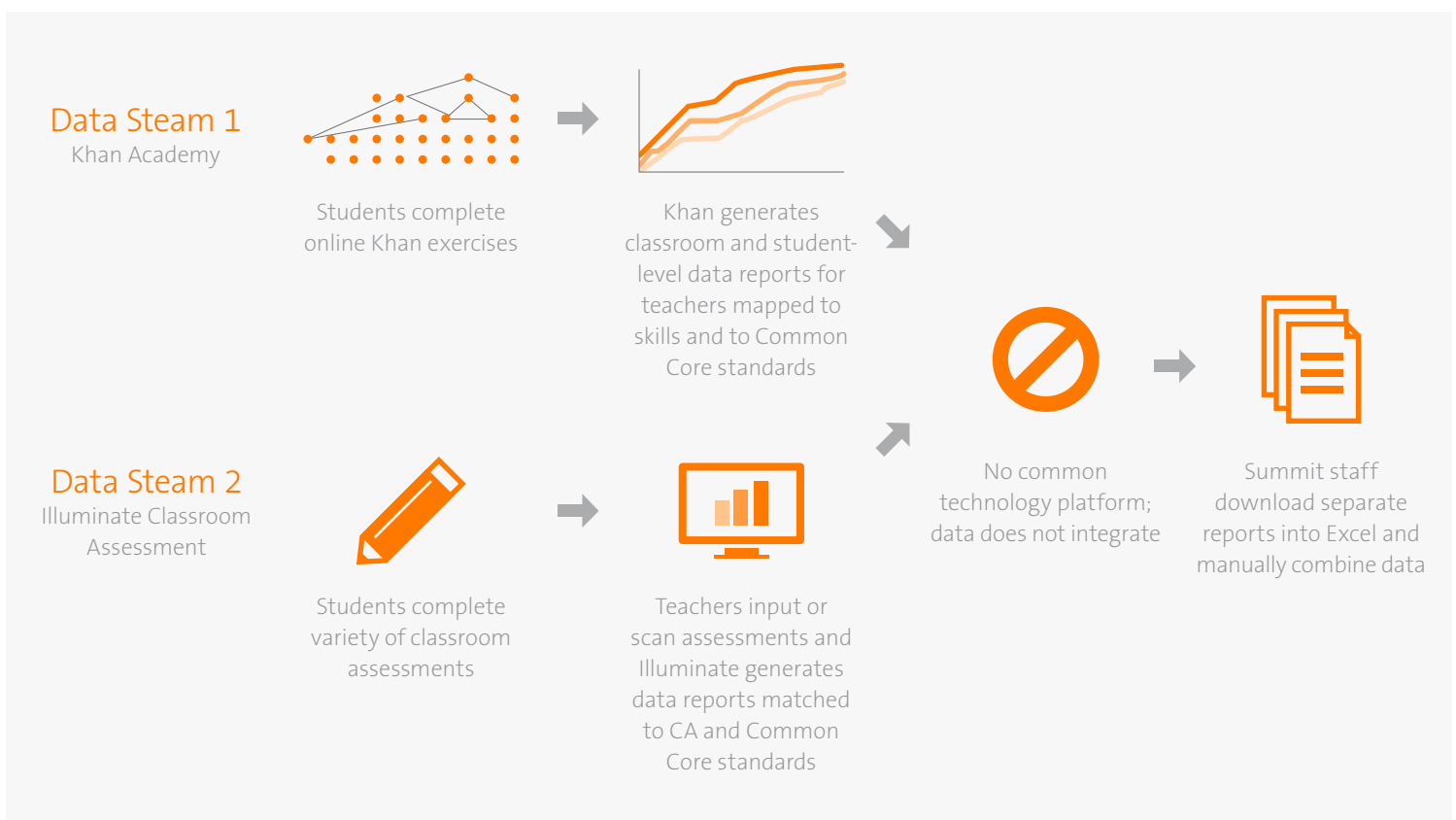
with SSJ, Khan has relied on SSJ's feedback to improve its user experience as well. The student goal-setting mechanism, for instance, was created through conversations with SSJ staff as a way to increase student agency and ownership over learning.

Data Integration:

Portability of Data Remains a Challenge

While the data generated from Khan Academy helps teachers target instruction, it does not integrate with SSJ's comprehensive system of offline assessments. In addition to the IntelAssess

Fig. 4
Data Flow from Blended Learning at Summit San Jose



placement test, SSJ's math teachers employ a cycle of yearly state tests, tri-annual benchmark exams, ten teacher-created "concept assessments" that each student must pass twice per semester, and daily "exit tickets" to track understanding of concepts (*See Appendix 3 for details on assessments*). Teachers manage this array of data using SSJ's student information system, Illuminate. While Illuminate has helped link SSJ's assessment data to standards as well as to demographic variables, no technology platform currently links data from Illuminate with data from Khan Academy. Instead, Summit teachers and CMO staff download and combine the two sets of data manually in Excel spreadsheets in order to run analyses and understand student progress on similar topics or skills. This time-consuming process is cumbersome, and SSJ has noted data integration and portability as the single greatest challenge to better understanding each student's performance and needs within its blended model. In the coming years SSJ hopes to address both the technology challenges of data portability as well as to better link online and offline assessments to similar standards that allow for a better synthesis or comparison.

Human Capital:

A Blended Human Capital Model Relies on One Fewer FTE per Grade Level

Summit San Jose relies on 11 full-time-equivalent teachers to cover the three blocks of its schedule – two teachers each for English, history, science, and Spanish, and three teachers for math (*See Appendix 5 for an organizational chart*). As noted previously,

Summit utilizes three math teachers for 9th grade to deliver instruction in conjunction with Khan, compared with four math teachers at other Summit schools. As a result, these three math teachers manage 35 as opposed to 25-student classes, spend more time planning blended lessons, and received additional support from school and CMO leadership as the blended model was being developed (*See Appendix 7 for details on professional development*). According to Summit's leaders, this added responsibility has placed a premium on recruitment. The most successful blended learning teachers will possess the strengths of any other urban teacher, but will bring added skills in using data as well as the flexibility to try new approaches and constantly adjust in the classroom. SSJ has relied on this "early adopter" mentality to maintain equilibrium through a rapid evolution of the blended classroom model, and to suggest new ideas for the model going forward.

Role of the CMO:

Summit CMO Provides Support in Key Areas

SSJ's operational model is notable for the school's relationship with its CMO, Summit Public Schools. While some CMOs centralize all the school revenues and "level" them back out across the network, Summit Public Schools intends for dollars to follow students, and so it asks schools to retain their revenues while paying a services fee for the supports the CMO provides (12% to 18% of annual expenses with the share decreasing as schools mature). In general, Summit Public Schools' services support its network in multiple areas while

capturing economies of scale and relieving schools of functions that don't relate to student learning. In particular, two capacities are central to SSJ's blended learning model. First, Summit Public Schools provides detailed data analysis and reporting based on the information captured by Khan Academy and traditional assessment systems. Given the challenges of data integration discussed above, this data analysis is both time consuming and highly important for understanding individual student progress and needs. Second, staff at Summit Public Schools have offered crucial experience and business acumen in identifying and negotiating with vendors for both the software and hardware components of SSJ's blended learning program. Given the disjointed state of the current educational technology market, this expertise in guiding organizations through vendor selection and management has enabled SSJ to carefully choose high quality partners without diverting too much of a school leader's time away from instructional and building-level leadership.

Technology Requirements:

Technology Infrastructure Incurs Unexpected Time and Expense

When SSJ launched its blended model, the team planned for additional time and expense to secure adequate bandwidth, maintain local servers, and stock each math class with working laptops for every student (*See Appendix 7 for technology details*). Still, the amount of time spent on technology infrastructure far exceeded the team's expectations. After purchasing enough laptops to run a 1:1 student-to-computer model in math, the school

invested in a robust local network as well as two T-1 lines based on the internet bandwidth needs of previous Summit schools. Soon, however, the school found this bandwidth inadequate. Over the first semester SSJ successively upgraded to a powerful OC-3 circuit that provides 150 megabits per second but incurs an unbudgeted expense. Furthermore, there is no technology specialist onsite at SSJ. As a result, an IT specialist from the CMO spent nearly 75% of his time supporting the school through its initial months – approximately threefold the amount of time initially anticipated. While SSJ staff are quick to note that technology and bandwidth overruns were largely resolved after the first semester of operation, as a network Summit Public Schools has decided to build in an extra margin of time and resources for future launches of blended model schools.

Financial Model

Summit Public Schools San Jose

Financial Model

Based on early projections, SSJ expects to become sustainable on public revenues by Year 5 when the school reaches full enrollment.

Among the core beliefs of Summit Public Schools is that all schools must be self-sustainable on public revenue at five years from launch in order to ensure longevity and allow new schools to open in the Summit network. This model relies on public and philanthropic funds to launch a 9th grade cohort, and over time saves costs on non-teaching faculty and CMO services while maintaining high attendance and adding one student grade level per year. Just as schools in its network must become self-sustaining, Summit Public Schools plans to break even as a CMO in 2020 when 14 schools operate at full capacity.

Financial Impact of Blended Learning per pupil

FINANCIAL BENEFIT

+ \$353 *One fewer math FTE*

ADDED COSTS

- \$69 *Added internet bandwidth*
- \$66 *Amortized computer purchases*
- \$49 *Extra firewall*
- \$15 *Miscellaneous technology costs*

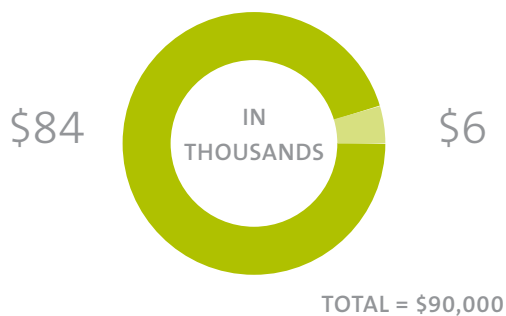
POTENTIAL REINVESTMENT

= \$155 *Per pupil savings 2011-12*

Does not include upfront investments

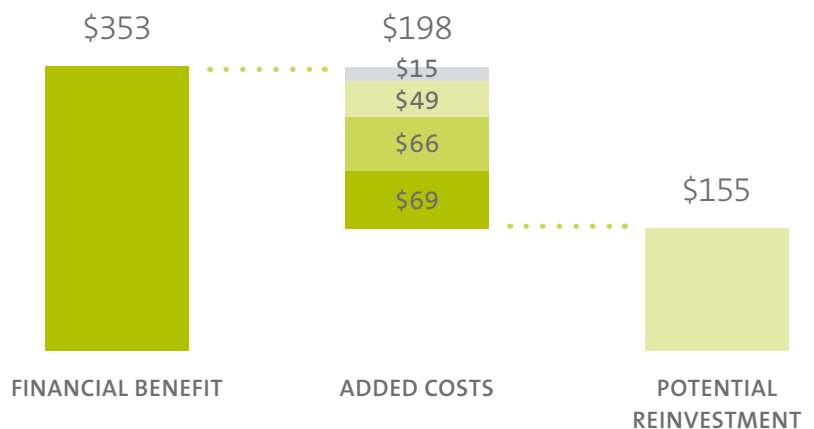
Fig. 6

Upfront Investments (Year 1)



- Consulting services (blended learning project management and launch; teacher development costs)
- Additional technology infrastructure setup costs

2011 – 12 Ongoing Financial Benefit and Added Costs (per pupil)



Within this framework of sustainability, blended learning plays an emerging role. As discussed earlier, SSJ primarily switched to blended learning to raise achievement in math. While school leaders recognized blended learning's potential to help the school break even on public funds, finances proved a secondary motivation. As one school leader said, "It was important to us that blended didn't cost more than our existing model. We at no point got into this because it was a save money thing." As SSJ recently finished Year 1 of operation, school leaders have been cautious about relying too heavily on savings or added costs until the blended model matures and stabilizes. In the meantime, they view blended learning as a means to reallocate resources to potentially achieve stronger results for students. In particular, SSJ's model has combined a smaller instructional staff with assorted investments in technology infrastructure. These changes to SSJ's financial structure, based on self-reported data, are explored in greater detail below:

Upfront Investments in Blended Learning

Non-recurring costs to build and refine SSJ's blended model were largely comprised of consulting fees leading up to and during Year 1 of operations. SSJ engaged the educational technology consulting firm Alvo Institute to prepare for and project manage the launch of SSJ's blended model, and during the January Intersession of Year 1 SSJ contracted Stanford University to work with teachers and Khan developers on integrating online with offline learning. Together, consulting fees totaled \$84K

in Year 1.¹⁰ In addition to consulting costs, SSJ invested \$6K to set up the technology infrastructure before school opened. Finally, while not included in budgeting, CMO staff from Summit Public Schools note that network leaders spent more time than expected during Year 1 to help launch and support the new blended model.

Ongoing Additional Costs Due to Blended Learning

Beyond the upfront investments in blended learning, during Year 1 SSJ has invested an additional \$198 per student in technology infrastructure compared to a traditional model (based on 204 students). This includes \$69 per student in additional internet bandwidth, \$66 in amortized computer purchases to achieve a 1:1 blended model,¹¹ \$49 in extra firewall costs, and \$15 in miscellaneous technology costs. It is also important to note that Khan Academy's programs and implementation supports are provided for free to SSJ and all other Khan schools – a key enabler of SSJ's overall financial health.

Ongoing Financial Benefit Due to Blended Learning

While other Summit schools opened 9th grade with four FTE math teachers, SSJ relies on three FTEs combined with Khan Academy – resulting in a Year 1 savings of \$353 per student when accounting for salary and benefits.

When comparing ongoing costs and financial benefits due to blended learning, SSJ expects to save \$155 per student in Year 1. While SSJ is in

¹⁰ All calculations have been made across Summit San Jose – i.e., Tahoma and Rainier – assuming 204 students.

¹¹ Amortized calculations assume a 4-year useful life and 10% annual replacement rate of \$670 student laptops.

its early stages of planning for a full high school expansion, school leaders expect SSJ to become sustainable – i.e., self-sufficient on public revenues – by full enrollment in Year 5 of its operation in 2015-16. Achieving this objective depends on several assumptions. On the revenue side, SSJ leaders expect enrollment to rise, and expect to receive both a \$1.35M Summit Public Schools startup grant paid over four years, and a \$575k Federal Charter Schools startup grant paid over three years. In addition, SSJ expects to keep expenses low by using Khan or other free online content providers, and school leaders anticipate a substantial drop in facilities costs as schools move to publically-provided buildings in Year 4. In addition, SSJ’s model budgets for a \$300K operating reserve at both Tahoma and Rainier by Year 5 which, combined with promising early signs from blended learning, gives school leaders confidence they will meet their sustainability goals. Furthermore, while school leaders are cautiously optimistic about SSJ’s financial projections, they emphasize that the value of their model will continue to be in reinvestment to improve educational outcomes. As one leader said, “Our hope is that blended learning will allow us to have superior performance within the same resources.” (See Appendix 9 for detailed financial information).

Lessons Learned

Summit Public Schools San Jose

Lessons Learned

After a year of implementation, blended learning has helped Summit San Jose better realize its vision of a rigorous school model that targets the learning needs of every student. SSJ's exploration of blended learning – successes and challenges alike – holds lessons for other schools, and will also guide the growth of the Summit Public Schools network in the coming years.¹²

Success Factors for Blended Learning at Summit San Jose

SSJ staff point to several success factors that have helped the school better realize its overall vision for education:

1. Innovation is a process not a model

At the end of Year 1, blended learning looks dramatically different than it did at the beginning. Along the way, SSJ has pushed its teachers and partners to test new approaches, offer feedback, and think up ways to improve. Rather than viewing its school model as static, SSJ's aspiration is to create a culture and process that consistently changes for the better. As one Summit leader said, "The idea that we need to iterate and constantly evolve is one of our most important themes. A lot of people want to know our model and how to implement the model. We think having one model is actually a huge mistake...it's a process, and you have to invest the time [to improve]."

2. Blended learning supports the larger vision

Blended learning has thrived at SSJ because it complements and strengthens the school's vision of diverse learning experiences for every student. This enables faculty to recognize the strengths and weaknesses of technology, and use it as a critical tool alongside other strategies for instruction.

3. A vendor partnership based on R&D

In working with Khan Academy, SSJ has formed a mutually-beneficial partnership that offers the school both a quality product and a notable process for continuous improvement. By choosing a vendor open to customization and cultivating frequent contact and a strong working relationship, SSJ has joined with Khan developers to improve the quality of the classroom program while serving as an innovation lab for Khan's own growth and learning.

4. Flexible, adaptable faculty

While teaching in a blended classroom requires several skills above and beyond traditional instruction, SSJ staff highlight a flexible, "early-adaptor" mindset as a critical success factor to navigating the ambiguity of a Year 1 blended model. While Summit leaders have offered or contracted professional supports when possible,

¹² SRI International is also currently engaged in an impact evaluation of SSJ's blended learning model for the 2011-12 school year. The report, expected to be published in late 2012, will compare performance between SSJ and a control group of similar schools.

SSJ teachers have become the deepest experts on Khan's strengths and limitations, and have driven innovations and addressed challenges largely through experimenting in the classroom.

Lessons Learned for Blended Learning at Summit San Jose

While SSJ staff are enthusiastic about what blended learning has helped them achieve, they also emphasize several lessons learned and ongoing challenges from Year 1 of operation. These include:

1. All teachers are like first-year teachers

While SSJ teachers have been responsible for much of the school's success in growing a blended model, even experienced teachers acknowledge that they struggled at first with the novelty of blended learning. Summit has spent significant time attracting teachers with early adopter mentalities and providing support on skills like data analysis. Nonetheless, simultaneously planning and managing both online and offline learning experiences has proved taxing, and leads some teachers to comment that it feels like teaching in their first year all over again.

2. Don't underestimate technology infrastructure

In preparing for blended learning Summit planned for added infrastructure compared to a traditional model, but still underestimated the resources and staff time required. Internet bandwidth in particular proved a persistent challenge over the school's first six months, and school leaders note that it can be difficult to find funders willing to support the added costs of

bandwidth and other technology infrastructure. In addition to the financial investment in additional infrastructure, Summit leadership spent significant extra time supporting the school as unexpected challenges arose and faculty and leadership navigated an unknown and at times confusing blended landscape.

3. Data Integration Remains a Challenge

While teachers have begun to integrate online and offline modalities, these advances have depended largely on personal initiative, and SSJ still lacks a robust system to integrate Khan feedback with traditional assessments and data. SSJ leaders note that this is half a technology challenge of linking data between two different platforms, and half a content challenge of better aligning Khan Academy exercises to a Common Core curriculum. Khan has made improvements in this area over Year 1 with additional progress expected in the future, and SSJ has identified data integration as a critical priority to explore in future years.

Blended Learning and the Future of Summit Public Schools

Blended learning has taken root at Summit Public Schools. At SSJ, biology teachers have watched the experience of their colleagues in math, and started experimenting with blended lessons using Khan and other public resources. Based on SSJ's piloting of blended learning in Year 1, the school plans to knock down walls – literally and figuratively – to create an even deeper blended math model when it expands to 10th grade in Year 2. Starting with a

newly-leased cluster of classrooms, SSJ will remove dividing walls to create an open, flexible space that can accommodate 210 students pursuing a range of learning modalities. Rather than 9th and 10th grade math tracks, SSJ will build a single, competency-based scope and sequence where students progress through learning “phases” based on mastery of standards. Together, 9th and 10th grade students will spend their two-hour math block in the new, open space pursuing learning online, individually, with tutors or peers, and with instructors in small or large groups. A range of adults – including teachers, para-professionals, and interns – will direct overall student progression, but the “default” learning modality will be individual learning online, with students shifting to instructor-led learning as appropriate.

As SSJ’s Year 2 blended model will continue to focus on math, the school will maintain and deepen its partnership with Khan Academy. Additionally, SSJ plans to develop a more robust system to integrate online and offline data in a way that’s more useful to teachers in the classroom. The team will most likely prototype different versions of data analytic and reporting tools before partnering with a particular vendor, but hopes to develop a more effective data system that can be implemented at SSJ and eventually across other Summit network schools.

At the network level, Summit Public Schools will be opening two new charter schools in 2013. Blended learning will play an even stronger role:

technology will be integrated in all classrooms and subjects, and students will experience a greater variety of learning modalities and settings based on their personal preferences and needs. Without the experience of Summit San Jose, neither the school’s Year 2 expansion nor this next revolution on Summit’s model for a reimagined high school would be possible. “This work has pushed my thinking on what schools should look like,” said one school leader. “Without doing the work here we wouldn’t be able to imagine or design the next version.” For Summit Public Schools, personalization through blended learning is the future.

Appendix

Summit Public Schools San Jose

Appendix 1: Historical Results of Summit Public Schools

Summit Prep API Results (2009)

826 out of 1000

on the California Academic
Performance Index

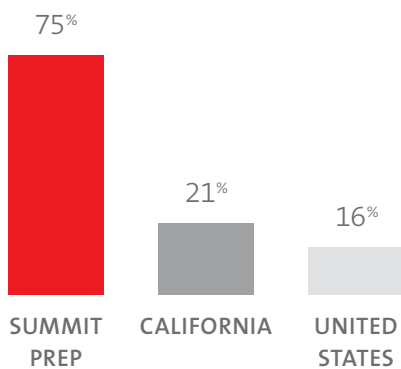
90th percentile

of schools statewide

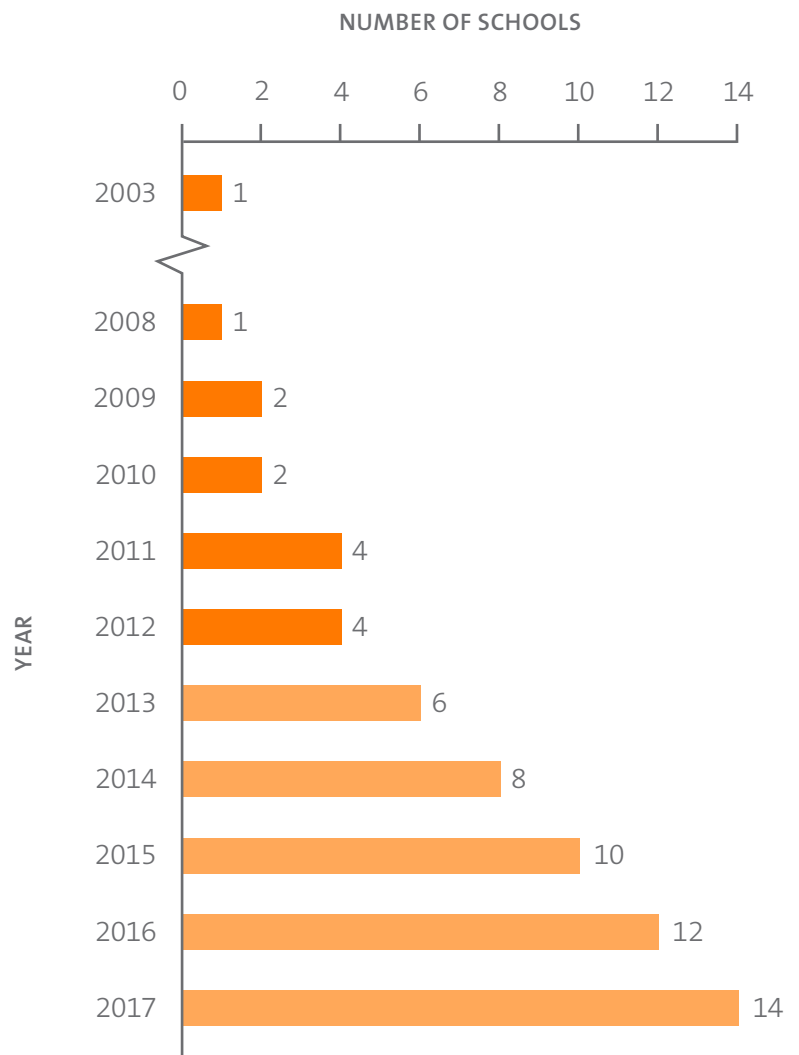
100th percentile

of students with
similar demographics

Seniors Passing at Least One AP Exam (Summit Prep, 2010-11)



Future Growth of the Summit Network



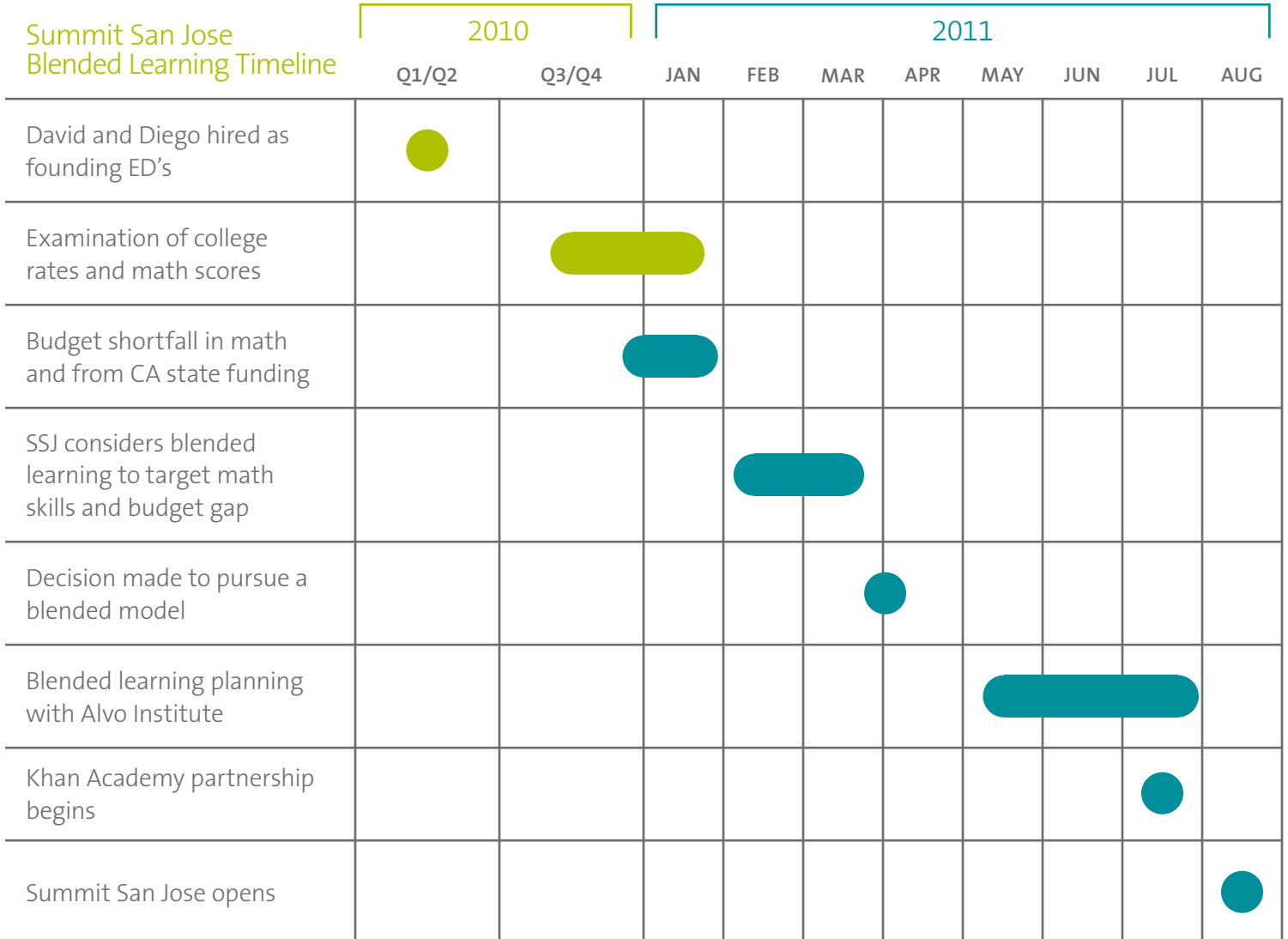
925 current student enrollment

5,522 students when all 14 schools open by 2017

5,992 students served at full capacity in 2020

2 schools currently run blended models; future schools will be encouraged to consider but not required to implement blended learning

Appendix 2: Project Plan for Launching Blended Learning



Appendix 3: Instructional Model – Details on Instructional Materials and Assessments

Instructional Materials	
ONLINE	OFFLINE
<ul style="list-style-type: none"> · Khan Academy 	<ul style="list-style-type: none"> · Largely internally-generated curricula, some developed by teachers, some by other SPS schools · Curriculum draws from SPS curriculum banks, College Preparatory Program, National Council of Teachers of Mathematics, and other sources · Uses GeoGebra - an open source, integrated algebra 1 and geometry tool used at other SPS schools and adopted by SSJ

Criteria for Selection (Online)

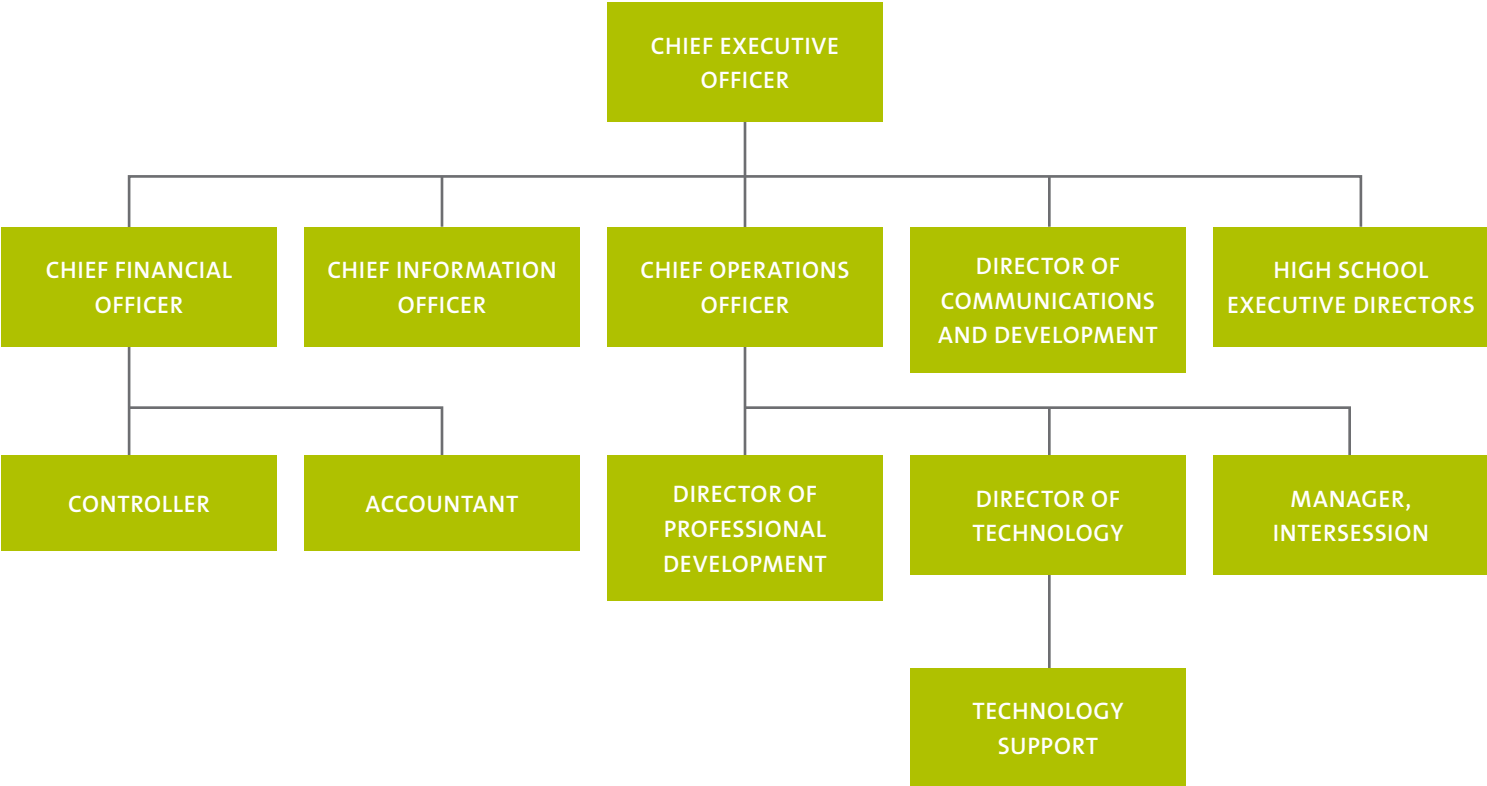
- Quality of content available
- Engaging user experience
- Ability/willingness to customize program to school needs
- Open architecture
- Willingness to share data/ease of working with data
- Cloud-based
- Free

System of Assessments	
ASSESSMENTS	FREQUENCY
CLASSROOM "EXIT TICKETS"	Daily
TEACHER-CREATED "CONCEPT ASSESSMENTS"	Weekly — students must pass each of 10 CA's twice in a semester
BENCHMARK TESTS	3x/year (October, December, March)
MAP	2x/year (December, May)
CALIFORNIA STANDARDS TEST	1x/year (Spring)
INTELASSESS ENTRY EXAM (9TH GRADE)	1x/year (August)

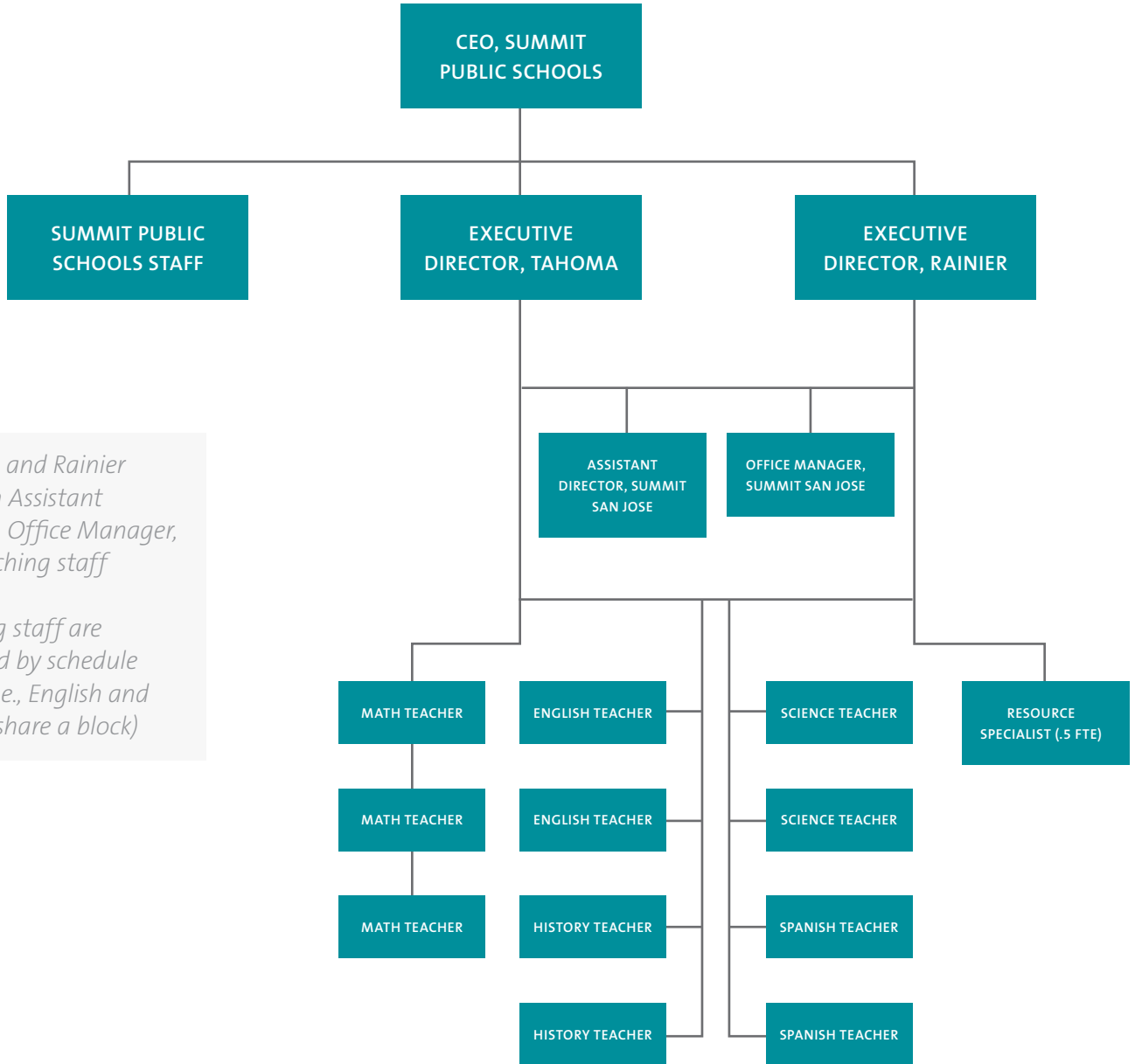
Effect on Instruction

- Exit tickets give daily snapshot of individual and class-wide understanding
- Concept assessments allow teachers to know that students master given topics
- Benchmarks track progress on year-long goals and help teachers adjust scope and sequence
- MAP and CST used to gauge student progress and school performance
- Khan is not used for assessment, but data generated informs lesson plans, allocation of time, and student activities during class time

Appendix 4: Summit Public Schools Organizational Structure



Appendix 5: Summit San Jose Organizational Structure



Tahoma and Rainier share an Assistant Director, Office Manager, and teaching staff

Teaching staff are displayed by schedule blocks (i.e., English and History share a block)

Appendix 6: Detailed School Schedule

PERIOD	MON-THU
FIRST / SECOND	9:00 – 10:55
THIRD / FOURTH	11:00 – 1:05
LUNCH	1:05 – 1:45
FIFTH / SIXTH	1:45 – 3:40
CONNECTIONS	3:45 – 4:00

SSJ uses a block schedule with a double block for math, a joint English/history block, and a block for science or Spanish.

In addition to the daily schedule, some students attend teacher office hours before school or tutoring after school. Students who have not finished their homework by Friday also attend “Friday Night Lights” until their homework is completed.

The schedule rotates in order to even out the relative merits of having a class at a certain time of day.

PERIOD	FRIDAY
FIRST / SECOND	9:00 – 10:25
THIRD / FOURTH	10:40 – 12:05
LUNCH	12:05 – 12:45
FIFTH / SIXTH	12:45 – 2:10
CONNECTIONS	2:20 – 3:30

Appendix 7: Support for Blended Learning

Professional Development

- Frequent meetings between each teacher and Executive Directors, Assistant Director, and/or CMO staff
- Weekly work with Khan Academy staff on data analysis and using the Khan platform
- 1-month Intersessions each January and May/June devoted in part to formal and informal professional development. Teachers attend specific trainings on blended learning, such as integrating online and offline teaching. In addition, teachers have autonomous time to develop their own interests and skills.

Teaching & Planning Time

- 545 instructional minutes per teacher Monday – Friday, plus office hours before school
- 2-hour, daily common prep/planning time for the math team
- Weekly planning meeting with Khan implementations consultant

CMO Supports

- Leadership
- Finance
- HR
- Professional Development
- Data Analysis
- College Coordination
- Technical Support
- Intersession Coordination

Best Practices from Other Schools

- Summit Public Schools coordinates site visits and best practice exchanges among schools within the SPS network
- SPS organizes a weekly principals meetings to share best practices
- SPS curates a lesson plan bank for teachers across the SPS network

Appendix 8: Technology Detail

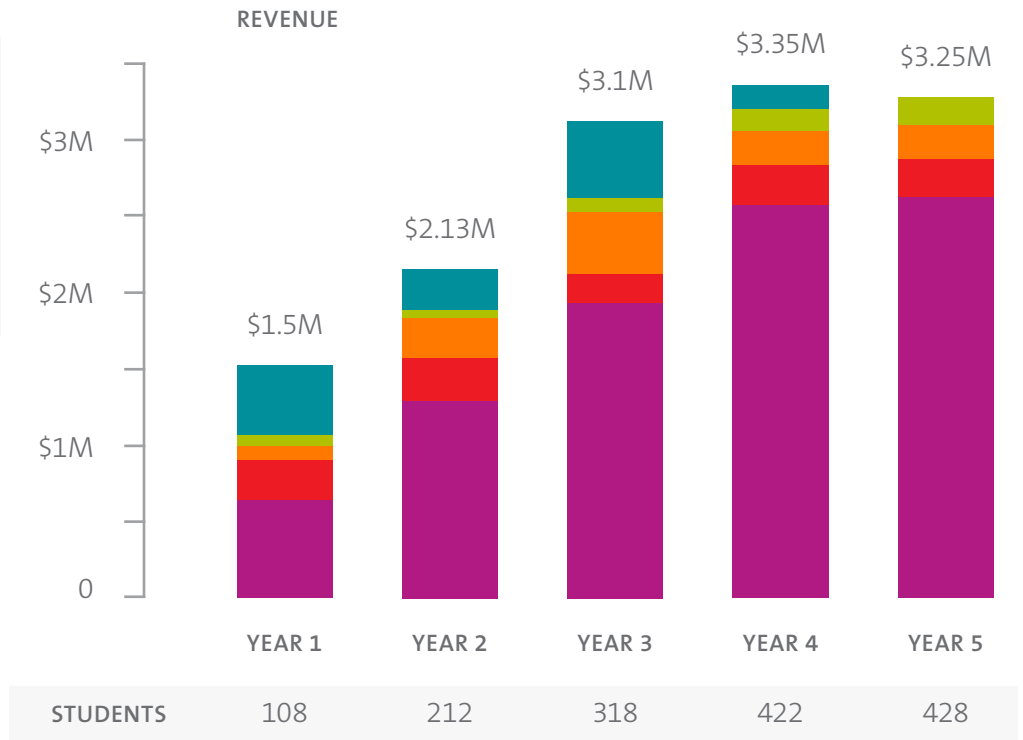
CATEGORY	BRAND	DETAILS
Classroom equipment	Samsung	Document Camera
Classroom equipment	InFocus	LCD Projector
Classroom equipment	Logitech	Headphones w/mic
Classroom equipment	Dell	Laptops (student)
Classroom equipment	HP	Laptops (student)
Faculty computing	Lenovo	Laptops (faculty)
Network infrastructure	Netgear	Network Switches
Network infrastructure	SonicWall	Firewall
Network infrastructure	Dell	Server
Network infrastructure	Ruckus Wireless	Access Point
Network infrastructure	Ruckus Wireless	Wireless Manager
Network infrastructure	APC	Backup Battery
Network infrastructure	Cisco	Router
Network infrastructure	Dell	Server Rack
Network infrastructure	Chatsworth	Cable and Ladder Management
Purchased services	TelePacific	Internet (OC-3) 150mbps
Purchased services	TelePacific	Voice
Purchased services	SPS Hosted (Ubuntu Linux)	SPS - San Jose Website
Purchased services	SPS Hosted (Ubuntu Linux)	Faculty Homework Repository
Shared with SPS	SPS Hosted (Alfresco)	Collaboration and documentation portal
Shared with SPS	Illuminate	Student Information Systems
Shared with SPS	Google Apps	Email
Shared with SPS	VM Ware	Virtualization
Shared with SPS	Microsoft	Operating System
Shared with SPS	Microsoft	Office Application
Telephone	Digium	PBX System
Telephone	Polycom	Phone Handset

Appendix 9: Financial Detail

KEY ASSUMPTIONS

1. \$1.35M SPS start up grant paid over 4 years
2. \$575K Federal Charter Schools start up grant paid over 3 years
3. Increase in state block grants based on rising enrollment

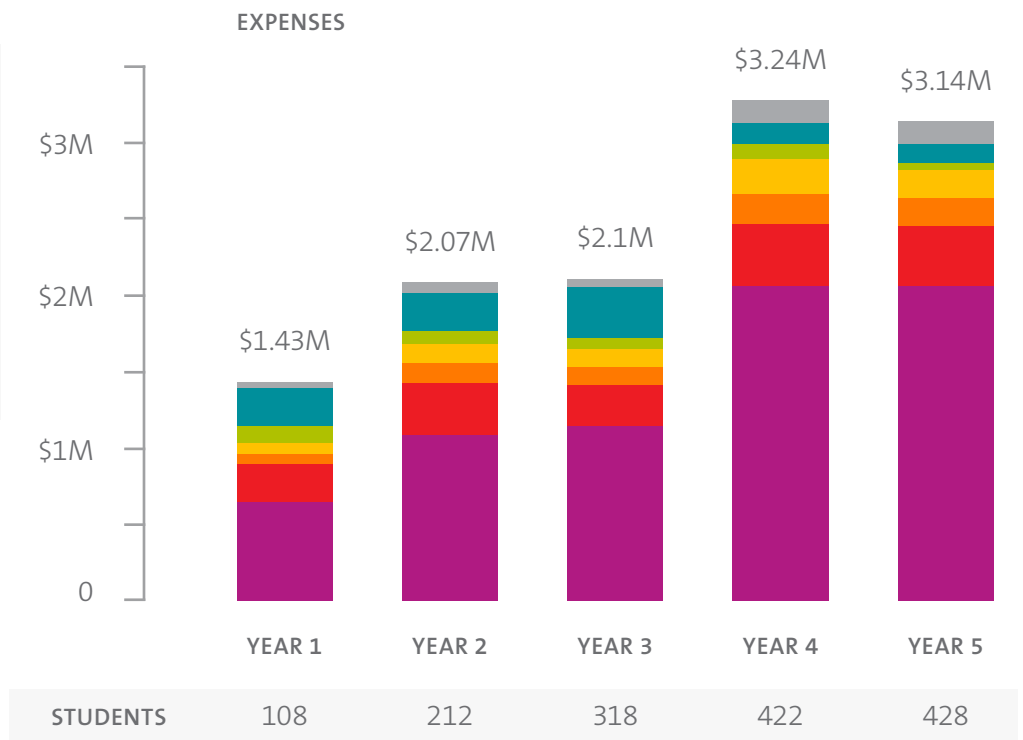
- SPS Grant
- Other
- Other State Revenue
- Federal Income
- State Block Grant



KEY ASSUMPTIONS

1. Use of Khan Academy or other free blended provider
2. Upfront investment in technology inventory followed by lower costs on replacement basis
3. Y4 drop in facilities costs as schools move to publically-provided buildings
4. \$300K operating reserve by Y5

- Other
- Facilities
- Technology
- Books & Materials
- Contractors
- CMO Services
- Faculty



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