

# Khan Academy: Filling the Gap in Education

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## Abstract

As summer vacation concludes each year, teachers begin to prepare for the children who will be under their educational care. Children approach school with a variety of emotions, from excitement and nervousness to dread and anger. The realities of the American K-12 educational experience remains that some students will be in sub-par or inadequate learning environments where teachers have a lot of material to cover and less and less time for remedial work, or even to wait until the every student in the class is considered at mastery level. Students then get caught in a vicious cycle of needing more learning exposure but having less time to acquire it. There have been after-school tutoring programs for decades, but typically they are only available for students whose families can afford the cost. Khan Academy has proven that its free learning platform of one-to-one tutorial style videos and lesson activities can “catch” students who would otherwise be falling through this learning gap of need versus time. Khan Academy is not limited to K-12 students- it is a learning experience for students of all ages, “from eight to eighty. It can be equally helpful to kids studying a subject for the first time and for adults who wanted to refresh their knowledge; for students grappling with homework and for older people hoping to keep their minds active and supple” (Khan, 2012). Khan Academy helps bring equity to students outside of a traditional classroom setting. Students can access learning in Khan Academy’s online learning platform, grow skills and address areas of need until true mastery of a subject has been completed. Khan Academy continues to expand to reach inexperienced as well as more mature learners. It can help fill a gap in education that has left students without the full mastery of learning they need in order to succeed in school and life.

## Main Body

Khan Academy was developed in 2006 by Salman Khan in his desire to create a reasonable and effective way to remotely tutor a young cousin who lived across the country. His cousin Nadia, a 12 year old “straight-A student, highly motivated, always prepared student” had just had the first academic setback of her life by failing a math placement exam (Khan, 2012). Khan knew Nadia had great academic potential, as she had proven herself as a logical, creative, and tenacious student. Her abysmal performance on the placement exam would directly impact what math courses would be in her future, and Khan was worried about the academic limits that would be unnecessarily applied to Nadia. Because of a single test, Nadia “would be left far short of her potential” (Khan, 2012). Khan, who holds multiple degrees from MIT and Harvard, was not a trained educator when he developed the initial concept for Khan Academy. He writes in his book *One World Schoolhouse* that “I had no Big Idea for the most effective way to teach. I did feel that I understood math intuitively and holistically” (Khan, 2012). He first started tutoring her over the phone and each using a software program called Yahoo Doodle that allowed each other to see the written work on their computers. When Nadia, as with so many other students, showed “thought paralysis” when Khan used real-time tutor talk with her, he slowly understood he could abate her frustration and shame if she needed something explained again by video recording his lesson. Nadia could literally “hit the replay button” when she was too embarrassed to communicate what she didn’t understand. By trial and error, Khan learned that short videos, less than 10 minutes long, were the key to teaching basic concepts in an efficient way and avoided students from tuning out as what often happens in a traditional lecture style classroom setting. He used YouTube as his primary platform, and soon enough, people beyond his family began viewing his videos.

Khan Academy operates under a brilliantly simple concept- to provide short educational videos about mainstream educational concepts available for free to any learner. The Academy's website proudly states that it can offer a world-class education for anyone anywhere. (Khan Academy, 2014). All of the site's resources are available to anyone. It doesn't matter if you are a student, teacher, home-schooler, principal, adult returning to the classroom after 20 years, or a friendly alien just trying to get a leg up in earthly biology. Khan Academy's materials and resources are available to you completely free of charge" (Khan Academy, 2014). Salman Khan decided that keeping the equipment and production costs low was top priority, and so he decided he would not appear in the videos, but rather, only his voice. "Tutoring is intimate. You talk *with* someone, not *at* someone" (Khan, 2012). Each Khan Academy video is structured to be like "working through homework at the kitchen table with your favorite uncle looking over your shoulder" (Noer, 2012), rather than the more traditional, didactic lecture style. Khan wanted to "help students see the connections, the progressions, between one lesson and then next; to hone their intuitions so that mere information, absorbed one concept at a time, could develop into true mastery of a subject" (Khan, 2012).

### A Potential Khan Academy Student

Upon first glance of little Alexander, his family origins or language ability would not stand out to you at first. You would see his animated expressions and body language, and his jovial manner, and his bright and inquisitive eyes. He looks like any typical kindergarten student, with the same uniform excitement about school that his fellow classmates have. Once you get to know this wonderful child, you see how not all of his academic needs are being met. Alex was born in Macedonia, and his mother and father emigrated to Boston in 2012 when Alex was nearly 4. Over the next two years, while his mother worked at a local daycare and as a nanny and

his father working two jobs in restaurants, education for Alex became the center of their lives. They were undeniably a hard working, loving family, and the mother made it quite clear to me that she saw school, education, and learning as a saving grace for Alex and the way to a better life that they always dreamed for him. It would reaffirm why they came to America.

Despite having a robust Office of English Language Learners that services thousands of students each year, Alex was not tested or registered as an English Language Learner. Because of this, his family was not presented with options for his educational settings, such as a Sheltered English Immersion classroom or a Traditional Bilingual Education classroom, where Alex would be working with specially trained teachers and receiving both push in and pull out language services, and arguably, his transition to English language would have been more natural and enriched (Boston Public Schools, 2014). Alex's mother confided in me that she was too embarrassed to ask for clarification about the process, and did not want her son to be labeled or held back, and he would learn English in his own way. Over the course of the months I had him in my classroom, Alex did learn social cooperative English, as well as some Academic English, but in my professional opinion, he would have tremendously benefited from English as a Second Language (ESL) services. However, even with ESL services, Macedonian is an atypical foreign language in Boston and probably very few if any personnel in Boston Public Schools could converse with Alex and his family in their native tongue. Even though official school publications are available in translation in at least 9 languages (Boston Public Schools, 2014), none would benefit Alex's family. Regardless of Alex's language ability, he showed a true thirst for learning. He enjoyed being in school, he engaged in all of the learning activities and applied himself as best as he could.

I had weekly phone calls with his mother each week, per her request, to discuss his performance and growth. She was incredibly invested in Alex's educational experience, and would often call me when she was driving from her first job to the second. When the school year was over, I was invited to their house to share a traditional Macedonian meal, and to talk more about ways to enrich him during the summer vacation. His mother proudly showed me some "Get Ready For 1<sup>st</sup> Grade" workbooks she had purchased for Alex, and asked him to read me part of a reading passage. As I listened to how she tried to instruct him and guide him in the reading, I was struck by how determined she was to get him to learn. She herself struggled with the passage and pronunciation of certain words, and actually instructed him incorrectly in a few instances. Regardless, I praised her efforts, and immediately began thinking how best I could support her so that she could support Alex. After all, she is going to be a constant presence for Alex's education, and she will keep trying regardless of the difficulty of the material. She will need the right tools and platform to educate him correctly. This is where Khan Academy fits in. Khan Academy creates a solution for Alex's family.

Once the necessary bills are paid, Alex's family does not have any extra money to pay for tutoring services. There was a waiting list for the singular after-school program offered at school this past school year, and Alex's mother did not feel comfortable sending her young son across the city to another program. An older, Greek neighbor will be babysitting Alex after school, and without language skills herself, she won't be able to aid Alex. In 1<sup>st</sup> grade, his teacher will be juggling a classroom of 25 children and will probably not have time to work one-to-one with Alex frequently. But Khan Academy can. And it can benefit Alex's very eager, very involved family, because they can watch the videos alongside him. They can watch the videos repeatedly if they want to or need to. Even if they do not understand the academic English being spoken,

they could begin to understand the visuals displayed on the screen. They can start at the basics and work their way up to a mastery level. They can solidify skills already known from previous learning experiences and grow from there, or they can begin with brand new concepts and build a foundation for more. His family could watch the Khan Academy lessons and impart the knowledge to Alex in either English or their native tongue. His family might use Khan Academy to fully understand a math concept that appears on Alex's homework, so they can instruct him in the right way. Alex could become inspired by his family's love of learning. Alex's mother demonstrated to me that she will not be passive in his education. Khan Academy allows her to be an active participant, and serve as a "learning partner" (Khan, 2012).

### How Khan Academy Works

Khan Academy is constantly growing and developing. Once hosted exclusively in Salman Khan's bedroom closet (Khan, 2012), the primary staff now exceeds 72 full time employees and dozens of interns (Khan Academy, 2014). Its largest content area surrounds topics in mathematics, which is divided into early foundations, K-8, high school and beyond sections. Topics covered include arithmetic, geometry, and calculus, among many others. Science content is next robust, and while the biology, physics, and health sciences are geared mostly toward the high school level, there is a section devoted to discoveries and projects that would certainly catch the interest of a younger learner. Economics and finance, arts and humanities, computer programming and cryptography are also represented on the website. Not surprisingly, there is an entire section related to test preparation, covering high school assessments of the SAT, CASHEE, and AP Art History, and graduate level GMAT, MCAT, IIT JEE, and NCLEX-RN. Users also have the option to view partner organization content, like the

British Museum and the Brookings Institute, redesigned in the Khan Academy style, as well as video links to speeches and interviews (Khan Academy, 2014).

The beauty of Khan Academy, and perhaps the most proprietary element about it, is the “learning dashboard” that can serve as a student’s personal homepage that keeps track of what a student has been learning about and where to take the learning next (Khan Academy, 2014). The experience for the user is quite dynamic. Khan Academy is designed to be accessible for learners of all ages, and is available to be translated into Spanish or Portuguese (Thompson, 2011). A user creates a login, or can choose to log in through Google+ or Facebook. Learners can earn “badges” that serve as incentives of accomplishment, and the most elusive badges are only earned after hours of mastery. The website acknowledges student success and progression. The website uses metrics to guide and recommend learning pathways for students, which can serve alongside or completely separate from a teacher’s guidance. Students can identify what skills he or she wants to work on, and the website will track completion. Progress is tracked in real time, so students, their teachers, or learning coaches can see where each student is at that moment. “Coaches, parents, and teachers have unprecedented visibility into what their students are learning and doing on Khan Academy.” (Khan Academy, 2014). The learning platform does not hold onto results in a secretive or surprising manner. It is designed to be readily accessible.

Another outstanding element to Khan Academy is that students can approach the website independently, or by their teacher’s design. A teacher can register his or her students in her Khan Academy roster and not only create a specific learning program targeting skills needed for development for each and all of her students, but track the data. Parents are required to be connected to the website for any user under age 13. Since Khan Academy’s educator learning dashboard allows teachers to see their students’ progress, successes, and struggles. Flexible

grouping can be instantaneous, as teachers can read the data to know which groups of students might need to be redirected. On a 60 Minutes special, a teacher who utilized Khan Academy as a supplemental math experience in her class remarked that “When I see red boxes indicating struggles, I can pull students in for a mini lesson to address the learning needs.” (CBS News, 2012). Khan Academy has morphed from strictly a video service to an intuitive, efficient learning management platform.

### Khan Academy as a Partner to Traditional Learning Environments

Khan Academy has proven it is successful at innovating access and equity to education on a global scale. Over the past two years Khan Academy videos have been viewed more than 200 million times<sup>1</sup> (Noer, 2012). The site is used by 6 million unique students each month (about 45 million total over the last 12 months), who have collectively solved more than 750 million problems (about 2 million a day), and the material, which is provided at no cost, is (formally or informally) part of the curriculum in 20,000 classrooms around the world. Volunteers have translated Khan’s videos into 24 different languages, including Urdu, Swahili and Chinese. (Khan Academy, 2014).

As promising and as successful as Khan Academy has been, I firmly believe that Khan Academy should serve as a supplemental learning experience for students, and not as a replacement for a standard educational experience. K-12 students need educational professionals to teach and guide them. There are gaps in the Khan Academy experience that may or may not be addressed in the future. Khan Academy’s content is heavily math and science focused, and there are no formal lessons on English language and literature or many other humanities topics.

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<sup>1</sup> As of June 21, 2014, there have been over 458 million views on the Khan Academy YouTube page. (Khan Academy, 2014)

Topics are heavily centered around high school learning, and although any student can access the videos, some of the content might not be developmentally appropriate for certain students at certain ages; a 1<sup>st</sup> grader is most likely not ready to learn about genocide or about microeconomics. I firmly believe that students need face to face time with educational personnel, as well as other students. Khan Academy is largely a one-sided learning experience. Great learning happens with interaction and feedback, and while Khan Academy does involve some elements of data for students to track progress, it is limiting and less interactive than sharing that experience with a teacher. Khan Academy should not replace a classroom, but serve alongside it, and could be blended in with a “flipped classroom” approach where students watch the videos at home and then do practical applications in the school classroom.

Technology obviously is the vehicle for Khan Academy to flourish, and to open up educational access and opportunities on a global level. “Technology has the power to free us from limitations, to make education far more portable and flexible... The internet can make education far, far more accessible, so knowledge and opportunity can be more broadly and equitably shared” (Khan, 2012). The potential to catch students from falling behind in their studies by giving them a platform to get more support in their learning, like little Alexander with his linguistic needs, or students with disabilities, a student trying to prepare for college, or a retiree who wants to keep his brain sharp. As Salman Khan proclaims, “How can we justify not offering these [learners] a world-class education, given that the technology and resources to do so are available?” (Khan, 2012). Khan Academy is mirrored by another recent online learning phenomenon called Massive Open Online Courses (MOOCs), where learners can take free undergraduate and graduate courses online. Clearly, the time is here for free, online educational experiences. Khan Academy harnesses technology to help fill the gap in education.

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