

Khan Academy I

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The current educational arena is one that has been heavily laden with national and state reforms within the formal educational system. High stakes testing and increased accountability measures are designed to close student achievement gaps. However, despite best efforts, gaps remain between various groups of students. The one size fits all model for educating students continues to be ineffective in educating students. As a result, this has caused many involved in education to look for alternatives to support and supplement individualized education. Educators and researchers are viewing informal education as a possible means of bridging the learning gap in students. One example of informal education is Khan Academy. This paper will explore the history, theory, and context of Khan Academy as well as revealing its success and those who participate.

Informal education is learning that takes place outside of a structured traditional learning environment (International Labour Organization ILO, 2006). Informal education is in contrast to formal education. Formal education is organized, regulated, and held with defined roles of the teacher, students, and the institution (Dib, 1988). Informal education in the 21st century may take shape in a variety of forms to include, but not limited to educational apps, games, groups, and videos. Khan Academy fits into the framework of informal learning as a result of its non-traditional approach to learning.

Khan Academy's website has a collection of free video tutorials that are stored on YouTube. Each video is no longer than about 15 minutes in length in which Khan explains and demonstrates how to problem solve. There are opportunities for participants to ask questions in real time to a wide reaching audience. The video format allows users to privately review videos several times if necessary to rework problems and develop understanding. Khan Academy has a

series of multiple content and subject areas that include: math, science and engineering, computing, arts and humanities, economics and finance, and test prep. Khan Academy site goes beyond videos and also incorporates peer-to-peer tutoring, evaluation tools, and problem sets.

The mission of Khan Academy a non-profit organization is evident; “provide a free, world-class education to anyone, anywhere” (Khan Academy, 2017). Sal Khan founded Khan Academy in 2006. Khan is the executive director of Khan Academy and driving force that started the company. Khan, a former hedge fund manager, migrated to education as a result of helping his cousin who was struggling in mathematics. It began with him tutoring her over the phone and quickly spread amongst family and friends that Khan was providing successful tutoring remotely. To keep up with the demands of his students and to prepare lessons ahead of schedule he quickly realized that a video format would be beneficial. At that time, he hadn’t realized that he was embarking on an innovative technology based approach to learning (Billy, 2015).

Khan’s cousins expressed that they preferred to watch his videos than interacting with him directly (Billy, 2015). It was at that moment he realized the potential impact, noting that the videos he was creating would always be there even if he was not. His cousins or anyone for that matter could view the videos anytime, start, stop, and pause them as they saw fit (Billy, 2015). Khan recalls asking himself what if I made more videos that people could connect with and use them as a learning tool (Billy, 2015)? This propelled him to continue making mathematics videos, and by 2009 there were over 100,000 people using Khan’s resources a month (Billy, 2015).

This innovative approach of using technology within education has garnered the attention of many in the field of education. The Bill and Melinda Gates Foundation has determined value in this approach to learning as well as Eric Schmidt, the CEO of Google, Anne Doerr, and other

fundere (Gupta, 2012; Khan, 2012). Financial backing from multiple contributors has allowed Khan Academy to create access to content for a wide range of students both nationally and internationally.

The power of Khan Academy is in its ability to provide personalized instruction, feedback, shared progress data with teachers and parents. Teachers of mathematics have reported that they have struggled with differentiating instruction within their classrooms (Vigdor, 2013). The potential for personalized, differentiated instruction is a strong proponent for Khan Academy. This is in line with the US Department of Education's push to move away from whole group instruction and make provisions for small group and individualized instruction (US Dept. of Ed, 2010).

Many in the field of education are beginning to realize the importance of individualized education; educational psychologist Bloom understood this back in the early 1980's. Bloom concluded that student achievement was improved through face-to-face, one-on-one tutoring (Bloom, 1984). Bloom found that mastery learning had a considerable impact when used as an instructional strategy (Bloom, 1984). Although Bloom's research was conducted over twenty years ago, recent research confirms his conclusions when mastery learning was utilized (Kulik, Kulik, & Bangert-Drowns, 1990; Wamburgu & Changeiywo, 2008; Yildrian & Aydin, 2005). Khan Academy and Bloom's correspond to each other. Khan Academy provides adaptive instruction that provides immediate feedback through the use of videos and practice modules (Khan, 2012). Learner feedback and data is disaggregated for teachers within an organized dashboard. Individual student data can then be used to assign students to small group and enrichment (Cargile & Harkness, 2012). Khan is also an advocate of flipped classrooms in which teacher centered direct instruction is replaced by student-centered instruction (Cargile &

Harkness, 2012). Khan believes that using Khan Academy lets students work at their pace while allowing the teacher to plan efficient and engaging instruction and focus on other activities such as projects and simulations in which students get to practice mathematics (Khan, 2012).

The US Department of Education calls for research-based instructional strategies to be implemented within districts and schools (US Dept of Ed, 2010). Lori Cargile and Shelly Sheats Harkness from the University of Cincinnati conducted a study into student use of Khan Academy. Their study was designed to look at how the program was being used and to garner the experiences of program participants. Five participants ages 13-15 from 4 different schools in four different districts were selected for the study. Participants were all females and from diverse socioeconomic status. Participant's experiences with using Khan Academy varied. Overall, the researchers found that Khan Academy was not being implemented as per the program directives. This study sheds light on the importance of professional development for implementation, use of Khan Academy as a mathematics tool, and dashboard usage to support individualized instruction (Cargile & Harkness, 2012). The researchers further highlighted that at the time of the study Khan's book on recommended program use had not been published resulting in possible teacher misconception of program use (Cargile & Harkness, 2012).

A study conducted by Light & Pierson 2014 investigated how teachers incorporated Khan Academy resources in conjunction with Chilean practices. Researchers found that taking this approach to learning altered the way in which students engaged with and were engaged by mathematics (Light & Pierson, 2014). Teachers and students interactions changed as a result of using Khan Academy. Teachers used more facilitation in conjunction with direct instruction. The role of student and teacher changed with students taking more control over their learning (Light & Pierson, 2014). Students in the Chilean study experienced differentiated instruction. Those

who required additional support were given time needed with the teacher, some students required additional learning opportunities, and some students required a challenge. The use of differentiated instruction is one of the tenets of Khan Academy and National Council of Teachers of Mathematics (NCTM) (National Council of Teachers of Mathematics (2000)). Overall, the study yield positive results in student engagement and learning.

Both studies are important to understanding the potential impact on student achievement when using Khan Academy. The first study gives credence that professional development for teachers and administrators is necessary to ensure effective implementation. The second study demonstrated that there was positive student engagement and increased learning opportunities after using Khan Academy. Although both of these studies are different, it helps educators and various other stakeholders make important decisions before implementation.

Where does Khan Academy fit within the theoretical framework? Khan has chosen not to align his work with any particular theory instead he thinks of his work as being intuition based (Khan, 2012). It can be argued that Khan Academy could fit within the constructivists' theory after looking into the two studies mentioned in this paper. In constructivism, the learner participates in personalized learning experience in creating or constructing meaning versus being passive in directly receiving knowledge. Participants in Khan Academy are active participants who are given individualized instruction based on their needs. Khan Academy allows for the differentiation of activities to meet students needs. When a task is authentic and hold meaning for learners they learn effectively (Anderson, 2016).

There is certainly a change in the educational landscape as more opportunities for informal learning present themselves. Policy makers, administrators, and teachers will have to vet these programs for their success and usefulness within the classroom. It will be important that

decision makers look to the research community to validate various programs. Furthermore, this nor any other program cannot be viewed as a silver bullet for solving education's issues. Instead, sound pedagogical practice; psychology, professional development, and researched best practices must all be used in a harmonious way to meet the needs of individual students.

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