KHAN ACADEMY

Case study by Alissa C

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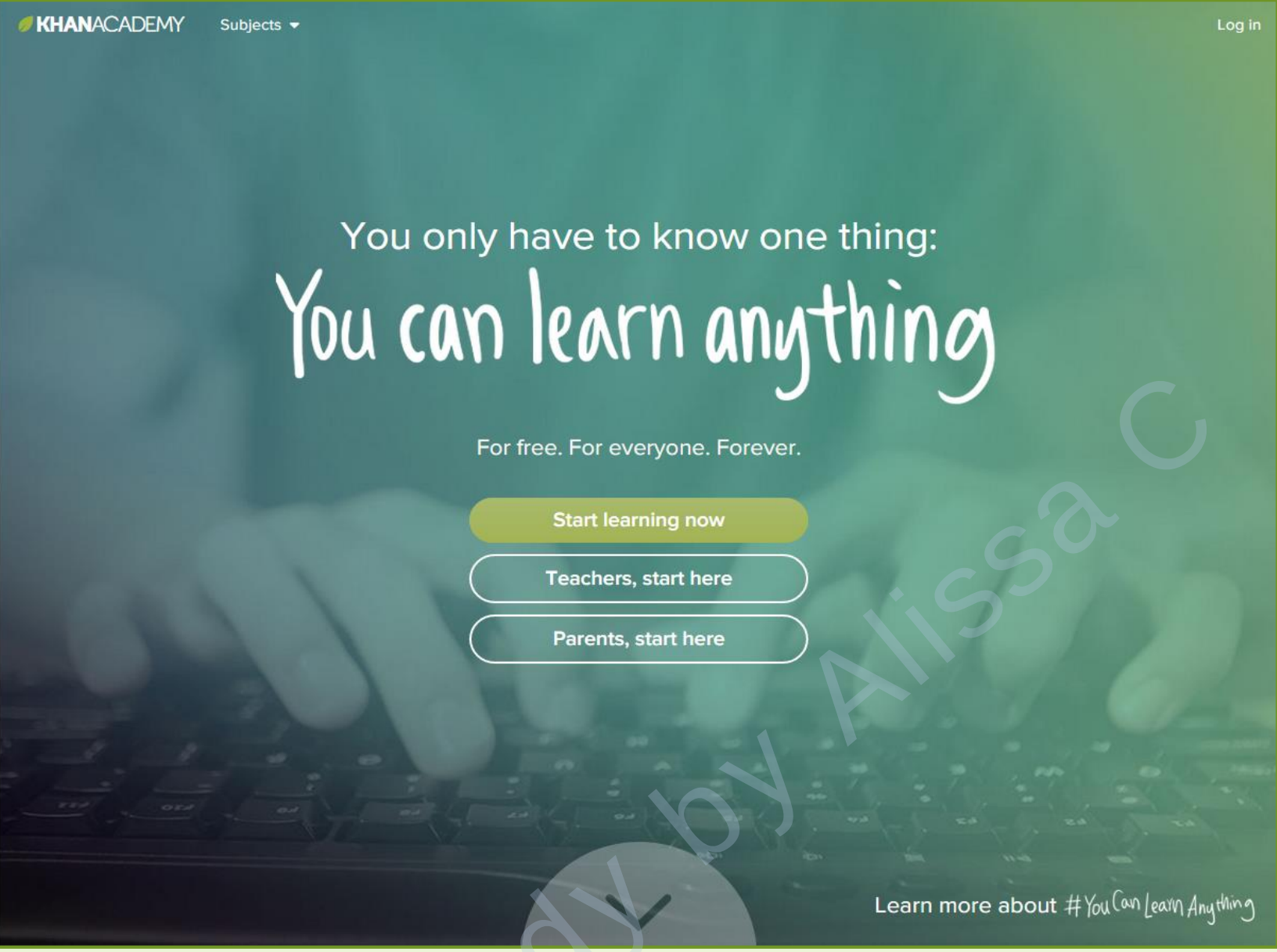


WHAT IS IT?

A free, online, educational resource for everyone. Founded in 2008 as a not-for-profit organization by former hedge-fund analyst Salman Khan, Khan Academy is a global, online learning resource that strives to offer "free, world-class education for anyone, anywhere [9]." Using short instructional videos, practice exercises, and a "personalized learning dashboard that empower[s] learners to study at their own pace in and outside of the classroom [1]," the site has grown from one man tutoring his cousin remotely to a team of 75 full-time staff working to improve and expand Khan Academy for its growing community of 23 million learners and mentors. While the content is most comprehensive in mathematics and computer programming, other subjects include humanities, art history, physical sciences, economics, and even college-admissions preparation.

"Most people are held back not by their innate ability, but by their mindset… We can all become better learners. We just need to build our brains in the right way."

— KHAN ACADEMY

https://www.khanacademy.org/youcanlearnanything

The Audience

For everyone. Khan Academy's target audience is marketed as "for everyone of all ages." For mathematics, there are videos ranging from absolute beginner concepts, like counting, all the way up through college-level calculus. However, it is primarily optimized for K-12, as much of its content adheres to the Common Core standards and it offers learning analytics developed with teachers in mind but open to all.

Besides age range, Khan Academy and its extensive video content has been translated into 28 different languages in an ongoing process to become fully global. As of 2014, about 40 percent of the site's users are from countries outside of the US including India, Brazil, Mexico, and South Africa [9].

Coaches. In addition to targeting students, the site has advanced dashboard analytic tools for "coaches" or mentors, who can be parents, teachers, and even peers. The learning dashboard allows coaches to monitor their mentee's progress.

Although the site is optimized for teachers, parents, and students, anyone with internet access, a Wi-Fi-enabled device, and a passion for learning can take advantage of the resources and features offered.

THE CONTENT

Khan Academy's primary driving source and the reason it has been so successful so far is because of the wide range of content. In a 2014 TED talk interview, Khan says the organization is working to complete "all of the major concepts that one would need to know for the K-12 Common Core [State Standards], as well as AP Calculus" by working with Smarter Balanced Assessment Consortium, Illustrative Mathematics, and College Board [5]. Since then, Khan Academy has also partnered with Stanford School of Medicine, MIT+K12, NASA, Dartmouth College, The Metropolitan Museum of Art, and many more, in efforts to provide more specialized content in those areas.

Staff & Content Credibility

Staff bios. In the beginning years of Khan Academy, the only person creating content its founder Salman Khan, who has multiple degrees from MIT and Harvard [2]. Today, Khan Academy has teams of content specialists that specialize in math, health and medicine, and art history and history, in addition to the other staff involved in managing the site itself. All of the staff's bios, including past work, projects, education backgrounds, and even passions/hobbies, are easily accessible on the website [2], ensuring users that Khan Academy commits to creating accurate content for its videos and exercises and is constantly working to improve the site.

Other users. In addition, some information credibility comes from Khan Academy users and the community itself. Any registered user with at least 5000 points can contribute to the accuracy of content on the site using the "report a mistake" button under each video or exercise.

SIMPLE DESIGN

Using Khan Academy

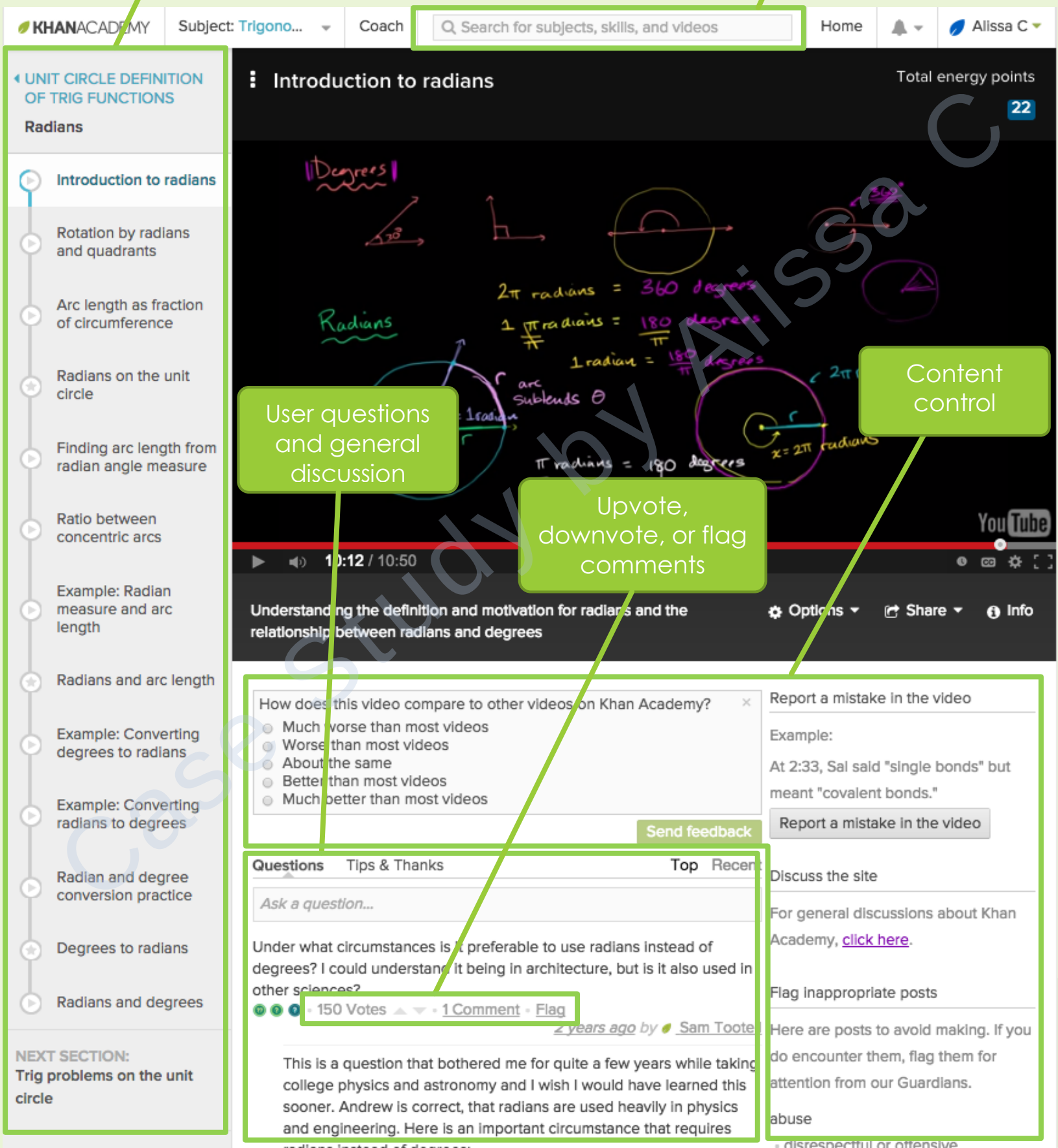
Easy to use. Following the principle of Khan Academy that anyone anywhere can learn, anonymous users can use all parts of the site for free. One only has to select a topic from the subjects menu at the top toolbar or do a site-wide search for subjects, skills, and videos to begin learning. However, as a registered user, learning progress can be tracked through the personalized dashboard of one's learning statistics and through points and badges earned by watching videos or completing exercises.

Help forums. In general, it is not difficult to learn how to use Khan Academy due to the pop-up tutorials. However, for more information, the help center is a comprehensive resource for frequently-asked questions and contains user guides for specific groups of users (e.g. learners, teachers and coaches, parents, and translators). If a question is not answered in these guides, one can submit suggestions, get troubleshooting tips, or report a problem through the forums. This kind of customer support demonstrates Khan Academy's commitment to its users.

Khan Academy Video Interface

Suggested video-watching order

Search bar for finding content easily



User questions and general discussion

Upvote, downvote, or flag comments

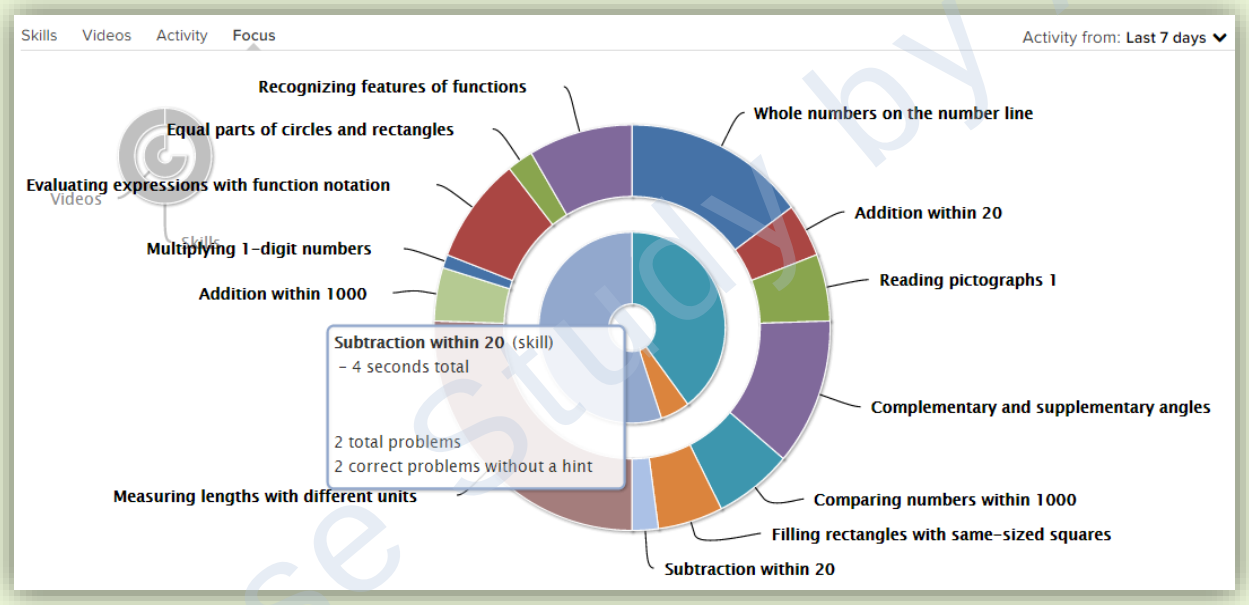
Content control

Moreover, the majority of Khan Academy's video narration, mostly by Sal Khan, is done in the vernacular rather than in the lofty academic terms which might be expected of someone with multiple degrees from MIT and Harvard. Khan also records videos without a script; while unconventional, it allows users to "hear Khan thinking things through aloud, using intuition and solving the problem with his viewers rather than for them" [8]. Overall, the relaxed nature of Khan Academy videos makes Khan more relatable and the content less abstruse for the learner of any age.

The Learner's Dashboard

The learner's dashboard is one of the central features of Khan Academy that allows learners to see their personal learning data and self-monitor their progress. Some of the more notable features include:

- *Progress*. Users can see comprehensive statistics of learned skills, what videos they've watched and for how long, and their site activity in graphical format based on time spent, energy points earned, and the focus of what topics one has learned.



This is one of the visual representations of a user's progress and recent activity, viewable only by the user and his/her coaches, if applicable. The inner circle represents videos watched, and the outer circle shows the skills learned.

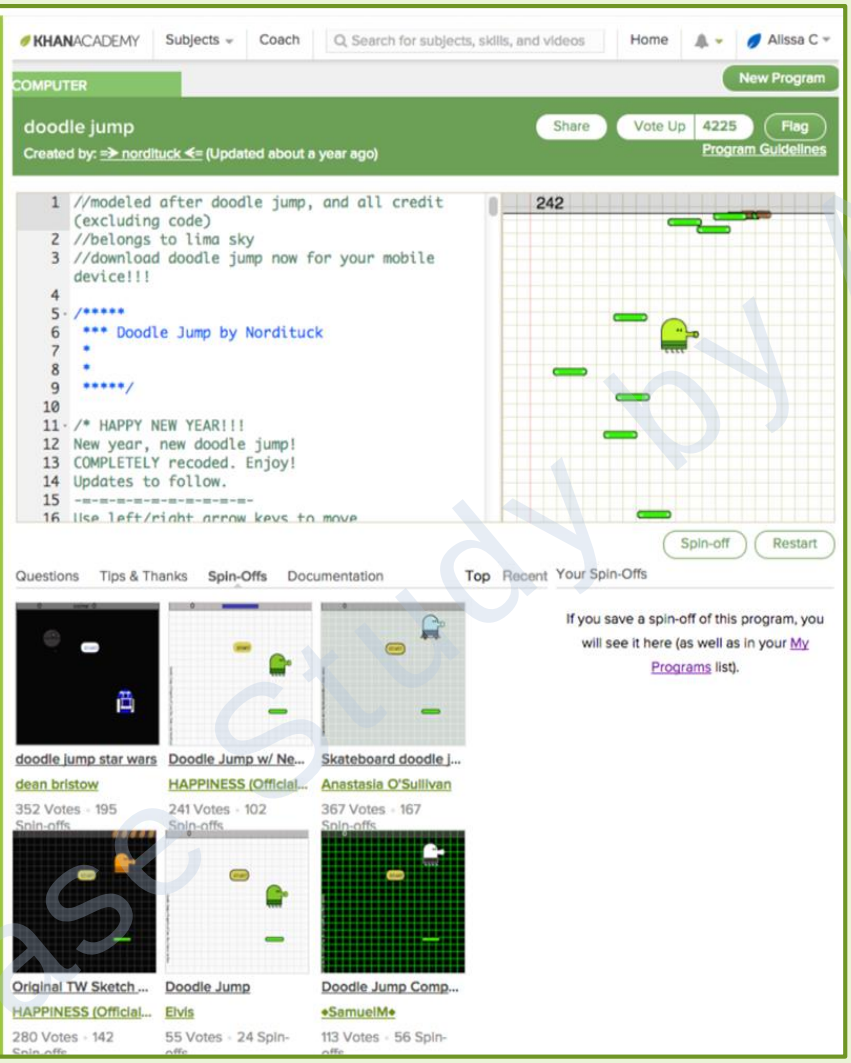
- *Discussion*. This is where all of a user's questions, answers, and discussion-related badges can be viewed. Khan Academy's dedication to creating a community of learners who can help each other and provide feedback on the videos and exercises.
- *Programs*. Here, one can view the list of programs one has written using KA's embedded computer programming feature. Khan Academy believes in sharing and building off of other users' programs (with proper citation). This is again an emphasis on the importance of the learning community and how users learn from others.

Community Learning

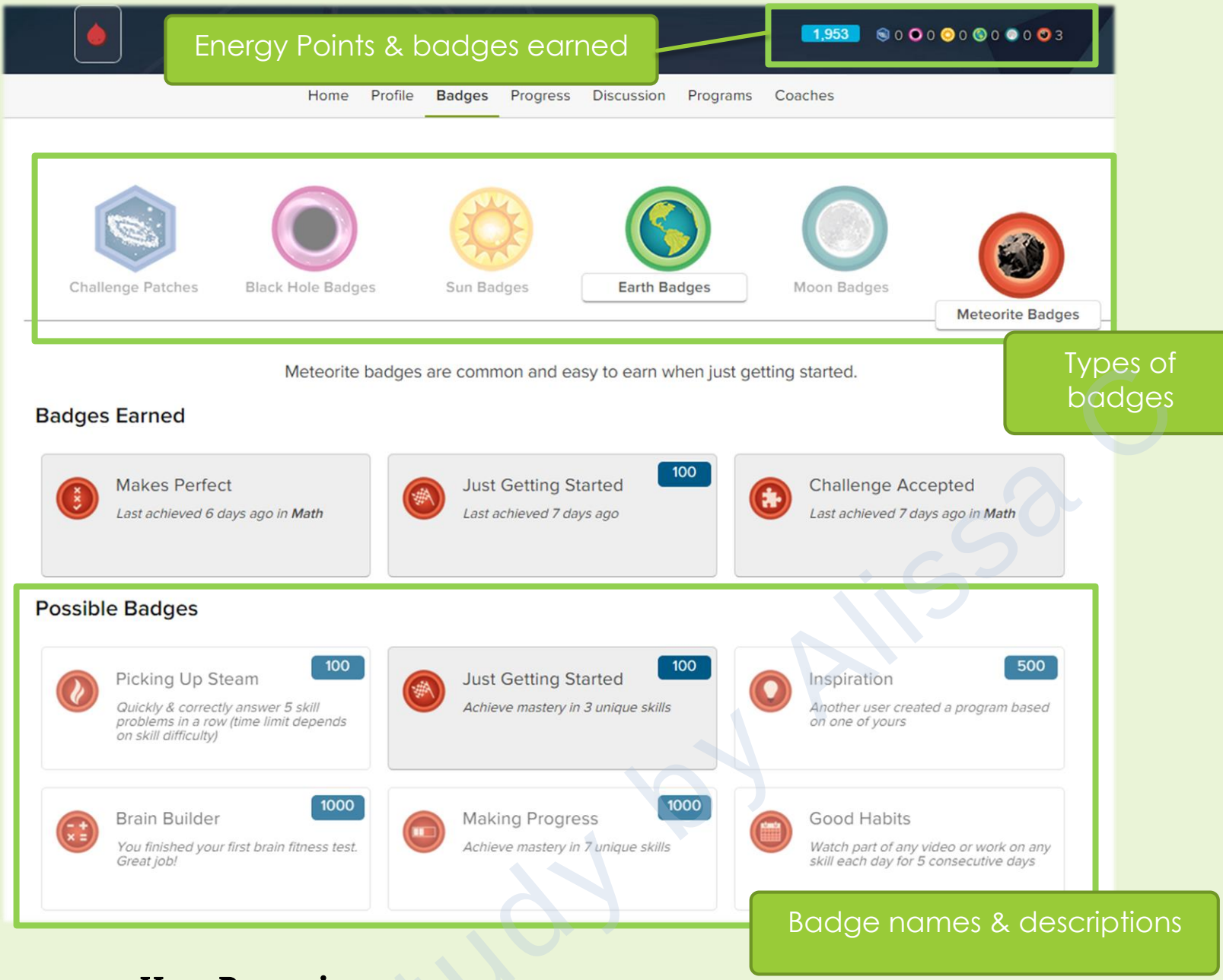
User comments. Khan Academy has come a long way from its original 2009 design, which listed external YouTube links [6] with YouTube comments as the only form of community interaction. Now, Khan Academy has decided to embed the YouTube videos with a discussion section underneath, streamlining the learning process by having users interact on the same website from which they're watching the videos. In addition, users can ask questions, answer and comment on other users' questions, and upvote, downvote, or flag unhelpful or irrelevant comments. This feature allows for quality control of the comments section specifically by other Khan Academy users, something that cannot be replicated on YouTube comments.

On the left side is the raw coding for the featured program Doodle Jump which user =≫ *nordituck* ≪= created. On the right side is the program where users can play the game.

Here are the spin-off programs other users created using the original source code.



Programming. Another feature that emphasizes community learning on Khan Academy is the computer programming gallery, where users can browse other user-created programs and create their own from scratch. When viewing a program, the code is displayed on the left and the program on the right. Underneath, there's the familiar question/answer interface found on video pages on Khan Academy, but with an additional "Spin-Offs" tab where one can view other users' programs that used the original's source-code. The documentation tab is a useful coding toolbox that lists the basic programming codes (shapes, colors, text, transforms, environment, etc.) with links to review how to use them. This idea of creating and expanding on someone else's project using their source code (with mandatory citation) advocates creativity and community learning.



User Retention

Energy points. These points, rather than measuring mastery or ability, measure effort on Khan Academy based on videos, practice problems, tasks, and challenges completed [13].

Badges. Badges, in addition to energy points, serve as additional motivation to keep coming back to Khan Academy to watch videos and complete exercises, especially for younger audiences.

Self-motivation. Although energy points and badges may serve as external motivating factors for younger audiences, the main reason for users to return to Khan Academy and continue learning is the self-motivation to learn. Users also receive weekly emails that summarize what one has accomplished in the past week and remind users to keep learning on the site. Otherwise, Khan Academy revolves primarily around user's own motivation to return and keep learning.

Distraction Free

One of the most important features of Khan Academy that distinguishes it from other online learning resources is its pure commitment to giving the best learning experience to its users. There are no advertisements and no mention of money, unlike other online learning resources like Coursera.org, which advertises its courses as free but asks users to pay for a "Verified Certificate" of completion. Khan Academy does not have this external distraction of paying for additional features; it focuses only on providing free general education.

APPLICATION

In the Classroom

Putting Khan Academy into context, it has been used successfully in "blended learning" environments in which face-to-face interaction (FTF) and online learning are combined. This is more effective than using FTF or online learning separately [12].

A specific type of blended learning is flipped classroom learning, where students watch videos at home that "present content in short, bite-size chunks, rather than monolithic hour-long lectures" [7]. In the classroom, students do practice exercises, instead of listening to the traditional in-class lecture, thus engaging them more in the coursework. In the age of information abundance and ever decreasing attention spans—an issue Nicholas Carr expresses in "Is Google Making Us Stupid?"—this strategy of providing shorter videos only seems fitting, and other video-based, online learning resources have followed suit and adopted this format.

Using Khan Academy with face-to-face instruction in school also proved effective in increasing student scores; after Los Altos school district in Northern California incorporated flipped classroom learning with Khan Academy, the number of 7th grade students who reached advanced or proficient levels in math rose from 23%-41% [7].

Following Khan Academy's flipped classroom model, Stanford Medical School adopted this format in 2012 and found that the optional class attendance increased about 50%; additionally, students' test scores averaged 74% in the flipped classroom model compared to 41% in the standard lecture format [10].

In summary, Khan Academy is "trying to change the conventional view about how education works" [4] by promoting flipped classroom learning, which has been statistically proven to be more effective than the traditional lecture.

Massive Open Online Courses

Following the success of Khan Academy, other online educational resources, termed Massive Open Online Courses (MOOC's), have become prominent. MOOC's are conducted completely online, offer more career-focused and university-level courses, and are typically structured with mandatory coursework during a set period of time [5].

Fees. Additionally, they often include fees that, while generally thousands of dollars cheaper than paying a full university tuition, repel those who cannot afford to pay for education or simply want to brush up on their academics without paying for it. This is where Khan Academy is favored over those for-profit MOOC's.

External content. Khan Academy also largely produces its own content in accordance to Common Core State Standards, whereas MOOC's like Coursera, Udacity, and edX rely solely on external content from partnering with various organizations and universities. The advantage to Khan Academy making its own content is that users only need to adapt to the learning format once, and it is less intimidating to learn concepts from someone speaking in the vernacular.

Thus, while Khan Academy was one of the first to make free, online learning popular, it covers content for a vastly different audience—one that's simply looking for general education—than the one MOOC's target. In Khan's own words, "Khan Academy is anywhere between, 'I have a test tomorrow on L'Hôpital's rule, so let me... get some practice on it,' all the way to, 'I am running a calculus class and I want all my students to learn at their own pace with me as their teacher... so I can [monitor students' progress], and if someone's falling behind I can pair students together'" [5]. The site was one of the first successful online learning resources that made others rethink the traditional format of education, and it targets the general population that many MOOC sites don't cater to.

CONCLUSIONS

What makes Khan Academy so successful, and what can we learn from it?

As a user-friendly website:

- Designed with its audience in mind, so nearly any literate person can use it or learn to use it. This model of basing a website's features on how users interact with it is one all websites and information resources should follow.

Designed for its users

- Keeps users engaged with the site in multiple ways. Gamification through the badges and points system is a good external method of user retention especially for younger audiences, but the primary focus is on getting users to keep learning by sending weekly progress reports through emails.

- Dedicated to its mission of providing free online learning resources for everyone. Its clean design is ad-free and doesn't ask for money to "unlock" parts of the site's features, unlike some MOOC's or other websites. Ironically, Khan Academy as a non-profit organization still is more popular than many for-profit MOOC's.

Complete dedication to its mission

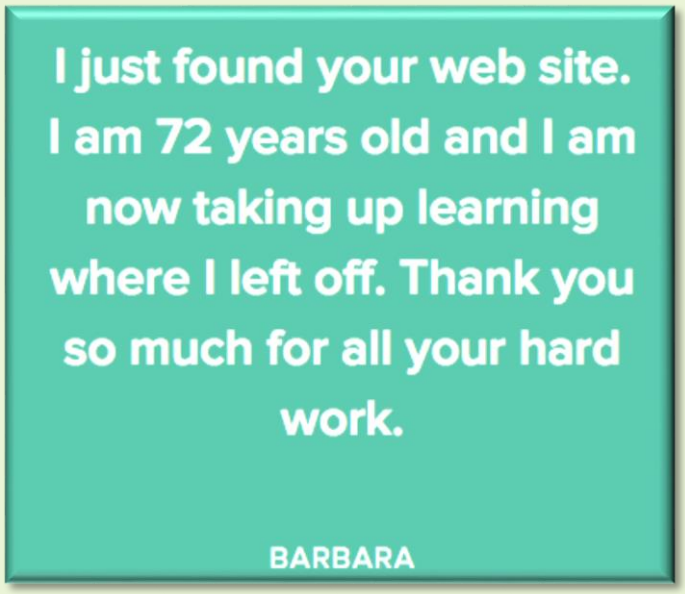
As a learning and teaching resource:

- For the classroom, Khan Academy's freestyle format works well with the flipped classroom educational model. It's the perfect supplement to any classroom setting for students and teachers, whether formally implemented or not, because of the in-depth learning analytics dashboard for both.

- For the individual user without the added benefit of a formal, face-to-face education, Khan Academy offers an extensive online learning community. This helps users of any age learn with each other through the discussion forms and the "coaches" feature, allowing someone like 10-year-old Matthew, who learned 642 inverse trig problems on his own time [11], or 72-year-old Barbara, who picked up learning where she left off [1], to interact with others and get feedback on their work.

Versatile format for use inside or outside the classroom

Through its simple but powerful user interface, it's obvious that Khan Academy kept its wide audience in mind. Everything about its design—from its emphasis on collaborative, community-based learning to its commitment to producing quality content without distractions—is a testament to the site's tagline "You Can Learn Anything." The primary focus is simply to provide accessible, general-education content, but using the website is completely voluntary. The majority of those 23 million people signed up because there's value in Khan Academy, and there are few, if any, rivals to the site which offer the same resource of comprehensive grade-level content.



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   The information from sources 1, 2, 9, and 13 come directly from the Khan Academy website itself, and I used them for general information about the site and its staff.

2. "About the Team." *Khan Academy.* Khan Academy, Sept. 2014. Web. 20 Feb. 2015.
   See annotation for source 1.

3. Carr, Nicholas. "Is Google Making Us Stupid?" *The Atlantic*. Atlantic Media Company, 1 July 2008. Web. 20 Jan. 2015.

4. Husock, Howard. "Reclaiming The American Dream VI: The (Other) Lessons of Khan Academy." *Forbes.* Forbes Magazine, 28 Oct. 2014. Web. 20 Feb. 2015.
   This resource is not scholarly, but it comes from Forbes magazine which is a well-known news source. The author has a focus on "philanthropy, civil society, housing and the welfare state" and he uses Khan Academy as an example of "seeking ways to change [educational] norms." I used this article to get the philanthropic quote about Khan Academy and how it's revolutionary in trying to change the conventional views about education.

5. Jacobs, Elizabeth. "The Evolution of the School of the Future." Ideas.ted.com. TED Conferences, LLC, 15 Jan. 2014. Web. 21 Feb. 2015.
   I used this source to get direct quotes from Salman Khan, creator of Khan Academy. This was a transcript of an interview with him, and it comes from TED talks editor Elizabeth Jacobs who is a TED staff member.

6. *Khan Academy.* 28 Feb. 2009. *Internet Archive.* Web. 21 Feb. 2015.
Internet Archive "Wayback Machine" lets people visit past versions of websites. I used it to see how Khan Academy's website has changed since 2009.

7. Koller, Daphne. "Death knell for the lecture: Technology as a passport to personalized education." *New York Times.* (2011).
This is from a credible news source, The New York Times, and while it is not necessarily a "scholarly" article (no references listed, and is directed towards general public), the author does refer directly to certain studies like the 2010 meta-analysis from the Department of Education (source 12). She is also a computer science professor at Stanford and works at the Stanford Artificial Intelligence Laboratory. According to her TED.com bio, she's one of the founders of startup company Coursera, one of the companies that was inspired by Khan Academy, so she definitely has qualifications to write about this topic.

8. Parslow, Graham R. "Commentary: The Khan academy and the day-night flipped classroom." *Biochemistry and Molecular Biology Education* 40.5 (2012): 337-338.
This article comes from a scholarly journal about education and biochemistry and molecular biology. I found this article through MLibrary and Wiley Online Library. The author of the article is an associate professor at the University of Melbourne and has numerous other publications in the field of biology.

9. "Press Room." *Khan Academy Help Center.* Khan Academy, Sept. 2014. Web. 20 Feb. 2015.
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10. Prober, Charles G., and Chip Heath. "Lecture halls without lectures—a proposal for medical education." *New England Journal of Medicine* 366.18 (2012): 1657-1659.
This is a scholarly article because it has references, is published in The New England Journal of Medicine (whose audience is for the medical community), and is co-authored by two professors from the Stanford School of Medicine and the Stanford Graduate School of Business.

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This is more of a journalistic article but it comes from WIRED Magazine, a well-known news source that focuses on technology in general. The author is a writer for the NY Times Magazine and Wired.

12. U.S. Department of Education, Office of Planning, Evaluation, and Policy Development, Evaluation of Evidence-Based Practices in Online Learning: A Meta-Analysis and Review of Online Learning Studies, Washington, D.C., 2010.
This resource is useful because it is a meta-analysis from the U.S. Department of Education that provides information on the effectiveness of face-to-face interaction versus online learning, as well as blended learning models.

13. "What are energy points?" *Khan Academy Help Center.* Khan Academy, Sept. 2014. Web. 20 Feb. 2015.
See annotation for Source 1.