



Vocab Tab: A Case Study

An exploration of the production and evolution of the
Google Chrome Extension used over 5 million times annually.

by Alex Stillman

I. The Concept

The Situation

Many good iPhone games enjoy an initial phase of popularity, but the truly great ones stay on home screens for months, if not years. Flappy Bird, 2048, and Doodle Jump have all entertained me on subways, planes, and cars. Hoping to find ways to reclaim this otherwise under-utilized time, I made the bold move to delete all my iPhone games in an attempt increase my productivity. Out with 2048, in with *The New York Times*.

Changing my habit was challenging but worthwhile: I was learning more about the world and staying engaged with current events. Because *The New York Times* sometimes uses advanced language to express complex ideas, I began keeping a list of unfamiliar words and definitions to improve my vocabulary: captious, truculence, ratiocination. I enjoyed learning and using this language; it was (relatively) painless, memorable, and repetitious. This got me thinking. I wanted to create a product for students like me to improve their vocabulary. I thought through guiding principles and a goal for this project.

The Goal

Help people improve their vocabulary without significantly impacting their lifestyle.

Guiding Principles:

1. The education must be painless.
2. Repetition is key.
3. It cannot replace or remove value.
4. It must be free!

The Execution

I created the product with my guiding principles in mind. I pursued development of a Google Chrome Extension, a third party add-on that modifies a user's Google Chrome experience. As the world's most popular browser, Google Chrome and its Chrome Web Store gives me access to its over 1 billion users.

To populate the extension with vocabulary, I looked to the source that inspired this development. The New York Times curates a daily blog of words to know, an excellent resource for this project.

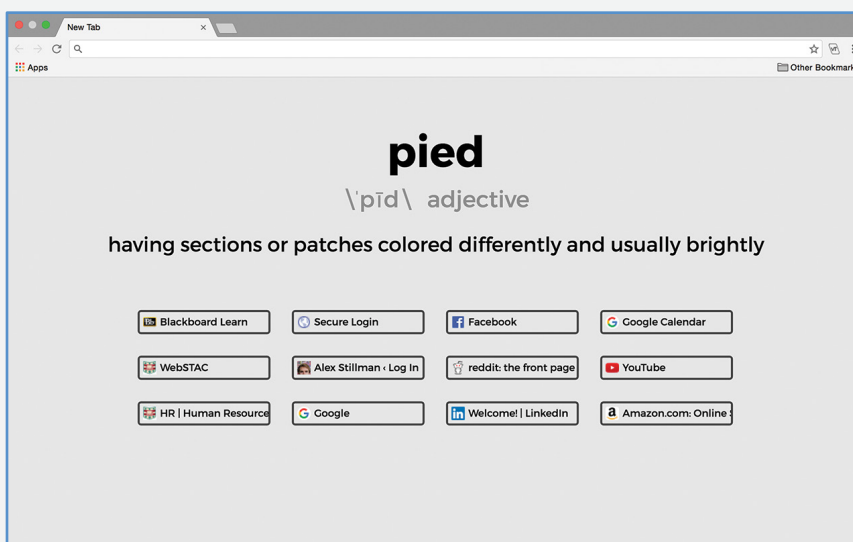
As a self-taught coder, I have a strong understanding of and familiarity with the technical skills required for successful deployment, including Javascript, HTML/CSS, and JSON. Having studied design and freelanced for clients, I knew that I could create a visually engaging

product that would dynamically optimize to a variety of environments.

Confident in my skills, I began a highly iterative development process, building, crashing, breaking, and refining the extension until I had gone from minimum viable product to a completed Alpha.

The Product

VocabTab is a Google Chrome Extension that serves users a word-worth-knowing every time they open a new tab. The extension cycles through a curated, manageable list of words, each with an accompanying definition, pronunciation, and part of speech, while maintaining the usability of the default new tab screen by presenting the user's most visited websites in a familiar grid.



The word, pronunciation, part of speech, and definition are clearly displayed

Quick access to your most-visited sites

Simplistic neutral tones are a nod to VocabTab's *New York Times* inspiration

Throughout development, I found ways to follow my guiding principles:

1. The education must be painless.

By incorporating points of lightweight education into users' lives, the psychological barrier of mental effort is reduced, creating a painless experience. Over time, the summation of all of these lightweight learning moments creates greater understanding of the vocabulary.

2. Repetition is key.

Essentially everyone opens many new Google Chrome tabs per day, providing a great opportunity for repetition. It does not harm the effectiveness of the extension if users disengage with the vocabulary some of the time because high Chrome usage ensures that at least some of the time users are learning new vocabulary.

3. It cannot replace or remove value.

All Google Chrome usability is maintained for VocabTab users. Most notably, the most-visited websites grid that helps with quick access to frequently visited destinations is kept.

4. It must be free!

I was more than happy to share VocabTab with the world for free. I learned lots about deployment to the Google Chrome Web Store and have loved hearing positive feedback about VocabTab.

The Tech Stuff

A Google Chrome Extension follows common web development architecture with the addition of a JSON delegator that requests permissions and allows access to different parts of Google Chrome. For a new tab extension, I request tabs functionality and topsites information to populate the top visited sites grid. With the override function “`chrome_url_overrides`”: {“newtab”: “vocab.html”}, users are served the VocabTab new tab instead of the default. Within the delegate, HTML, CSS, and javascript files are all linked.

To efficiently populate the wordbank, I built a simple scraping tool to gather and format words, pronunciations, parts of speech, and definitions. I organized the wordbank as an array of arrays to make recall as efficient as possible.

The topsites grid is populated using pre-gathered and locally stored Chrome data. Population occurs by iteration, using cached page titles and favicons. The entire div is hyperlinked to the target URL and has an `a:hover` selector and `-webkit-transition` animation to increase user understanding of the grid.

The CSS is fully dynamic, optimizing across a variety of screen sizes. Spacing and sizing values are generally defined in relative rather than absolute terms, using viewport units `vh` and `vw` when possible. Due to the dynamic styling, few breakpoints are needed, though I ensured that the user experience was optimized for the most common screen sizes.

Finally, I included full Google Analytics integration to gather usage information.

The Result

I successfully deployed VocabTab globally in October 2016. In its initial weeks on the Chrome Web Store, it gained approximately 100 users per week and feedback was highly positive. (Since launch, I have maintained a 4.5 star rating across over 20 reviews.) My initial goal had been accomplished: I had created and deployed a successful product. Now it was time to improve it.

II. Modification for International Use

Analytics Telling a Story

I monitored VocabTab’s analytics carefully in an attempt to notice useful trends that might point to potential product improvements. After four months of successful deployment, I had no-

ticed a trend in the data that I found very interesting: 24/7 usage.

Initially after the launch of v1.0, usage statistics closely followed typical American waking hours; I saw the vast majority of VocabTab activity from 8AM EST to 12AM PST. As the user base expanded, I wasn't just noticing greater American waking hour activity, but greater 24/7 usage. This insight, combined with users' location information, gave me a sense of the international scale of VocabTab's adoption.

Researching the Audience

The use case of VocabTab for international users was not completely clear to me. I hypothesized that these users could be either expats hoping to improve vocabulary skills or foreigners using VocabTab to improve their English language capabilities. Hoping to gain greater insight on my users, I followed up with one user who had left a review on VocabTab. The conversation I had with Mohammad reaffirmed my suspicions about who my international users are and helped me shape future versions of VocabTab. Mohammad's responses have been modified for clarity.

Hello, Mohammad! Thanks so much for using VocabTab. I'm trying to get an idea of who my users are -- could you tell me a bit about yourself?

I am a 24-year-old computer engineer living in Mit Ghamr, Egypt. I downloaded VocabTab in December and have been using it since.

I'm happy to hear that! Is English your first language?

No, Arabic is my first language. I have been studying English since I was in middle school.

Has VocabTab been able to help you learn English?

Absolutely. I am seeing words that I never knew. Seeing them everyday is an easy way to get to know them.

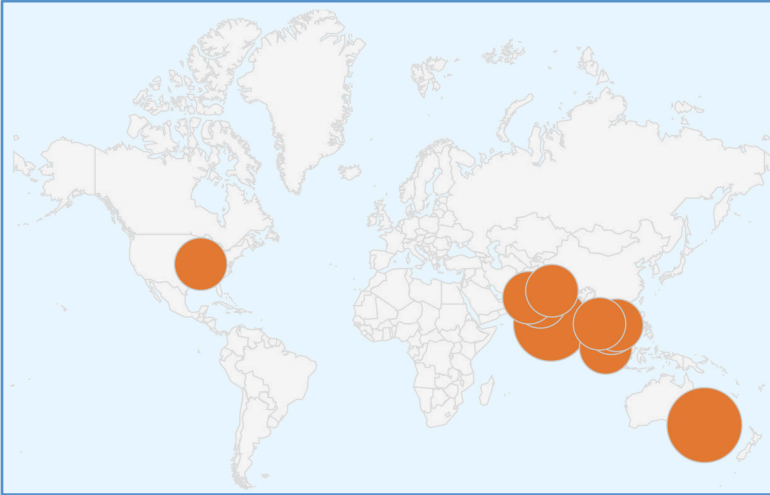
How well does VocabTab work on your computer?

Internet can be slow but VocabTab works well for me.

Thank you for using VocabTab! I appreciate your time.

The Result

V2.0 launched as the VocabTab edition optimized for international users. Six months after being first deployed, about 25% of VocabTab usage came from foreign countries, some of the most popular being India, Vietnam, Turkey, China, and Pakistan. Analytics allowed me to understand the noteworthy usage trends, helping me optimize the VocabTab experience for users like Mohammad worldwide.

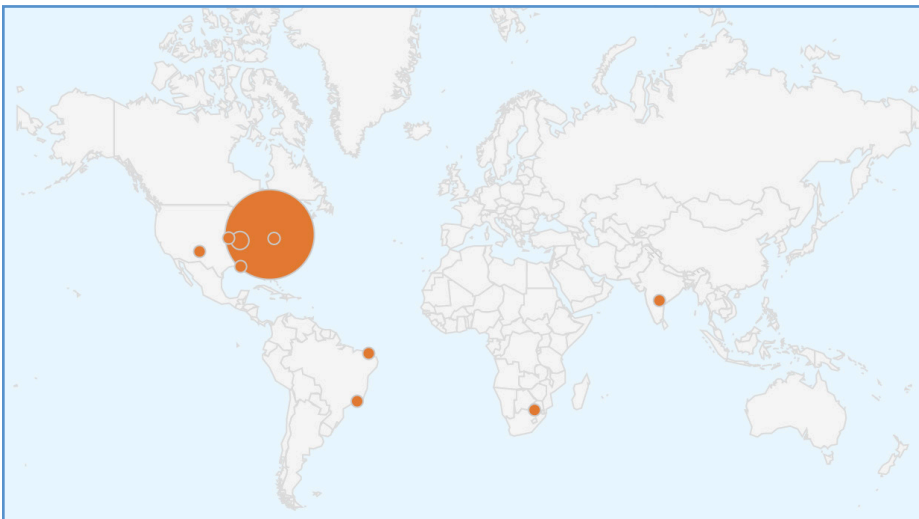


Google Analytics geo-location of active users at 2 AM EST, midday for the areas of high activity

III. Adaptation to New Use Cases: Altoona and Beyond

Analytics Telling a Story, Again

In early September 2017, I was surprised to find high usage coming from Altoona, Pennsylvania. During business hours, approximately 50 users would have high engagement (long session durations and high page views per session). Further investigation led to the discovery



Altoona's 50 users compared to other single-user locations.

that one ISP accounted for all of this traffic: the "Greater Altoona Career & Technology Center." A quick internet search led me to get a better understanding of the single biggest user cohort, the Greater Altoona Career & Technology Center, a vocational high school and continuing education facility focused on teaching technical skills to Altoona's teens and adults.

Researching this New User

Greater Altoona Career & Technology Center uses VocabTab in a computer lab for all of its intended reasons: it provides lightweight points of vocabulary improvement that help students speak and write with greater proficiency.

I got in touch with Dan, the head of the Computer Programming Department at GACTC, to hear more about its use of VocabTab. I haven't built v3.0 yet, but hearing from this new user group has helped me shape plans about how to create a great experience for the next phase of users. Dan preferred not to be quoted, but below is an outline of how v3.0 will be an improvement.

V3.0: Satisfying New Customer Segments

1. Levels of Vocabulary Difficulty

Being able to offer varied levels of difficulty would allow VocabTab to serve a wider audience. Especially in the context of a school where students' vocabulary proficiencies differ widely, this feature would be very helpful.

2. User-Input Top Sites

Currently, VocabTab populates its top sites grid with Chrome's user-generated top sites, but offering the ability to customize these websites would be especially helpful for educational purposes. For example, administrators could populate the list with links to the school's learning management system, website, and email system.

Where VocabTab Is Today

After being live on the Chrome Web Store for one year, VocabTab's growth and reception have been remarkable. By focusing on creating a great experience for all of VocabTab's users, no one is left behind. Today, VocabTab helps thousands of daily active users all around the world learn vocabulary. I'm proud that VocabTab is used over 5 million times annually, just one year after deployment. Moreover, VocabTab gets 4.5 of 5 stars on the Chrome Web Store.

V4.0 and Beyond: Listening to the User

Even though v3.0 is still under development, I am considering what VocabTab v4.0 and beyond will look like. There are features and expansions that I am already considering for these future iterations, but in the end, taking a data-driven approach to product development and listening to users is what will determine the product roadmap.

Test-Specific Wordsets

While many users use VocabTab for personal vocabulary improvement, some use the platform as a way of learning test-specific vocabulary. Every year, high school students spend

billions of dollars and countless hours memorizing SAT vocab, one of the few parts of the test that requires true memorization. VocabTab is well-positioned to serve these users and any others hoping to learn wordsets for a standardized test.

Parallel Products

There are many potential growth points for VocabTab, but one of the most promising is a suite of parallel products that could help students learn a variety of subjects. Essentially any discipline requiring memorization, fast recall, or repetitive learning could be ideal to apply to the new tab format. Students learning multiplication tables, the laws of physics, historical events, or foreign languages could all benefit greatly from such new tab products. Similar tools like Quizlet have found great success in this space, boding well for this concept.

As I continue to do customer research, get a sense of the competitive landscape, and optimize for all types of users, I will be on the lookout for opportunities like these. If I were interested in monetization opportunities, discipline-specific new tab products would be an excellent opportunity. However, I find the personal educational experience of building, launching, and refining products to be too valuable to focus on monetization. I'd rather learn about product positioning, marketing, and refinement in the real world than monetize.

Listen to the User, Empathize with Pain Points

Overall, my greatest opportunity for future growth comes from hearing how people are using VocabTab. Both versions 2.0 and 3.0 are products of observing my analytics, doing customer research, and listening to users. Building and deploying unnecessary features or optimizations could reduce the effectiveness of VocabTab for all without benefitting anyone.

As I continue to refine VocabTab and create new products, I make sure to listen to users and empathize with customer pain points to create the best digital experiences.

About the Creator

I am a junior at the Olin Business School of Washington University in St. Louis double majoring in leadership & strategic management and marketing with a minor in design. I am a self-taught coder with multiple products on a variety of platforms including the iOS App Store and the Chrome Web Store.

Feel free to contact me at alex.stillman@wustl.edu or visit my website www.alexstillman.co to learn about some of my other projects. I love hearing from people!

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