American Battlefield Trust – Web Analytics

Capstone Final Report

Authors & Roles

Andrew Grzybowski – Project Manager

[redacted] – Team Communicator

[redacted] – Secretary

[redacted] – Evaluator

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Abstract

This capstone project, developed in partnership with the American Battlefield Trust (ABT), focuses on analyzing and enhancing digital engagement through web analytics. The Trust is a nonprofit organization dedicated to preserving America's historic battlefields and educating the public about the significance of those sites. With a primary audience of students, educators, and history enthusiasts, the Trust operates a content-rich website that serves as both a learning resource and a platform for public engagement. As digital traffic becomes increasingly important to the success of mission-driven organizations, our goal was to investigate how users interact with ABT's digital properties and identify actionable strategies to improve engagement, retention, and audience outreach.

Initially, the project aimed to map out user pathways through the ABT website using a detailed Sankey diagram. However, due to limitations in the available Google Analytics data, particularly the lack of detailed session-based navigation, we determined that such a visualization would not meet our standards for accuracy or quality. The data available would not have produced a Sankey diagram that was precise or insightful enough to support meaningful conclusions. As a result, we pivoted the focus toward other high-value insights that could better align with both the Trust's needs and our commitment to delivering a polished, actionable final product. Notably, we discovered that Chrome OS usage was a reliable proxy for student engagement due to its dominance in K–12 education. Additionally, we found increasing user referrals from ChatGPT beginning in September 2024, which aligned with the academic calendar and suggested a growing role for AI tools in student research behaviors.

The Trust's most visited pages included battle summaries for Gettysburg, Antietam, and Fort Sumter, as well as the timeline of the American Revolution. These pages saw the longest average session durations and provided clues about which historical topics resonate most with users. Traffic analysis showed that organic search and direct visits were the top acquisition channels, while engagement time was highest for users referred by school applications and social platforms. Notably, patterns in site traffic closely followed the academic calendar, with increased activity during the school year and noticeable spikes around midterms and finals, further reinforcing the Trust's central role as an educational resource. Our cohort analysis revealed strong initial interest, especially from student-heavy audiences, but also highlighted a steep drop in user retention after the first visit.

Our client stakeholders, including Larry Swiader and his team, emphasized the importance of understanding student usage patterns and improving outreach to teachers and families. Based on stakeholder meetings and analytic findings, we produced a comprehensive set of insights and recommendations. These included developing lightweight, Chromebook-optimized content; introducing gamified engagement strategies such as badges and quizzes; optimizing key landing pages for search engines; and launching a "Return & Learn" email series to boost user retention.

The final deliverables include visualizations of traffic sources and user retention trends, a city-by-city analysis of Chrome OS usage, ChatGPT access patterns, and strategic recommendations tailored to ABT's mission. This project not only addressed current needs but also laid the foundation for future research into how digital tools can better serve educational nonprofits.

In summary, the American Battlefield Trust - Web Analytics team used data-driven methods to uncover meaningful patterns in how visitors interact with educational content. By identifying where engagement is high, where drop-offs occur, and which audiences show the most promise, we equipped the Trust with a roadmap for deeper digital impact, especially among students and educators, their most valuable long-term stakeholders.

Client Roles and Contacts

[redacted]
Chief Digital Engagement Officer at the American Battlefield Trust. Served as the primary point of contact for the project.

[redacted]
Web Analytics Specialist at the American Battlefield Trust. Played a key role in supporting our access to digital data and contextualizing key trends.

Team Background and Structure

Each team member brings a unique background and set of goals to the project:

- **Andrew Grzybowski:** Cybersecurity and Data Science student with strong technical and leadership experience. As Project Manager led the team and conducted analysis on Chrome OS usage and student-based engagement trends.

- [redacted]**:** Social Data Science major with an interest in data analysis and economics. Served as Team Communicator, liaising with stakeholders and leading efforts on traffic source patterns, ChatGPT referrals, and seasonal user trends.

- [redacted]**:** Cybersecurity-focused student with a strong background in technical analysis. Managed evaluation and breakdown of traffic sources, contributing to insights on platform behavior and acquisition strategies.

- [redacted]**:** Cybersecurity student focused on long-term engagement metrics. Produced analyses on user retention, engagement duration, and cohort behavior. Maintained project documentation and served as Secretary.

Methods

To fulfill the goals of the American Battlefield Trust - Web Analytics project, our team followed a structured, iterative process grounded in data analysis, stakeholder collaboration, and user behavior research. We began by defining key objectives in collaboration with the client: to better understand who was using the Trust's digital platforms, how those users interacted with the content, and what could be done to increase engagement, retention, and long-term value for educational audiences.

Our initial methodology focused on mapping user pathways across the site using Google Analytics flow visualization tools. We intended to create a Sankey diagram to illustrate typical session journeys. However, early in the project, it became clear that the data granularity provided by ABT's Google Analytics account was insufficient. The platform lacked the session-level tracking detail required to visualize accurate or meaningful user flows, making it difficult to meet our standards for insight quality. Rather than proceed with an analysis that might misrepresent user behavior, we adjusted our project scope to focus on more reliable metrics and high-impact areas.

From that point, we adopted a segmented analysis strategy using Google Analytics, Excel, and Tableau. We explored traffic sources (organic, direct, referral, social), device types (with a focus on Chrome OS as a student proxy), geographic regions, top content pages, and time-based metrics like average session duration and bounce rate. We also conducted a cohort analysis to examine engagement trends over time and used daily active user data to identify patterns in site activity that corresponded with the school calendar.

Our team divided the work into thematic areas:

- Andrew focused on **Chrome OS** analysis and identifying engagement trends tied to student audiences in specific cities.
- Noah examined **ChatGPT referrals**, seasonal traffic patterns, and the potential for interactive technology (VR/AR) to improve retention.
- Damien conducted a detailed **engagement and retention** analysis, tracking how long users stayed, how often they returned, and which pages held attention.
- Isaiah broke down **traffic by source and platform**, tying long session durations to school apps and social platforms while assessing the impact of various acquisition strategies.

Throughout the semester, we held multiple Zoom meetings with the client to share findings, confirm hypotheses, and refine our deliverables based on feedback. We coordinated tasks and shared updates through regular meetings and group messages. All team members contributed to compiling visualizations and written insights for both the midterm and final presentations.

Challenges and Adjustments

The most significant challenge we faced was the lack of navigational depth in the analytics data. This limitation forced us to abandon our original goal of building a comprehensive Sankey diagram. Rather than allow this to compromise the quality of our work, we shifted to a modular analytics approach, prioritizing sources, devices, and engagement data that could be confidently interpreted.

We also encountered constraints related to student privacy laws, which restricted visibility into the behaviors of users under 18. To navigate this, we used indirect signals (e.g., Chrome OS usage, and seasonal activity spikes) to infer school-related traffic. Lastly, some tools used by ABT, like Crazy Egg or Sprout, were unavailable to us, so we worked within the bounds of the Google Analytics access we were given and supplemented our insights with public benchmarks and stakeholder feedback.

In the face of these challenges, our team remained flexible and solutions-oriented, adjusting the scope as needed while maintaining a consistent focus on delivering insights that were accurate, meaningful, and actionable for the Trust's digital strategy team.

Background Research

Our project began with an in-depth investigation of the American Battlefield Trust's mission, stakeholders, and current digital infrastructure. This background research helped us frame the objectives and scope of our work and provided critical insight into the values and goals of our client.

MOST Analysis

We used the MOST framework to understand how our project aligned with the American Battlefield Trust's broader strategic goals:

- **Mission**: The American Battlefield Trust (ABT) is dedicated to preserving America's hallowed battlegrounds and educating the public about what happened there and why it matters.
- **Objectives**: Inspire public appreciation for American history and the nation's founding values of liberty and independence. A core goal is to expand educational access through historical interpretation.
- **Strategy**: Broaden awareness of significant battle sites through digital and physical preservation, while enhancing educational outreach efforts.
- **Tactics**: The Trust provides classroom materials to educators, hosts public events, creates virtual battlefield tours, and invests in the upkeep of preserved lands.

These priorities directly informed the Trust's growing interest in understanding how its website supports K–12 education and what digital changes could better serve students, teachers, and history enthusiasts.

DEI Considerations

The American Battlefield Trust's digital education materials highlight the historical contributions of African Americans, women, and other often-overlooked groups. Our project supports the Trust's diversity, equity, and inclusion goals by identifying how well current website traffic reflects these audiences and whether key user groups, like students from underrepresented communities, are being effectively engaged.

Our data analysis approach helped assess whether the Trust's digital reach aligned with its goal of inclusive education, and where engagement might be improved to ensure broader, equitable access to historical content.

Project Purpose

The purpose of our capstone project was to help the Trust gain a deeper understanding of its digital audience through detailed web analytics. By examining traffic sources, content engagement, and device usage patterns, we aimed to uncover insights that could guide future web strategy, improve user experience, and help tailor content delivery to core audiences, especially students and educators.

Stakeholders and Impact

The project's primary stakeholders were members of the Trust's digital engagement team, including Larry Swiader (Chief Digital Officer) and Alexandra (Assistant on the digital team). These stakeholders were most interested in understanding how students and teachers interact with the website and how to increase long-term engagement and retention.

Secondary stakeholders include the site's end users, students, educators, families, and donors, who benefit from a better-optimized educational experience and more accessible historical content.

Research Direction and Evolution

A key insight that emerged from our early research was the importance of **Chrome OS** traffic as a proxy for K–12 student engagement. Because Chromebooks are widely used in school districts across the U.S., identifying sessions from Chrome OS devices allowed us to infer student usage trends without accessing restricted demographic data.

This led us to produce a city-level analysis of Chrome OS access rates, which revealed that while high traffic occurred in cities like Charlotte, cities like Fayetteville and Raleigh showed more meaningful engagement. This discovery helped direct later recommendations toward Chromebook-optimized content and localized outreach strategies.

We also monitored referral patterns from tools like ChatGPT, identifying a major spike in usage that coincided with the academic year, further supporting our hypothesis that students are a central audience segment and that AI-assisted research tools are increasingly influencing traffic sources.

Stakeholder Interview Summary

In discussions with Larry Swiader and Alexandra, we learned:

The **American Battlefield Trust (ABT)** is a nonprofit organization focused on preserving historic battlefields from the Revolutionary War, War of 1812, and the Civil War. In addition to land conservation, the Trust is deeply committed to **K–12 historical education**, offering resources through both in-person experiences at key sites such as **Gettysburg** and **Antietam**, as well as through a robust and content-rich **digital platform**.

ABT relies on several digital tools to understand and improve its outreach. Their team primarily uses **Google Analytics** to monitor web traffic patterns and user behavior, which served as the main data source for this project. Additional platforms used internally include **Crazy Egg** and **Semrush** for user interaction and performance monitoring, and **Sprout** for managing social media content and engagement.

During early stakeholder meetings, the Trust identified several key performance indicators (KPIs) that guided the direction of our analysis. These included:

- Increasing overall website traffic
- Improving average **session duration**
- Growing signups for the **Battlefield Bulletin**, the Trust's educational email newsletter

These goals helped shape our deliverables and informed our focus on user engagement, traffic sources, and educational alignment throughout the project.

Project Status and Midterm Findings

At the midpoint of the project, we conducted an initial round of exploratory analysis using Google Analytics data, which helped refine our direction. One standout finding was the consistent user interest in battle pages like Gettysburg and Antietam, which showed above-average session durations of around 2.5 minutes. This confirmed that content tied directly to the K–12 curriculum held long-term relevance for student users.

We also discovered that the site's **Search page** was the most common landing point, not the homepage. This was a subtle but important insight, it highlighted the need to view search functionality not just as a navigation tool, but as a front door for content discovery. Optimizing what appears in search results could have an outsized effect on user experience and engagement.

In addition, we noted a measurable volume of returning users even without a formal user account system, suggesting that some students or teachers were bookmarking and reusing ABT pages for assignments or lesson plans. While not the focus of our final deliverables, this hinted at a possible opportunity for future work involving account systems, resource bookmarking, or personalized content experiences. These midterm observations helped sharpen the scope of our final recommendations.

Chrome OS Engagement - Andrew Grzybowski

Chrome OS traffic is a strong indicator of student engagement, particularly within K–12 environments. This makes it a privacy-safe, scalable proxy for evaluating how well the American Battlefield Trust is reaching its core educational audience. Our rationale is supported by the following data:

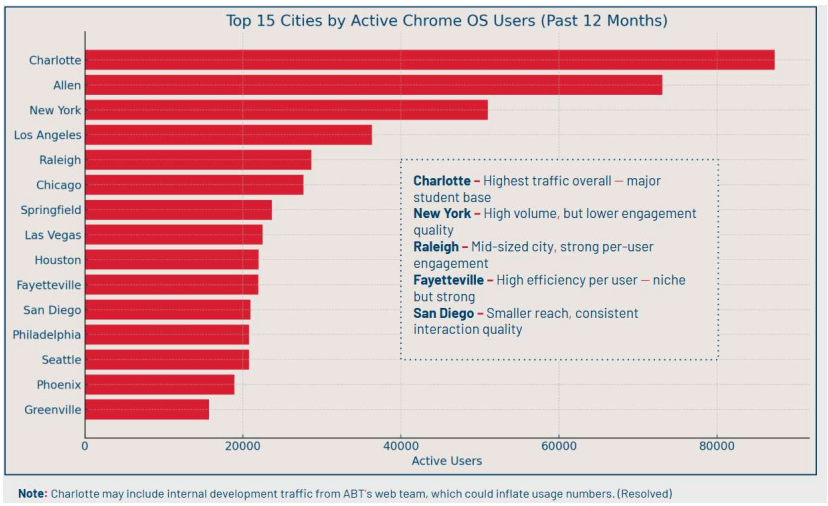
- **72% of Chromebook sales are to the education sector**
  Source: Computerworld, "ChromeOS 2023: Google has an eye on the enterprise too"
  https://www.computerworld.com/article/1620324/chromeos-2023-google-has-eye-on-enterprise.html
- **Over 50 million Chromebooks are in use in U.S. classrooms**
  Source: BuyBoard, "Chromebook expiration dates and how they are affecting school districts"
  https://www.buyboard.com/insights/chromebook-expiration-dates-and-how-they-are-affecting-school-districts
- **North America accounts for 53.8% of the global Chromebook market, driven largely by U.S. education**
  Source: Market Data Forecast, "Chromebook Market - Size, Share, Trends, COVID-19 Impact & Forecast (2024–2029)"
  https://www.marketdataforecast.com/market-reports/chromebook-market

Top Chrome OS Cities – Bar Chart

Description:

Highlights the top 15 U.S. cities with the highest number of active Chrome OS users from the past 12 months. Each bar represents the total number of unique Chrome OS users accessing the website from that city.

- Charlotte, NC, and Allen, TX had the highest traffic, exceeding 70,000 users each
- New York and Los Angeles followed, but with significantly lower engagement per user
- Mid-sized cities like Raleigh, Dallas, and Houston showed high volumes of student traffic



Note: Charlotte may include internal development traffic from ABT's web team, which could inflate usage numbers. (Resolved)

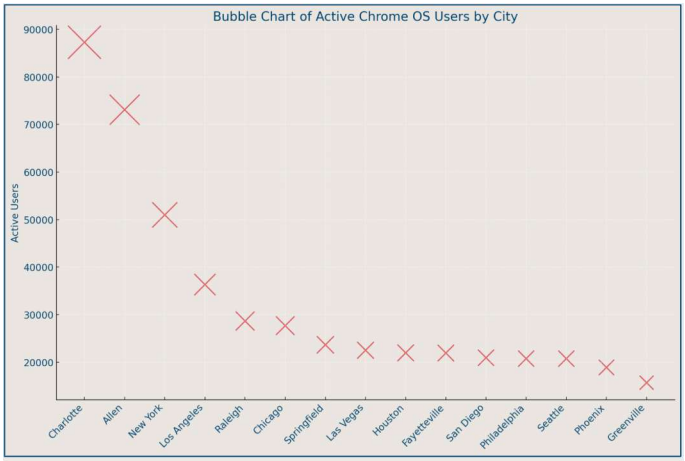
- Sharp drop-off after the top 5 suggests a few concentrated student markets dominate access

City-Level Comparison – Bubble Chart

Description:

This chart visualizes the number of active users per city as X marks. Larger marks represent higher user counts. It emphasizes relative traffic volume across regions.

- Charlotte and Allen visually dominate, confirming heavy student traffic
- A cluster of medium-sized bubbles (e.g., Raleigh, Indianapolis, San Diego) signals opportunity in cities with strong interest but less saturation
- This visualization supports targeting second-tier cities for outreach expansion



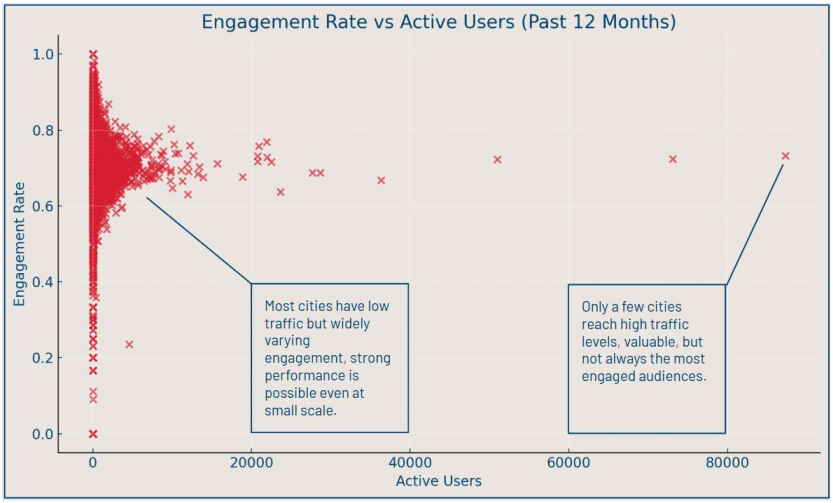
Note: This chart displays the same active user data as the previous bar graph but uses size and position to emphasize relative scale and the sharp traffic drop-off beyond the top cities.

Traffic vs. Engagement – Scatter Plot

Description:

This scatter plot compares each city's total active users to its average engagement rate. It helps determine where high traffic also means high-quality interaction.

- High-traffic cities like Charlotte and Allen only had average engagement
- Raleigh and Indianapolis, while smaller, had higher per-user interaction
- No direct correlation between traffic and engagement emphasizes quality over quantity

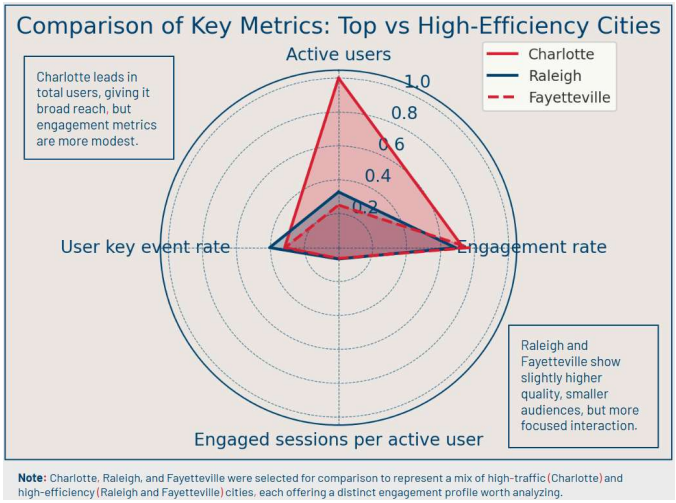


Engagement Radar – Chrome OS Metrics by City

Description:

This radar chart compares Charlotte, Raleigh, and Fayetteville across four key metrics. While Charlotte leads in total users, Raleigh and Fayetteville outperform in engagement quality, with higher session depth and key event rates. This shows that smaller cities can deliver more focused, impactful student interactions, making them valuable targets for outreach.

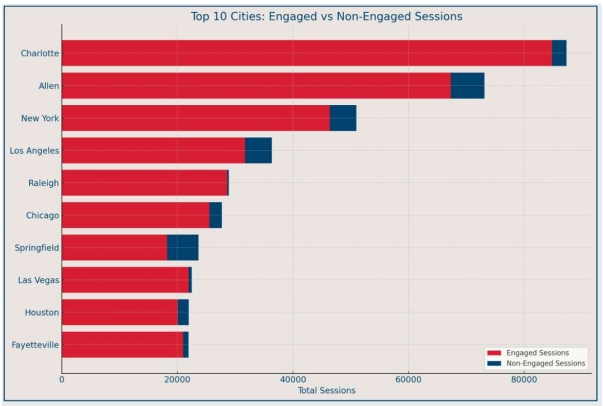
- Charlotte leads in total users but ranks lower on engagement quality
- Raleigh and Fayetteville show fewer users but outperform in session depth and meaningful interactions
- These cities offer high-value targets for impactful student outreach



Chrome OS - Additional Visuals

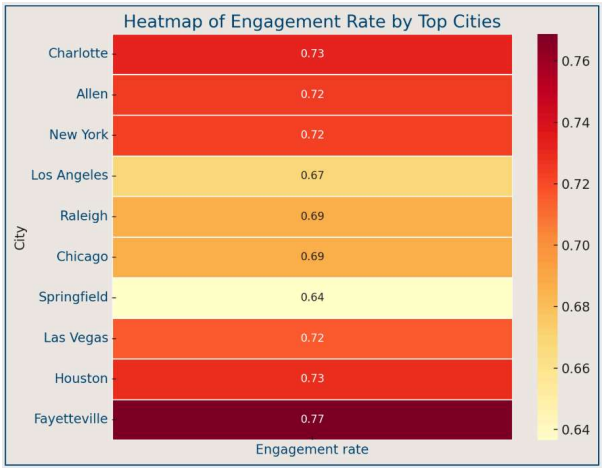
Stacked Bar Chart

This chart shows that while Charlotte and Allen have the most sessions overall, a portion of their traffic is non-engaged. Cities like Raleigh and Fayetteville have fewer sessions but a higher share of engaged users, making them strong targets for meaningful outreach.



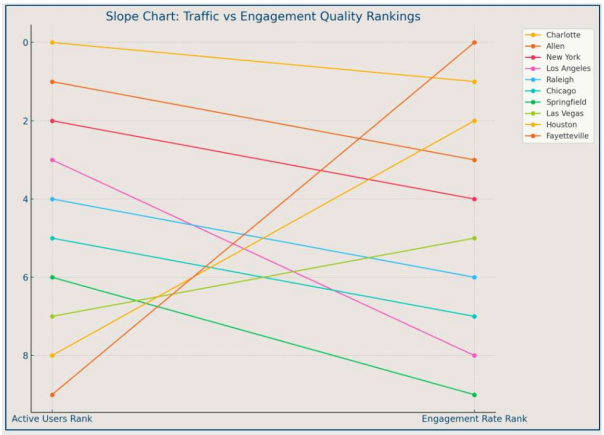
Heatmap

The heatmap shows engagement rates by city, how actively users interact with the site. Cities like Fayetteville, Charlotte, and Houston show higher engagement, suggesting deeper user interest. While traffic volume varies, this metric helps identify cities where visitors are more likely to explore content meaningfully.



Slope Chart

This chart compares each city's traffic rank to its engagement rank. Cities like Raleigh and Fayetteville move upward, showing strong engagement despite lower traffic. In contrast, large metros like Los Angeles and New York slope downward, reflecting high traffic but lower engagement.



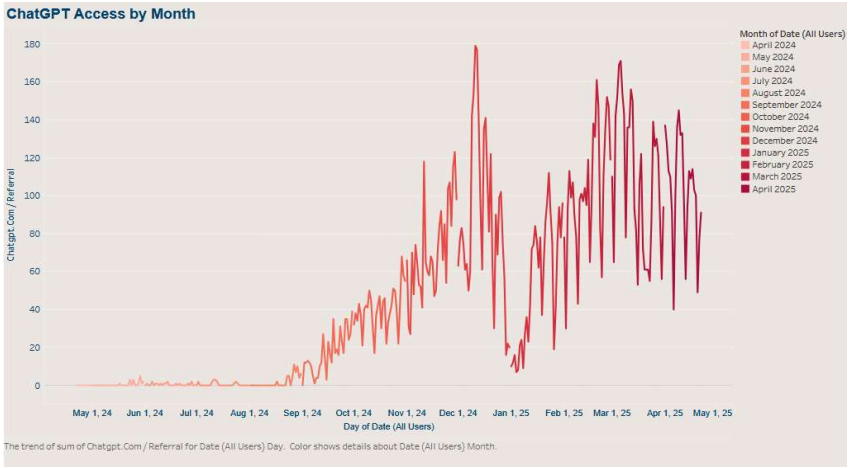
Methods Summary: Chrome OS Engagement Analysis

To generate these insights, on April 29, 2025, we extracted 12 months of Chrome OS user data from the American Battlefield Trust's Google Analytics dashboard. Chrome OS was selected as a proxy for student traffic, based on documented statistics showing that over 70 percent of Chromebooks are sold to the education sector and more than 50 million are currently deployed in U.S. classrooms. We aggregated metrics at the city level, focusing on four core indicators: total active users, average engagement rate, engaged sessions per user, and user key event rate. The resulting visualizations include a bar chart, bubble chart, scatter plot, stacked bar, slope chart, heatmap, and a radar-style city profile. These tools allowed us to cross-reference user volume with the depth of interaction. Cities were normalized for easier comparison across all metrics. We interpreted these visuals together to pinpoint outreach opportunities, especially in mid-sized, education-focused cities such as Raleigh, Fayetteville, and Indianapolis. Our approach combined traditional traffic analysis with geographic segmentation and behavioral cohort evaluation, creating a layered perspective of how and where student users engage most meaningfully with the site.

Conclusion & Strategic Takeaway

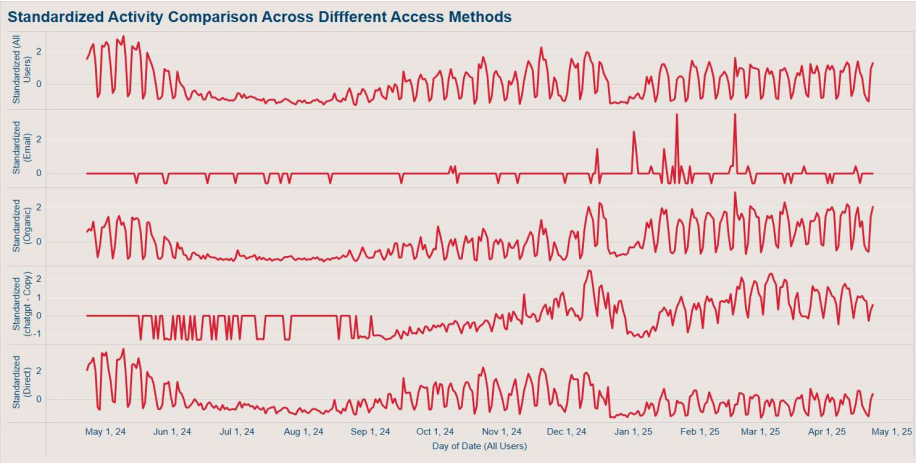
This segment of the analysis reveals that the American Battlefield Trust is already reaching a significant student audience through Chrome OS users. Cities like Charlotte provide scale and visibility, but mid-sized cities such as Raleigh and Fayetteville offer deeper engagement. By targeting high-engagement cities with Chromebook-friendly, educationally aligned content, ABT can extend its impact and strengthen its connection with younger learners.

ChatGPT Access Analysis - [redacted]

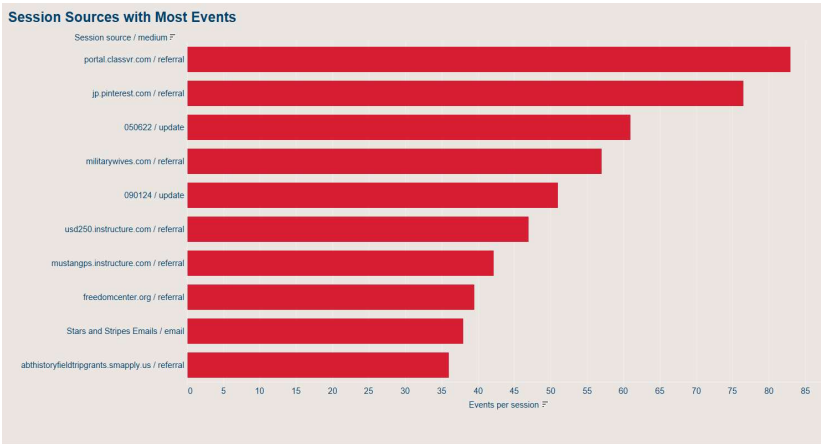


One part of the analytical data that was of particular interest to the American Battlefield Trust was the referral data from ChatGPT. In September of 2024, OpenAI began rolling out a web search feature to its flagship chatbot to allow it better access to correct information, in an effort to achieve more intelligent and more accurate answers. To measure the effect of this new feature, we extracted the daily count of ChatGPT referrals to the American Battlefield Trust's website from the past year and broke it down into a line graph progressing over that time period, which was broken down into months. As we can see in the graph below, the trend for ChatGPT referrals was initially near zero. However, when OpenAI began rolling out the new feature, we can see referrals from ChatGPT begin growing rapidly, spiking in December 2024 before falling

off precipitously for the month of January. The number of daily referrals grows again after the first few days of January, remaining at around 120 referrals per day for the rest of the time period measured. We will see this pattern reflected in later figures as well, as it shows us the general trend of usage for the American Battlefield Trust in general. The main takeaway from this graphic is that once OpenAI implemented its web search service, ChatGPT was often used by students for assignments and to answer questions.



To further explore these patterns, we standardized similar yearly data for all sesion sources, direct sessions, organic sessions, email sourced sessions and ChatGPT and compared them all on a single chart. In this graphic, we can observe the general pattern of access that the American Battlefield Trust's student audience has in its usage of the website. During the summer month, all user, direct and organic access bottoms out as each of them generally average a negative standardized score. Coming September and the beginning of the school year though, access grows to a peak in December before falling off sharply in January, before returning to a steady average for the rest of the year. This further reinforces our observation that much of the ABT's audience is students. On top of that, we can clearly see that ChatGPT falls into this pattern after its introduction in September, showing us that not only is ChatGPT a contributing factor to the site's traffic, its users are likely also students attempting to learn about American history. As such, optimizing the ABT website to work better with ChatGPT and other similar applications may be a good way to draw more users to the site through the application.



To gain some additional contest, we diverged from just examining the most common session sources to focus on which session sources created the most events on the ABT's website. The bar graph above shows us some interesting results - the website portal.classvr.com sits at the top of the list, with 83 total events over the past year. The American Battlefield Trust has a partnership with ClassVR, which can be attributed to why ClassVR has such a strong presence on the website. It also raises the potential of more VR and AR partnerships with the

American Battlefield Trust to further integrate real life experiences at famous American historical sites into the classroom. Alongside that, other historical websites that are associated with similar events as American battles are freedomcenter.org, which is also partnered with the American Battlefield Trust. The large number of events from that website shows potential in more partnerships with similar historical organizations to further the American Battlefield Trust's reach.

User Engagement and Retention - [redacted]

Overview:

For the American Battlefield Trust, where the mission is to educate and inspire rather than sell products, user engagement and retention are more than just performance metrics; they're signs of real impact. Every minute a visitor spends reading a historical article or exploring a battlefield map represents a meaningful moment of learning. Understanding how users interact with the site and whether they return, helps evaluate the effectiveness of the Trust's digital presence and outreach efforts.

In this section, we examined how users engage with the site and how often they come back. By analyzing engagement time, return behavior, and traffic sources, we identified what's working well and where there are opportunities to strengthen long-term user connections to the Trust's mission and values.

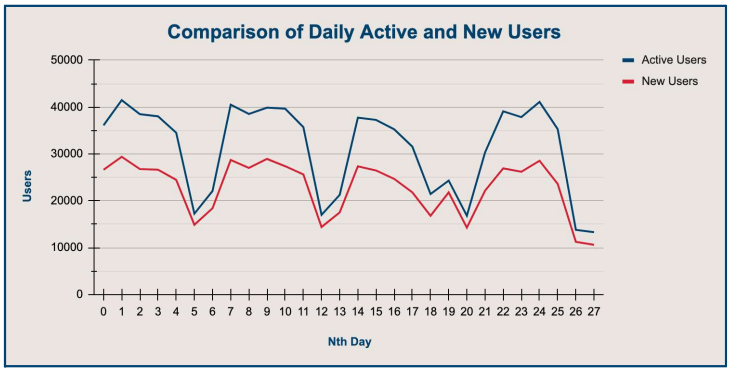
Key Findings at a Glance:

- Daily Active Users peaked April 1 & 24 (41,000+)
- High initial retention, but drops from Day 1 (~7%) to Day 7 (~2%)
- Content quality affects average engagement time (200–800+ sec)
- Suggestions: Exit prompts, quizzes, gamified badges, email follow-ups

Daily Active and New Users - Double Line Graph

Description:

This double line graph tracks daily active users and new users from March 31 to April 27, providing a snapshot of overall site activity.



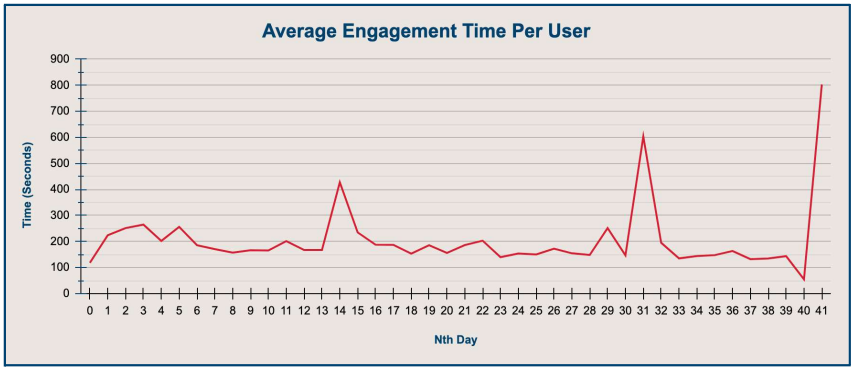
- Active users remained steady, hovering between 35,000 and 41,000 daily. Peaks on April 1 and April 24 exceeded 41,000; likely driven by targeted campaigns, social media pushes or timely content releases
- New users ranged from 10,622 to 29,397 per day, showing strong discovery and outreach.

The Trust consistently attracts a high volume of both returning and new users; an impressive achievement for a nonprofit educational content site. These peaks are opportunities to investigate what drove the traffic and replicate successful strategies moving forward.

Engagement Time by User Cohort - Line Graph

Description:

This line graph shows the average engagement time per user, grouped by cohort—users who first visited the site on the same day—over a 41-day period.

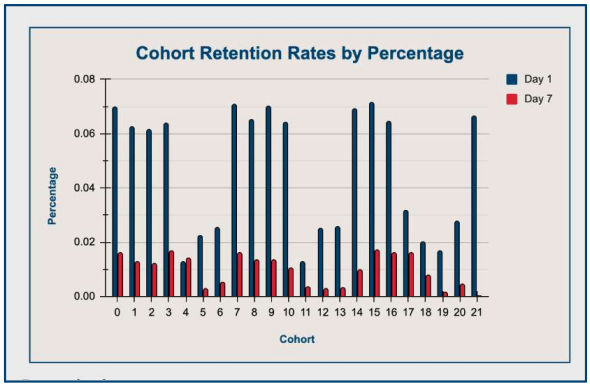


- Most user cohorts stayed on the site between 150-200 seconds (about 2.5 to 4 minutes).
- Several outliers stood out with much longer sessions, surpassing 400 seconds, and one cohort reached a remarkable 803 seconds (over 13 minutes).

Some content is clearly striking a chord with your audience. By identifying what those high-engagement cohorts experienced, the Trust can promote that content more broadly and guide other users toward similarly impactful experiences.

Retention Trends by Cohort - Double Bar Graphs

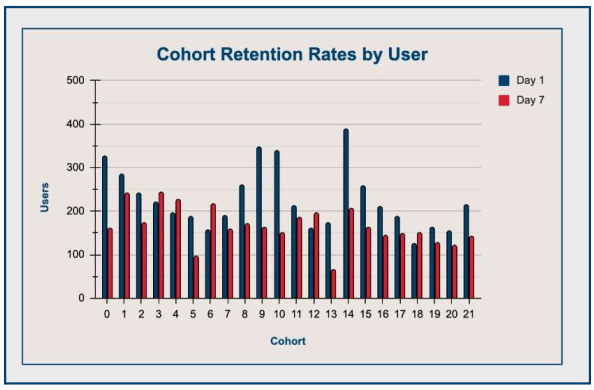
Description:



These double bar graphs display retention in two ways: the left shows the percentage of users who returned on Day 1 and Day 7, while the right shows the same data as actual user counts.

Findings:

- Day 1 retention was overall solid, ranging from 6-8% across cohorts.
- However, by Day 7, retention dropped sharply to 0-2%, with most cohorts seeing a 50%-75% decline in returning users after the first visit.



While the Trust is doing well at bringing users back within the first 24 hours, long-term retention is limited. This drop-off points to a clear opportunity: with a more structured re-engagement plan, more users could be encouraged to return and explore deeper content.

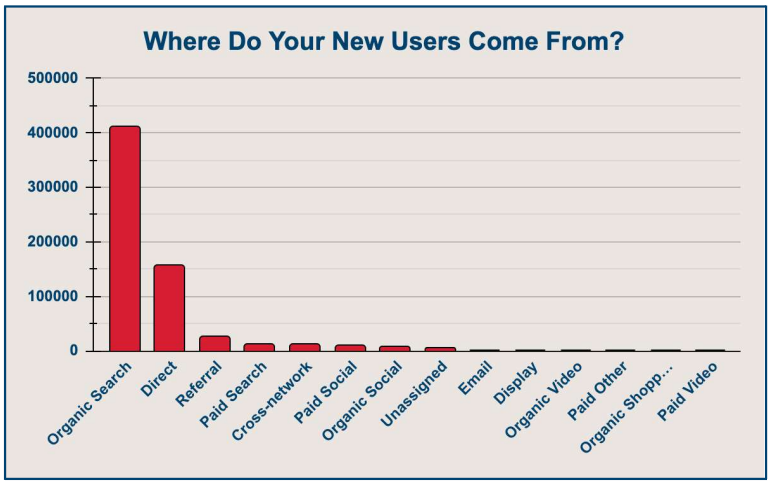
New User Acquisition by Channel - Bar Chart

Description:

This bar chart breaks down how users found the site during this time period.

Findings:

- Organic search led by a wide margin, accounting for 410,181 new users.
- Direct traffic followed with 157,087 users.
- Referral traffic brought in about 26,672 users, and Paid Search another 12,089.



Search engine optimization (SEO) is performing exceptionally well, and brand recognition is strong. However, reliance on search means it's essential to enhance those entry points. Many users likely land on deep content pages, and ensuring those pages encourage further exploration or signups is critical for booting overall retention.

Methods Summary: User Engagement and Retention Analysis

To evaluate user engagement and retention on the American Battlefield Trust's website, we used Google Analytics data collected between March 17 and April 27, 2025.

Key Metrics Included:

- Daily Active Users and New Users to measure overall traffic volume.
- Average Engagement Time per User, segmented by user cohorts, to assess content effectiveness.
- Day 1 and Day 7 Retention Rates to understand user return behavior over time.
- Traffic source Analysis to examine how users arrived at the site and which channels yielded the most return visits.

Conclusion

User engagement and retention are essential indicators of how well the American Battlefield Trust is fulfilling its mission to educate and inspire. While the site consistently draws high quality traffic, retention tends to drop steeply after the first day, a common challenge for content-driven platforms.

Strategic Takeaways

Capitalize on Peak Traffic Days: Investigate what contributed to high-traffic days like April 1 and April 24 and look for ways to replicate those success factors (e.g., email campaigns, social pushes, timely content releases).

Boost Content Stickiness: Many users land directly on deeper content pages. Adding exit prompts, related content suggestions, or calls to action can help guide visitors to explore more of the site.

Incentivize Repeat Visits: Consider interactive features like quizzes, gamified badges for returning visitors, or user follow-ups tied to content themes to re-engage first-time visitors

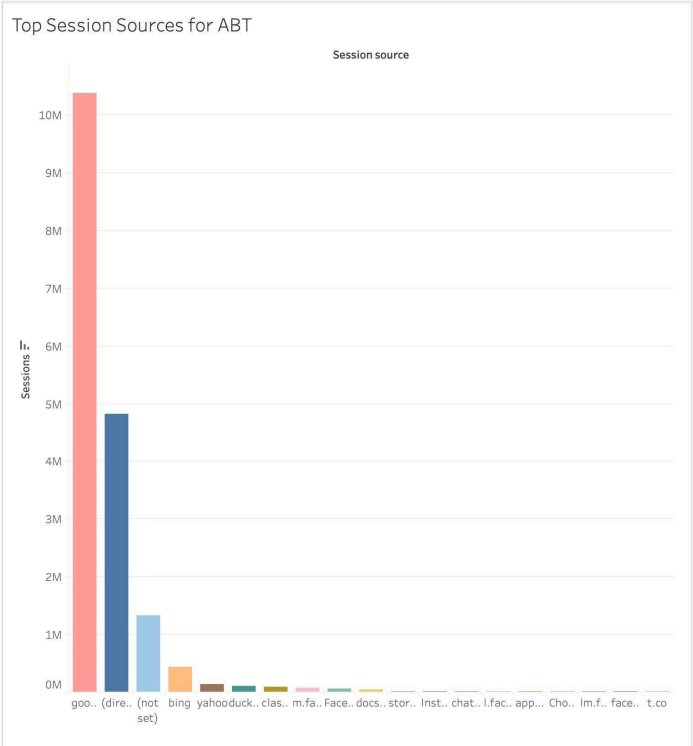
Refine Outreach Channels: Evaluate which traffic sources lead to higher retention and focus outreach efforts on the channels that bring in not just the most users, but the most returning users.

By prioritizing these strategies, the Trust can not only grow its audience but deepen its impact, transforming one-time visitors into lifelong learners and supporters.

Traffic Source Analysis - [redacted]

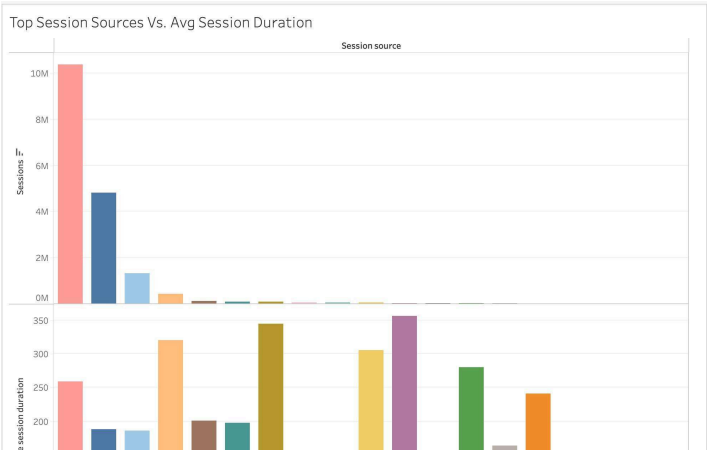
Method

One part of the data analysis that was especially important to the American Battlefield Trust was understanding which referral sources brought the most traffic to the website and how those sources contributed to user engagement. To measure this, we extracted Google Analytics data spanning from April 2024 to April 2025. Using the “Traffic Acquisition,” “Session Source,” and “Page Path and Screens” reports, we cleaned and organized the data before visualizing it in Tableau. These visualizations helped us identify trends in where users were coming from and how long they stayed, providing key insights into which channels (e.g., direct, search, classroom tools) could be prioritized for future outreach and investment.



Web Traffic Visualizations

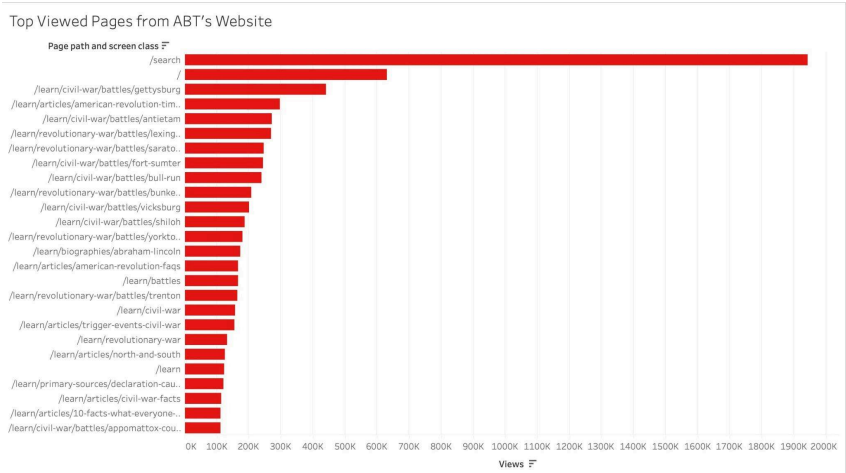
The chart to the left, shows the top 20 session sources for American Battlefield Trust. These sources are what brought the most users to the website. Out of the thousands of sources that brought people to ABT’s website, the top most used source was Google with more than 10 million sessions brought in over the course of a year. Other top sources include Facebook, Google Classroom, Instagram, and other applications used for school. It is good to note that the sources that look minimal compared to Google and direct are still performing very well with at least 10,000 sources being brought to the site.



To get a better look at these sources and the quality of sessions that come from these sources, we made another graph to the left that takes a look at the top session sources and the average session duration of each of these

sources. Using the same dataset as the first graph, we can see what sources brought in the longest session durations which was a key performance indicator for American Battlefield Trust.

From this graph, we can see how the session durations compare across the sources with the time of the sessions in seconds. We can see that even though Google brought in the most sources, it did not have the longest session duration out of the top sources. Top session durations come from storymaps.com, Google Classroom, Bing search, and Google Docs which are averaging above 300 seconds for session duration. We can also see good session durations for social media like Facebook and Instagram. Looking at this graph, this reinforces the fact that ABT is doing very well in terms of bringing students to their site and keeping them engaged for longer periods compared to other sources.



Most Viewed Pages Visualizations

We also wanted to look at the most viewed pages and screens for ABT's website to see where most users are going when landing on the site. Provided by the graph below, we took data from the "Page Path and Screens" dataset and put the top 25 most viewed pages in a horizontal bar graph that shows pages with at least 100,000 views per page.

At first glance, we can see that the most viewed page for American Battlefield Trust is their search page. During the early stages of development for our project, our client told us that they recently updated their search page so it would become more useful for their users and that is seen here in this graph. With the search page receiving close to 200,000 views, it is the only page with that amount of views and no other page comes close. This reinforces the fact that their search page is very useful and brings many users to the site and helps them get to where they need to go. We can also see that many of their pages for battles are doing very well, such as the battles of Gettysburg, Antietam, and Lexington all getting around 200,000 views or more. Among the top 3 pages, we can see the "/" page representing their home page is doing well and can assume that the home page is the main landing page when users come to their site.

Conclusion

After looking at all three visualizations, we can see that targeting students have been helpful in bringing more viewership to the site and have helped users stay on the site longer than other sources. We can also see how much social media web traffic has brought to the site as well, bringing in a good amount of users to the site. Targeting and putting in more marketing into social media could bring in as many users or more than schools and school applications.

Looking at the pages and screens section, the most important pages are doing very well with these pages getting 100,00 views or more. The advertisement of certain pages on search engines and social media could bring in more views.

Final Insights and Recommendations

Action	Why It Works
Create Chromebook-friendly digital resources (lightweight, fast-loading, Google-integrated)	Students are using school-issued devices with limited power and strict software access.
Develop city-specific educational campaigns for high-traffic Chrome OS cities (like **Charlotte** and **Allen**)	Focuses attention where student activity is already strong.
Partner with mid-size school districts in cities like **Raleigh, Fayetteville, and San Diego**	These areas show strong student use and engagement but often face less competition for outreach.
Host virtual battlefield tours tailored for schools	Ties directly into the Trust's educational mission while maximizing reach through accessible devices.
Continue monitoring device-level engagement trends	Chrome OS usage is a strong signal of where and how students interact with your content.
Optimize for ChatGPT searches	ChatGPT has seen a huge spike in usage in recent years, and optimization will draw in more traffic from that direction.
Create experiences to attract students to sign up for the newsletter	Events to promote the newsletter will encourage interest in signups and continued interaction.
Continue optimizing the website for students	Students remain the highest demographic present.
Partner with other history-oriented organizations and websites for more traffic	Lots of access activity and events are sourced from other websites - this could drive more events.

Promote more VR and AR-based experiences	Already a large success with classvr, more will expand the ABT's educational experiences.
Introduce a Return & Learn Email Series	Retention drops by Day 7. A follow-up email series keeps users connected and learning, increasing their likelihood of return.
Highlight the Most Engaging Pages via Smart Banners or Pop-ups	Your engagement time data reveals standout content. Promoting these pages helps guide new users toward proven, sticky experiences.
Offer Membership Badges for Returning Users	Light gamification (e.g., badges or progress) encourages repeat visits and exploration, boosting loyalty over time.
Use Exit-Intent Prompts with Historical Quizzes or Freebies	Converts one-and-done users by offering something fun or valuable before they leave, especially effective for first-timers.
Create a Start Your Journey Hub for New Visitors	Helps orient users, especially those arriving via search or direct links. A curated experience increases the odds of continued engagement.
Optimize Landing Pages for Organic Visitors with Clear Next Steps	Since Organic Search is the top acquisition source, ensure landing pages guide users toward signup, related content, or return pathways, turning discovery into deeper engagement.
Invest more in social media pages.	There is already strong web traffic coming from social media. Investing more on social media through more activity and ads could bring in many more users to the site.
Invest more into search from search engines.	Most users are coming from search engines like Google and Bing. Putting ABT's website on the top of the searches can increase user traffic coming onto the site and increase the amount of time spent on site as well.

Feature high-visited pages more often on the site.	Once users are on the site and are reading through the page, they can see other highly visited pages that feature other battles to keep the user engaged more. This can be done through the use of the right rail of the website.
Increased ads and referral links across top performing sources.	This can lead to more users seeing your website through paid ads across social media and other sites that have ads. These can be used to promote pages that fit a person's search or promote the website itself to expand the reach of people who visit your site.

Where to Go From Here

Cross-analyze Chrome OS usage with cohort and engagement data

Now that Chrome OS has been established as a reliable proxy for student users, future research should cross-reference this data with deeper cohort analysis and engagement metrics. By understanding how Chrome OS users behave over time—such as whether they return, complete educational actions, or explore multiple resources—ABT can more precisely tailor its outreach to improve long-term student retention and learning impact.

Refine audience segments and develop content for each

The current analysis shows clear variation in how users from different cities and sources interact with the site. ABT could benefit from refining audience segments based on geography, device type, engagement quality, and referral source. Creating modular content (e.g., virtual tours, worksheets, or themed timelines) tailored to these segments—such as high-engagement cities or first-time mobile users—would allow for more personalized and impactful educational experiences.

Use exit-intent pop-ups to capture one-time visitors

With many users bouncing after a single session, ABT should consider implementing light, non-intrusive exit-intent pop-ups. These can invite users to sign up for the Battlefield Bulletin, complete a short survey, or bookmark resources for later. Even modest adoption could yield large improvements in newsletter growth or future return visits.

Expand on ClassVR success with more immersive tools

The unexpected volume of referrals from ClassVR suggests strong demand for immersive, educational content. Building on this, ABT could explore additional VR/AR partnerships or develop 360-degree battlefield experiences accessible via Chromebooks or mobile devices. This approach aligns well with their mission and modern classroom trends, offering students a deeper connection to historical learning.

A/B test engagement strategies (CTAs, surveys, banners)

To improve session duration and reduce bounce rates, ABT should run structured A/B tests on key landing pages. Variants might include different headlines, call-to-action button placements, interactive banners, or embedded quizzes. Testing these elements can reveal what resonates best with student users and help the Trust refine its content design for higher engagement across priority audiences.

Deliverables Checklist:

American Battlefield Trust - Web Analytics

Final Report

- Complete write-up of project background, methods, insights, visuals, recommendations, and future steps.

Final Presentation - ABT Analytics

- Summary slide deck presented to the American Battlefield Trust. Includes key findings, visual highlights, and strategic recommendations.

User Engagement & Retention Visuals

- Graphs and charts showing cohort retention, daily active users, and average session durations.

. **ChatGPT and Session Events Visuals**

- Visualizations related to ChatGPT referral traffic, seasonality patterns, and search-driven behaviors.

Chrome OS Visuals

- Includes bar charts, bubble charts, heatmaps, radar plots, and slope charts.
- Focuses on city-level student traffic and engagement patterns via Chrome OS devices.

Web Traffic Visuals

- Visuals covering traffic source breakdowns, top referral sites, and platform usage insights.

ABT_Data

- Google Analytics exports and supporting data sheets used to generate visualizations.

Final Meeting Recordings

- Zoom recordings and client meeting audio files for documentation and follow-up.

Report Drafts

- Iterative versions of the report throughout the semester.

README

- Project summary, folder structure guide, and document navigation notes.

Contact Information

[redacted]

[redacted]

Andrew Grzybowski (Project Manager): AndrewGrzybowskii@gmail.com

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