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Virtual Rebel Website: A Strategy to Increase User Engagement through Bounce Rate Analysis

Michael Vendivel

University of Nevada, Las Vegas, vendivel@gmail.com

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VIRTUAL REBEL WEBSITE:
A STRATEGY TO INCREASE USER ENGAGEMENT
THROUGH BOUNCE RATE ANALYSIS

By

Michael Vendivel

Bachelor of Arts in Art; Concentration in Graphic Design
University of Nevada, Las Vegas
2008

A thesis submitted in partial fulfillment
Of the requirements for the

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Hank Greenspun School of Journalism and Media Studies
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Gregory Borchard, Ph.D., Committee Chair

Jillian Kilker, Ph.D., Committee Member

Gary Larson, Ph.D., Committee Member

Sand-Duck Seo, Ph.D., Graduate College Representative

Kathryn Hausbeck Korgan, Ph.D., Interim Dean of the Graduate College

May 2014

ABSTRACT

Virtual Rebel Website:

A Strategy to Increase User-Engagement through Bounce Rate Analysis

by Michael Vendivel
Dr. Gregory Borchard, Committee Chair
Associate Professor of Journalism and Media Studies
University of Nevada, Las Vegas

In a media environment that increasingly demands captivating content on a website, user engagement becomes a critical factor in the strategy of maintaining user interest. Research based on website analytics has shown that decreasing the Bounce Rate increased the time a web user spends on a website, entailing higher user engagement. Bounce Rate is the ratio of single-page visits on a website divided by the total number of visits, and it is used primarily used to quantify user interest. By examining the analytics and design of the student-run news site *Virtual Rebel*, produced by the Hank Greenspun School of Journalism and Media Studies at the University of Nevada, Las Vegas, this non-traditional thesis prospectus suggests a strategy to improve the communication of information, by developing methods to lessen the Bounce Rate and effectively increase user engagement. The purpose of this project also seeks to future-proof *Virtual Rebel's* content for subsequent users so that damage from media disruption is mitigated. Research had guided this strategy to apply an iterative process of analysis and modifications to various areas on the website. The areas of concentration were information architecture, graphic design, and media convergence. Through the process of adjusting these areas and analyzing Bounce Rate, *Virtual Rebel's* site owners were able to identify problems and find improvements, such that users were more engaged within the site. By increasing users' engagement on the website, the Bounce Rate was inherently lowered.

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PREFACE

I chose to do a non-traditional thesis on *Virtual Rebel* focusing on the idea that there are many aspects about websites that can be improved through various methods. The online medium is a complex system and there is no such thing as a unified fix to improve readership numbers or to create satisfied users. This strategy used Google Analytics' Bounce Rate key performance indicator to give clues about what parts of *Virtual Rebel* needed improvement. Google Analytics is one of the many web analytics solutions to choose from, but the service offered a robust set of features with reliable page tracking and carried a free price tag. As discussed later, Bounce Rate was indicative of a user's engagement. My ambition for this non-traditional thesis was to provide a strategy for *Virtual Rebel* to increase user engagement through Bounce Rate analysis, thus resulting in more readership numbers. I would also encourage other institutions to follow this strategy, if gaining more readers aligns with their goals.

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CHAPTER ONE

INTRODUCTION

Many organizations track their visitor usage with various web analytics programs. These data tracking programs give site owners different aspects of their web data and because keeping visitors on a site is arguably a shared goal among many, organizations need to know how many people are clicking deeper into a site or are return visitors. This specific engagement of the user is tracked through a performance indicator within a web analytics program known as the Bounce Rate. Bounce Rate within a web analytics program is a term that describes a user's engagement within a web page. A low Bounce Rate indicates that more users are engaged, exploring more content, and clicking deeper into the site, thereby increasing user engagement that will effectively decrease the Bounce Rate.

Creating a rich experience involves a multitude of areas within the website, but the primary goal in doing so is to engage the reader such that their experience is pleasing and they are persuaded to click deeper into the site, thus lowering the Bounce Rate. To achieve this goal, website owners must take extra steps when delivering content to users. Measuring visitor usage with a Bounce Rate analysis is crucial because it can provide valuable feedback to organizations that wish to engage their users in their content. This non-traditional thesis seeks to ascertain areas of improvement through Bounce Rate analysis that determine a user's interest level and then to implement adjustments to increase user engagement.

The student-news generated website *Virtual Rebel* (virtual-rebel.com) inherits this same goal. Engaging its readers will highlight content created by student journalists while promoting the Hank Greenspun of Journalism and Media Studies program (JMS School). By using the Bounce Rate as a performance measurement on *Virtual Rebel's* visitor data, strategies are created to effectively promote the website such that user engagement is increased, student work is highlighted, and the scholarly objectives of the JMS School are underscored, thus benefitting all stakeholders involved.

Up until the maturation of website analytics, a misconceived notion held that user visitation to a website was an accurate representation of user interest. Many users under this model would have noticed that websites in the past included a visitor counter somewhere on the page that signified how many users had passed through that domain. These counters would come in all shapes and forms, from basic text to something stylistic that resembled an odometer or digital clock. The measurements that were displayed on these counters represented a number of total visits. Webmasters had the option to hide these counters, but while this was an accurate count of how many *users* visited the site, it was highly inaccurate to measure anything more insightful.

The primary disadvantage of using these counters presented webmasters with the problem that there was not enough information to glean from in order to identify issues within the site. Therefore, owners could not improve the experience for the end-user. Another disadvantage was its intrinsic value in that every visit was recorded. This meant that all search engine robots, also known as web crawlers, were being recorded as a visit. Web crawlers caused inaccuracies in the counter if a website owner wanted to use this number to represent actual users. In response to the many disadvantages of basic

analytics, software developers started to create solutions to solve these issues. Through this effort, a software package called Urchin was one of the many solutions that were developed during this time to provide a mature analytics solution.

In 2005, Google had acquired Urchin through the purchase of its parent company, Urchin Software Corporation (Google, 2005), which consequently led to a rebrand and renaming to Google Analytics. Through significant analysis of data being recorded through Google Analytics, patterns had emerged and were programmed into the software to represent key areas of interest, called Key Performance Indicators (KPI). According to the Digital Analytics Association, there are three classes of analytics measurement: counts; ratio; Key Performance Indicators (KPI) (Fagan, 2013). Since Bounce Rate was the focus of this study and it was labeled as a KPI, a discussion about KPIs is due.

Key Performance Indicators represent meaningful data that inform webmasters on how to refine or enhance areas of the website, which was a vast improvement over its counter predecessor. Measuring by a KPI can be helpful as this helps align performance strategies of gaining more visits and loyal readers to the site and many analytics programs provide KPIs. Due to the ease of use, as well as being a software service that is free of cost, *Virtual Rebel* has chosen Google Analytics.

As previous research has shown, Google Analytics could be seen as a valuable tool to inform decisions based on the garnered data, but it should not be utilized as just a tool for generic usage. Daniel Waisberg and Avinash Kaushik, leading experts in the field of website analytics, stated that software like Google Analytics should be utilized as an *iterative process*. A process whereby organizations make changes to their website based on the data they retrieve from analytics programs, then measure the performance of these

changes by using a KPI (Waisberg & Kaushik, 2009). Measuring a KPI over time allowed for patterns to emerge, but Waisberg and Kaushik revealed that acquiring visitors (total visitors KPI) was only the start of a strategic campaign to keep visitors interested in the content on the site (Wasiberg & Kaushik, 2009).

Virtual Rebel (VR), the online news site that features student-generated work had a similar problem of tracking users. Its commitment was to publish student work online and spotlight the JMS School program (Muldrew, 2013). A secondary goal for VR was to gain more visitors and loyal readers. However, before the redesign, VR was not using analytics to record data about visitors or usage. Aligned with Waisberg and Kaushik's position, VR was not able to convert users into loyal readers, nor was it able to improve areas that needed it due to this inadequacy.

Virtual Rebel's usage of Google Analytics was to analyze key areas and identify problems based on patterns within a given timeframe that exist within the site. The most effective KPI that accomodated VR's goal was Bounce Rate. Because Bounce Rate measures a user's interest on the site or page, this KPI was an advantageous meter to VR as it revealed that visitors are clicking deeper into the site on an initial visit. Through an iterative analysis of the Bounce Rate, VR gained insight about users and it provided cues for improvement.

The broad inherent features of online media allow users to enjoy the benefits of having a constant flow of information with greater efficiency. Users can access news instantly at any time of the day and anywhere they are connected to the Internet. By either visiting the news organization's website or by performing a search on a search engine, readers have access to news from unlimited sources. However, with such broad

powers a user has to access content, content owners must respect the amount of power a user retains by having the capacity to effectively “change the channel.” A user has potential to leave the site if content is disorganized, deficient, or if the experience is uninteresting or bad. Furthermore, a user that leaves the site based on those criteria might not come back to the site if the experience is bad enough. With loyal users being the most important and valuable demographic on a site and because it is impossible to reveal what kind of visitors they will be at an initial visitation, it is crucial for news organizations to create online content that delivers a rich experience that is engaging to every user on every visit (Nielsen, 2008).

Background

Online Media as a Content Publishing Platform

By the early 1990s, public Internet adoption grew 100% per year. During the years of 1995 and 1996, the number of users grew by 1,000% (Coffman & Odlyzko, 1999). These unprecedented numbers in growth had attracted many innovators with reasons of their own to develop technology and software on top of the already ubiquitous Internet. Predicated on the ability to communicate data better than its technological predecessors and with such a broad user base, businesses found the Internet to be another valuable channel to reach customers.

By the late 1990s, information produced on the Internet had grown tremendously, which gave rise to technologies built by companies for the need to search and organize data (All about Market Research, 2013). Companies like Yahoo and Google were among the list of many companies that were successful in providing this type of service.

Consequently, the development of Content Management Systems (CMS) saw a steep rise after search engines matured. Content Management Systems were designed to give organizations an improved workflow in producing content onto the web (Maass & Kowatsch, 2012, p. 6). Conceivably, the marriage between publishing content under simplistic CMSs and a sophisticated service to organize information was arguably a significant milestone for content owners and the web. Among the vast list of CMSs that were developed, WordPress has been the dominant CMS choice, achieving a 40.42% of all CMS installations on the web (BuiltWith, 2013). Sites such as Quartz, a global business news site, The New York Times Company, and CNN Politics Tracker are all WordPress driven (WordPress, 2013). *Virtual Rebel* chose to adopt WordPress as its publishing platform because of its extensibility and popularity, including the ease of use and powerful management capabilities.

WordPress

WordPress is open-source software that runs as a service provided by wordpress.com or on a custom web server. It provides a platform by which users or organizations can create, edit, and publish content online. WordPress is extendable by software packages (plugins), which work in unison with the CMS to provide more functionality with little effort. Other alternative CMSs like Drupal or Expression Engine offer similar functionality as WordPress, but while these other options have their individual strengths as a publishing platform, WordPress' extensive list of features apply more directly to publishing content online.

Intuitive control, user management, web standard source code, and search friendly formatted content are some of the strengths that WordPress provides inherently. One chief feature that WordPress offers is the ability to use plugins built by developers around the world. Plugins give more power and functionality to WordPress and they are designed for simple installations, which is appealing to organizations that do not want to worry about the complexities of software nuances. It is unclear if the popularity of WordPress had resulted in a large community to build these plugins or vice-versa, but there is an apparent global support for the CMS and its plugin development (WordPress, 2013).

Virtual Rebel

Virtual Rebel is an online news resource that features journalistic work by students attending the University of Nevada, Las Vegas (UNLV) in the JMS School. *Virtual Rebel* was designed to give students a platform by which their work is highlighted during their program. According to the website, “A majority of the content on *Virtual Rebel* comes from feature stories, broadcast segments, photojournalism galleries, and other news-related work by JMS students, completed both inside of class and independently” (Virtual Rebel, 2013). In 2008, the first news post of the *East Paradise* website was published. By November 2013, *East Paradise* (now *Virtual Rebel*) had published almost 1,000 stories and reached almost 600 “Likes” on Facebook.

East Paradise (EP) was first established to focus on civic-journalism where news stories were posted from news generated by the community, namely near Paradise Road (Sansom, 2012). Encompassing a broad radius, EP’s ambition to post up-to-date information and news fielded stories from all over the community. Stories that were “not

usually covered by mainstream media outlets” (Tatum, 2011), were the familiar kind that had been posted to EP.

Early 2012 saw a transition when *East Paradise* wanted more exposure and declared a change of direction in the types of stories posted. The new direction was to place more focus on the JMS program and the resulting efforts of students, so that the work they generated could be published. Arguably, this switch in focus could have been viewed as a boon in interest for EP, since getting work published was a common goal for journalism students in the program (Cretu, 2011). Consequently, with the new goal in mind and fresh direction, the emphasis was no longer on civic-based journalism on Paradise, but on student-generated stories, thus the *East Paradise* name change to *Virtual Rebel* was rightfully executed.

In the summer of 2012, VR conducted a complete redesign of their website. The redesign’s vision had adhered to VR’s mission in that students’ volunteered work were to be spotlighted, this time working with new media principles and innovative methods of delivery within the online medium. The ultimate goals for the redesign were to feature students and their work, develop an improved workflow posting stories, converge media (audio/video/photography), and boost their online presence.

In late 2012, approximately four months after the initial meeting, UNLV students had launched the redesigned *Virtual Rebel*, achieving the first two goals — implementation of student profiles and improved workflow of posting stories. Converged media options and improving overall visits to the site are still in the process of being completed. The latter being the focus of the strategy of this study, while the former (the first two goals) are the components within it.

My direct involvement with *Virtual Rebel* started during the summer of 2012 when its staff expressed their interest in a redesign. Because of my interest in new media and my extensive history in the technology field, more specifically web design, this was a great opportunity to help *Virtual Rebel* achieve to their goals for an improved online presence. *Virtual Rebel*'s ultimate goal to boost their online presence involved a multifaceted strategy. During the initial meeting to start the systematic transition from *East Paradise* to *Virtual Rebel*, we discussed the first steps of the process. We started by identifying existing publishing practices and then the needs for the website. In doing so, we identified ways to improve the process for posting content and create more efficiency. Subsequently, information from the meeting was gleaned to discern the wants from the needs and the needs from the essential business requirements. This type of hierarchy strategy has proven quite successful from previous projects I have done in the past.

Essential business requirements that VR had were mainly involved in the technical aspects of running the site. Discourse about the hosting the site concluded that VR should continue to be hosted on UNLV's servers. By doing so, this allowed for easier tweaking to source code or assets and for a more flexible server configuration. Using UNLV's servers also meant that VR hosted source files on their network. This was a benefit as this could provide a faster response time to getting content for users compared to other shared hosting options like GoDaddy. Having UNLV host VR was also cost-effective since comparable hosting could range up to hundreds of dollars a month.

Another mandatory business requirement was to implement a reliable publishing platform. *Virtual Rebel*'s requirement was to give staff and users a platform that could be used on the web through the desktop or through a mobile device. The software that would

run this publishing platform would require a painless update process to mitigate downtime for users. After gleaning the valuable information from this meeting, it was clear that VR should stick with their current platform, WordPress. The discussion of the previously stated requirements had segued into a conversation about the needs of the VR staff and their primary goals of the site.

Virtual Rebel's staff had expressed their primary needs to highlight student work done by the JMS School and to promote the school and the website itself was of the utmost importance. These two goals inherently support each other so furnishing a redesign on the WordPress platform to accommodate these goals was the proposed solution by the VR staff and the most logical. Part of VR's vision was also to be the primary place of news and information, to boost their social presence, and to unify the efforts in other JMS functions such as *Studio G* and *The Source*.

Virtual Rebel's notable *wants* included a social presence on Twitter and Facebook. They also wanted the site to be responsive so that it would be mobile friendly on an array of devices, such that anyone with a device or a computer can access VR's stories at any time in an aesthetic format that was favorable for the width of their screen. To extend their need of spotlighting student work, VR had also decided that having a student portfolio area would help attain that goal.

The meetings on the redesign had occurred monthly to discuss the progress. The initial meeting had reiterated VR's needs, as well as to identify the deliverables. Through this information, I produced three wireframe sets of the home page, category pages, and article pages. In the subsequent meeting, I had shown all three versions with explanations of each component and the final decision settled on a hybrid of those three. At the

following meeting, I had revealed the redesign in the form of static images, and after the approval, I began preparing to turn the design into a theme for WordPress. Accounting for all of VR's specific needs, this took some additional planning.

Wordpress' heavily documented theme section for custom designs was a bountiful resource to help the process from mockup to code. The site was programmed in a sequential fashion to mimic the hierarchy, starting with the home page, then the category template, single article template, and finally the student profile page. Each component that had made the cut at the initial redesign meeting was carefully examined to ensure that elements were being properly aligned, content was being displayed correctly, and the organization of the page flowed smoothly.

The last meeting before the launch in late-January, was the final review of the site. During this meeting, I demoed the site, touching on all of the wants, needs, and essential business requirements, which had been fulfilled. But with any major redesign, slight changes to the publishing process needed to be composed for the VR staff and to fulfill this need, I created a manual to the new publishing process that detailed posting instructions and media recommendations when creating or updating a news article.

Various adjustments to the site have been made since the launch of the redesign. A Spanish section was added with the help of a few students translating the content. The main navigation had combined a few categories together to make room for these new sections. The upcoming menu item titled *Studio G*, will feature video content produced by students in the JMS School under the banner of Studio G. There are plans for the future to create a custom experience for photography and the photojournalism students and a section for audio broadcasts, involving *91.5 The Source*.

Thematic Statement

Previous research has shown that the Bounce Rate of visitors was an effective measure of user interest (Sculley, et al., 2009). User's interest levels are dependent on various factors that involve persuading a visitor to click further into a website. The flexible and open online medium has proven that consumers were choosing it over other standard channels for their news consumption (Pew Research, 2012, p. 14), so with such an open platform it was often difficult for news organizations to maintain readership as users have plenty of alternatives from which to choose. By focusing on areas such as content organization, media convergence, and social media, a successful implementation of these elements lead to more visitors and more loyal readers.

Gaining loyal readership and keeping them interested is of the utmost importance for news organizations. Naturally, additional visitors and loyal readers can translate into a positive bottom line for organizations that are profit-based. But for non-profit entities such as the Virtual Rebel, reputation is on the line for quality content. The overarching intent of this non-traditional thesis was to provide a strategy to gain more readers by applying core principles of various disciplines to the content and its context with Bounce Rate as the key indicator.

Significance of Study

News organizations have adopted a content management system or some form of process to publish their content online. This workflow greatly improved the way they published online news content, but even with the most optimized of workflows, loyal

readership and constant flow of visitors to a website were not guaranteed (Waisberg & Kaushik, 2009). Keeping users interested is a unique challenge particularly on a medium where users wield enough power to choose alternatives, if alternatives offer interesting content and an engaging experience.

With web analytics and KPI measurements, site owners and organizations were more informed to make better decisions (Joly, 2012). The adage that implied, “data are not worth collecting if it does not offer any insight”, holds true to the analysis of the Bounce Rate KPI. The Bounce Rate was examined to identify potential problems or ‘interest’ drop-offs, to ultimately give users a more engaging experience.

Organizations must take advantage of the online platform by providing organized and interesting content that keep a user interested to click deeper into the website. This type of user engagement persuaded users to click deeper within the site, thus leading to more quality visitors (Nielsen, 2008). Quality visitors could essentially be generalized as users who are not considered a bounced visit and as discussed previously, a bounced visit is a user that immediately leaves the site after entering. Establishing the backdrop in that a lower Bounce Rate was an improvement within the site, lends itself to mean that content was more interesting and relevant to the user (Plaza, 2009). Virtual Rebel focused on the following key areas to have the greatest impact on user engagement.

Information Architecture (IA)

The organization of information is essential for websites to thrive. Content must be organized and presented in a meaningful way to give the user information of value (Shedroff, 1999). Designing information such that users gain value with content, requires

architecting of data that are legible and organized. Information Architecture was defined as a structural design that organizes or labels online materials and communities and is a discipline under the Usability field. Similar to an outline of scholarship, IA outlines a web site's pages, key areas, and functionality. Information Architecture was also designed to bring the combination of information and design principals to the digital world. (Information Architecture Institute, 2013).

According to Peter Morville and Louis Rosenfeld, leaders in the field, information architecture should be invisible to the user. The idea is to make information or content available easily and readily to a user. When elements on a page or the pages themselves are out of place or hard to find, users find themselves frustrated (Morville & Rosenfeld, 2006, p. 12). Organizations run the risk of losing a user's interest initially if they cannot access the article or cannot find for what they are looking. This runs counter to VR's goal for increased readership, therefore an emphasis on IA to reduce the Bounce Rate and increase user interest was applied.

Graphic Design Principles

Graphic design is an art of visual communication but it also has a functional purpose. Its purpose is to communicate a message through use of visual elements. American Institute of Graphic Arts states, "Design is an investment in innovative thinking, positioning, branding, and communication that creates value for businesses in terms of competitive advantage, customer trust and loyalty, and market share" (American Institute of Graphic Arts, 2013).

Previous research has stated that elements from graphic design better predicted a user's experience (Sherin, 2012) and enabled a prioritization of information for a user to process (Courtis, 2004). Additionally, another study found that the wayfinding theory was applied to web sites in an effort to persuade the user to click deeper into a site and effectively accomplish a task (Tan & Wei, 2006). Through the usage of graphic design fundamentals such as visual hierarchy, color theory, wayfinding theory, and semiotics, websites can take full advantage of the design "investment" and can be more persuasive towards their visitors as well as more successful in aesthetic appeal.

One theory related to graphic design that that integrated into this strategy was that all colors have a specific value to them. The value of a color is simply the degree of lightness or darkness relative to the composition and elements around it. Four black squares against a white background stand out more than four black squares against a gray background (Figure 1).

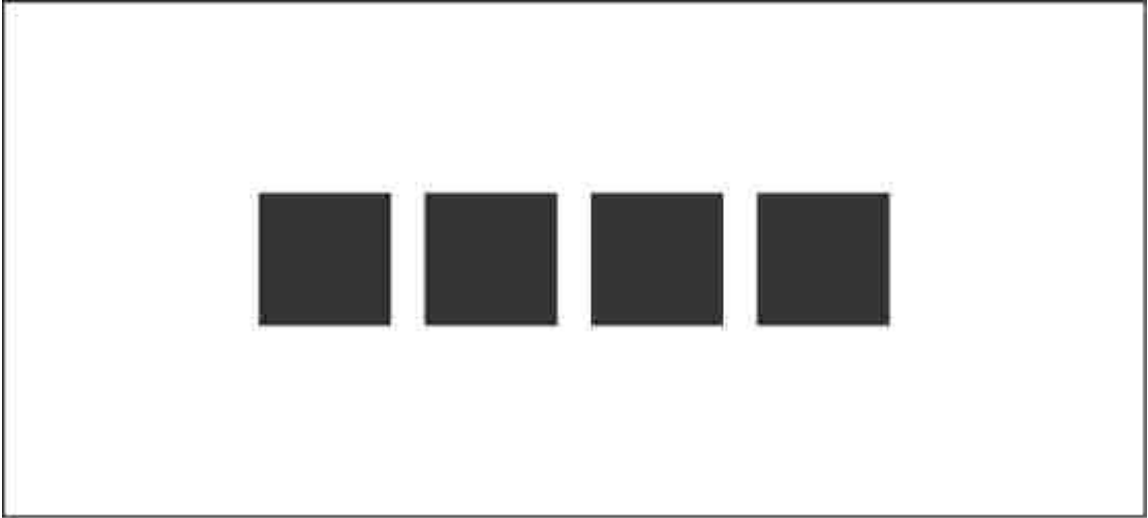


Figure 1. Color value comparison.

Color theory research had also exhibited that if one of those black squares was a different color (Figure 2), the eye would be drawn to it more than the other squares (Sherin, 2012, p. 14). To make things a bit more complex, color hierarchy implied that a difference in color from the monochromatic, lead the eye to the spot of contrast. The strategy applied these various graphic design theories and techniques to persuade the user into clicking deeper into the VR website.

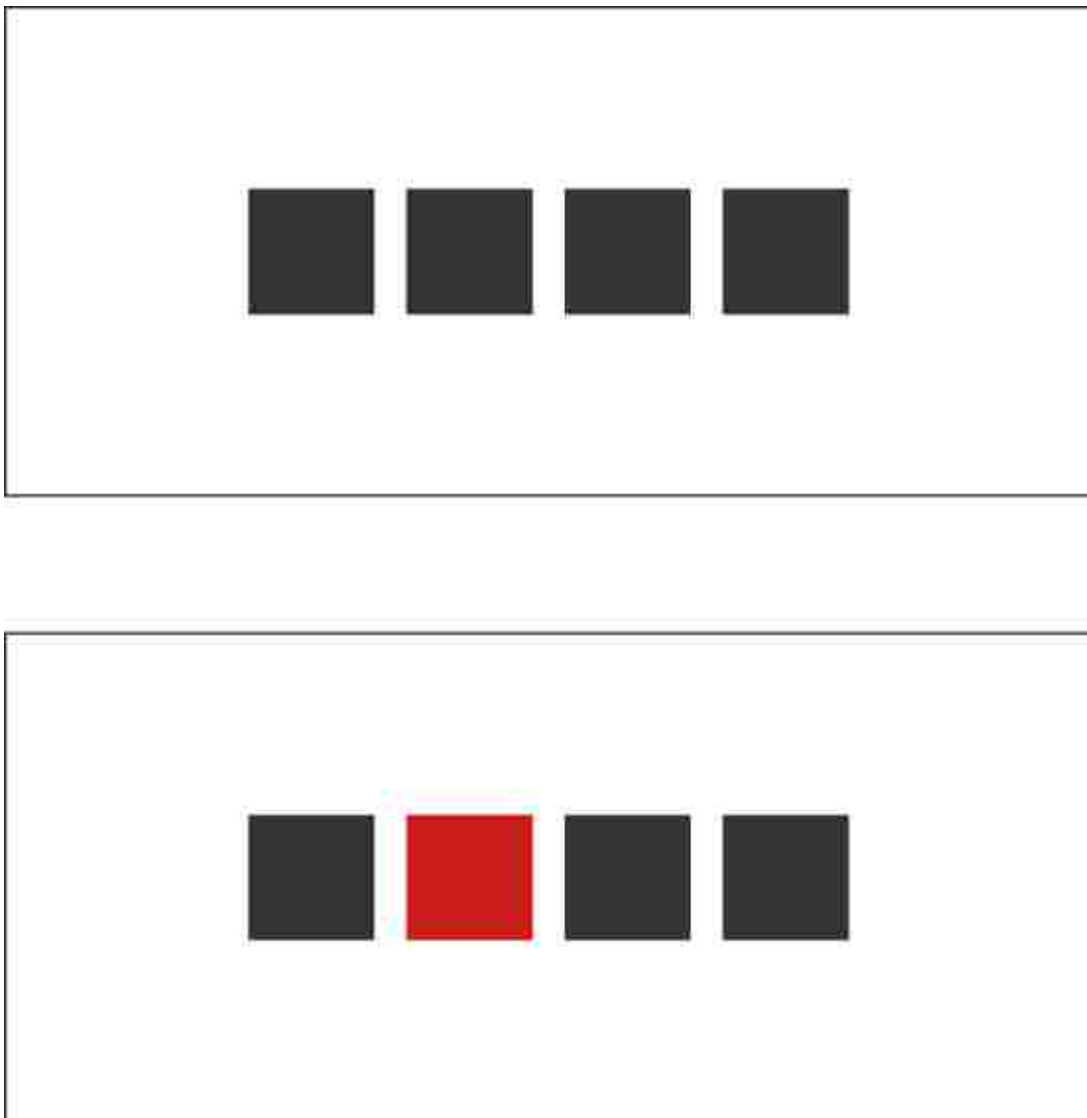


Figure 2. Using color to lead the eye.

Media Convergence

Media convergence is a broad term, but it is becoming a prominent aspect in news websites. Martin Hirst, a journalism professor at Auckland University of Technology, defined convergence as the “clash of old and new, particularly in terms of media forms and media platforms” (Hirst, 2011, p. 2). Media convergence was also considered as a process by which all aspects of media such as industries, markets, technology and business practices, form a close relationship (Jenkins, 2004). Transformations in these aspects have arguably allowed convergence to happen more frequently. A popular example was how CNN performed convergence by using technology to display video that relates to news articles (cnn.com) through various devices, such as a cellphone or a gaming console like the PlayStation. Boston.com’s *The Big Picture* focused on delivering high-resolution images with stories attached to each (boston.com/bigpicture).

Technological innovations have been intertwined with the history of journalism (Siapera, 2012, p. 30). Taking Twitter as an example, one of the features that its web service initially supported was data transmission by a short message service (SMS) through a cellphone, hence the 140 character limit on a tweet (Malik, 2006). Today, Twitter is pervasive among organizations and is accessible through various channels of media. It has become a primary news source for individuals and has broken some news of importance (Ritholtz, 2013), including the first images of the U.S. Airways plane that landed in the Hudson River (<http://twitpic.com/135xa>) or the death announcement of Osama Bin Laden (Stelter, 2011). News organizations adapting themselves to innovations

such as Twitter or Facebook reach a broader audience and create an enhanced experience for the end user.

Unmistakably, rich-media like video and images play an important factor in keeping audiences entertained. Marshall McLuhan, a renowned scholar who coined the term “medium is the message,” had theorized that media could be placed into two categories, hot and cool (McLuhan, 1994). Hot media contained less participation for the audience because the medium provided a high definition experience. Audience completion of information was unnecessary, as it was provided by the hot medium. Cool media on the other hand was explained as media that was low definition, such that the audience members would have a higher participation to supplement the lack of definition.

One strategy was to incorporate McLuhan’s theory into media convergence. The flexibility of CMSs like WordPress gives organizations the ability to converge media, such that the amalgamation of content (hot or cool) share context that is relevant to the user and strike a balance between high definition and high participation. Interests of users are raised through this process. Therefore, the Bounce Rate of *Virtual Rebel* is reduced through converged media.

Other Characteristics

The use of design patterns was applied to areas of *Virtual Rebel*. Programmers used design patterns in web development, as well as other software development processes, as a shortcut or proven solution in solving recurring problems. The benefits that design patterns imposed are that it saved the time and effort of those working on the

development process, meanwhile giving the user a familiar response to these recurring issues or requirements (Díaz, Aedo, & Rosson, 2008).

An example of a common design pattern that is ubiquitous on the web is the pagination component. Before the concept of pagination within the online medium came about, developers faced a recurring problem of how to display results on a page. Showing all results lead to a massive slowdown in a user's browsing session resulting in a horrible experience and showing a single result was too limited. To solve this problem, a design pattern was created to show only some of the results, but also give the user an option to see the next pages of results (Figure 3).



Figure 3. A pagination design pattern.
<<https://www.google.com>>

Examples of other characteristics that provided a richer experience for readers included links that were relative to what the user was reading (Nielson, 2008). Design patterns that showed links to previously read materials are also known as history tracking, which include trending and popular content that added context to a story. Relating relevant metrics, like top comments, to a particular article or implementing sharing options to social networks are rules of thumb to increase a user's engagement (Pongpaet, 2009). By giving the visitor options to exercise their egoism, more pathways develop into a richer user-experience, thus potentially stimulating interest.

CHAPTER TWO

LITERATURE REVIEW AND METHODOLOGY

Research from previous studies had shown that data from website analytics programs were exceptionally informative when developing methods to attain more users. Analytics programs such as Google Analytics track visitor data points starting from the total number of users that have entered the site. However, gaining more users was only the start of the effort, as Waisberg and Kaushik pointed out (Waisberg & Kaushik, 2009). Harvesting data on the total number of visitors described how busy a site was at any given time and was a sufficient measurement if the goal was to identify ephemeral popularity. However, total number of visits was inconsequential for most purposes, as it brought no meaningful data involving a deeper understanding of the visit. The *total visits* disadvantage was that it did not contain a full description of what users were doing on the website, nor did it describe their interest levels.

In a study to identify the importance of using analytics to drive decisions, a researcher had identified that institutions in higher education that were using some form of data analytics for their websites were ubiquitous. At 97%, higher education institutions revealed recording analytics on a website were not only important, but also mandatory (Joly, 2012). Through Joly's research, findings showed that analytics were a driving factor in decision making for websites. Testimonials from website managers that took part in the survey supported Joly's findings in that analytics gave them invaluable insight to improve areas of deficiency within their online presence.

Gaining a deeper understanding into the patterns of users benefited a site in various ways. Data from analytics was used to measure web site performance to reveal

areas of the web site where it needs improvement. The non-profit organization, Digital Analytics Association (DAA), whose main goal was to serve the public and provide data guidelines for digital analytics, outlined three areas in which analytics data could be categorized: counts; ratios; key performance indicators. Key Performance Indicators (KPIs) within analytical data were important components because they had relevancy in business strategies (Burby & Brown, 2007). Defined as count or a ratio, Key Performance Indicators held value when applied to user analysis to inform decisions.

A common KPI referred to as the Bounce Rate, has been a reliable indicator of the levels of user satisfaction on a page or a site. Burby and Brown's (2007) research sought to identify if Bounce Rate s could be predicted through search advertisements. In order to do this they had to first confirm that Bounce Rate s were a valid indicator of user satisfaction. Through their analysis of previous search data provided by Google Analytics, the researchers were able to confirm that Bounce Rate was well indicative of user opinion (Sculley, Malkin, Basu, & Bayardo, 2009). This study suggested that higher user satisfaction lowered the Bounce Rate KPI.

Sculley, Malkin, Basu, & Bayardo's (2009) research aligned with other scholarship like Plaza's source traffic effectiveness study. Plaza, an associate professor of economic policy at the University of the Basque Country (Spain), used a time-series dataset from Google Analytics, which was comprised of a website's usage patterns. Based on previous studies, the author hypothesized that return visits would show deeper visits within the site in comparison to new visits. Statistical algorithms were applied to the dataset and the findings proved the hypothesis in that return visits propagated longer and more active site browsing sessions (Plaza, 2009).

Based on the findings of Sculley, et al (2009), and Plaza (2009), it was suggested that a higher user satisfaction within the site lead to more visits and more return visits. By extension, content that was more relevant and more interesting to the user reduced the Bounce Rate throughout the site.

A similar study measuring Bounce Rate, as well as other various metrics and KPIs from Google Analytics, meant to identify the usefulness of usability within a website. Usability encompassed a broad set of design principles, many of which can be implemented within a website (Whatley, 2009). For instance, a website's organized design (through information architecture and graphic design theories) improved the intuitiveness of browsing, thus increased its usability. This study used metrics based on three different websites and had heuristic evaluators to assess and identify potential problems of usability. Thirteen key metrics of Google Analytics data were analyzed, including Bounce Rate. Through data analysis and heuristic evaluation, potential problems were found that suggested illogical navigation, irrelevant content, and faulty design. The authors' findings concluded that the use of analytics permitted quick evaluations of a website's problems to facilitate effective solutions (Hasan, Morris, & Proberts, 2009).

Implications from this study suggested that design components were key elements to provide users with a rich experience to content. As stated previously, a higher satisfaction related to a lower Bounce Rate, therefore a lower Bounce Rate suggests that users are interested in content. While the quality of content may not be known for each page or article, abiding to the guidelines in design effectively stimulated users' interest such that they had potential to click deeper within the site (Nielsen #4, 2008).

Using an analytics program and more specifically, using KPIs as a performance measurement can help to identify and determine what parts of the website are causing issues or what needs to be improved. Analyzing data through these programs should be done at intervals, rather than just one time. Waisberg & Kaushik stated that web analytics was not just a tool, but also a *process* through which websites improved areas that were targeted. Their argument was that web analytics should not be used just to generate reports, but to be treated as an iterative process for optimization in order to decrease the Bounce Rate (Waisberg & Kaushik, 2009). An organization must define goals, define their metrics (KPIs), collect the data, and then analyze the data. This iterative process enables valuable insight into page visits.

A recent study involving the application of the iterative process to their efforts created a baseline for measurement and gave researchers more insight to the data. The researchers' findings showed that important factors to keeping users on a website included design, usability, and performance (Kumar, Singh, & Kaur, 2012). This suggested that Bounce Rate was reduced by applying graphic design principles on the design of a website. The results of this study, illustrated the value in the *process* during the evaluation of a website's analytics.

Elements to engage a user successfully to reduce the Bounce Rate involved other components such as the application of visual theories. A recent study was performed to examine the effect on visual weights to identify the importance of graphic design fundamentals on websites. In this study, researchers used custom-built software known as *Magellan* that tracked mouse movement, clicks, and keystrokes during a user's visitation on a site. The study measured visual weights on the page, such as sizing of elements and

their colors. Valuable information was gleaned through this process and the author advocated, “the collective users’ behavior [is] an inspirational source of web design” (Leiva, 2012), implying that data garnered through web analytics software was a revealing source of information.

Color studies on visual hierarchy were also performed to identify the importance of color usage and its inherent properties. These studies used familiar terms of color: *hue*, the specific color family; *value*, the lightness, or darkness of a hue; *chroma*, the amount of saturation within a color. These three properties combined create a specific color. In an examination of colors used on documents, the findings showed that colors had improved the recognition speed of information and could facilitate the understanding of information through its context by the relationships of other elements (Courtis, 2004). Colors also provided the eye with visual cues to suggest to the user on what to particular area to focus (Sherin, 2012).

Research on the hierarchy of information through use of color found that a color’s saturation point, also known as chroma, was indicative of importance (Puhalla, 2008). The author found that the more saturated (chroma) and darker (value) the color in comparison to the others around it, the better the organization of visual information within the context of that area. These findings suggested that elements within a web site were received with proper visual hierarchy at a faster rate of processing because color relationships were applied effectively within the web page. An improved visual hierarchy and a faster processing of information caused less confusion within the page. This was advantageous to the overall strategy for *Virtual Rebel* since the user spent less time being confused and more time engaged in its content.

A recent case study was performed to determine the importance of visuals within a web site. The study had ratings from participants of three similar websites in numerous aspects to determine the strengths and weaknesses of each. The site that was rated more attractive with significantly higher satisfaction had more images relating to the content (Albert & Tullis, 2013). This implied that images on a website were more appealing to users and generated more user-interest.

Part of this study also determined that showing unrelated advertisements within the context of content groups resulted in a higher dissatisfaction among users. While advertisements are not shown on the not-for-profit *Virtual Rebel*, this finding lent itself to argue that information within their respective groupings had relationships. These relationships were the subject matter that had relevancy among the context. For example, an article about traffic should have contextual information pertaining to traffic, such as articles on construction of new roads, accident information, or events that clog the roads. By identifying related content that contains the same degree of importance, it could be argued that the user was just as interested in the content due to their current interest in the current article. The effort to keep content aligned with content groups was invaluable and created a favorable environment for both user and entity. The findings in Albert & Tullis' study incorporated into the theory of wayfinding, such that images were used as landmarks (Albert & Tullis, 2013).

A study that was performed to determine the behavior of users through the graphic design theory of wayfinding, outlined decision-making processes of users that browsed websites. The wayfinding theory proposed that, "in order to accomplish a wayfinding task (to reach a final decision) a user would perform three processes" (Tan &

Wei, 2006). Working together, cognitive mapping, decision generation, and decision execution give the recipient actionable information.

In a “think-aloud” process by which users stated what their actions were during their browsing session (similar to usability studies), researchers were able to identify that each user obeyed the steps of the theory of wayfinding by clicking on links and images that related to the object they wanted to find. Users experienced each step in the process, either consciously or subconsciously, and strengthened the researchers’ hypotheses in that the wayfinding theory could be applied successfully to web browsing. The authors had noted, “good graphic design facilitated browsing” and “good quality of information reduces the cognitive overhead” (Tan & Wei, 2006).

The concept of persuading users to click deeper into the site involves more than the elements of design. Websites must also be credible and must elicit action to the user. A study performed on Dell’s website revealed that in order for a site to be credible, it must incorporate various aspects of trustworthiness and expertise (Fogg, Laraki, Osipovich, Varma, Fang, & Treinen, 2001). Guidelines that were outlined with this study stated that the brick-and-mortar characteristics of the organization should be highlighted.

According to another researcher, the unconscious thought was the center of most decisions and behaviors relied on this heavily (Weinschenk, 2009). The author argued that the brain was composed of three parts: new; mid; old. The new brain processed all logic and reasoning, the mid brain managed emotions, and the old brain handled the subconscious and reacted to information processed by the new brain (Figure 4) (Weinschenk, 2009). Weinschenk posited that if content engaged all three brains, it was the most effective way of persuading users to click.



Figure 4. Stylistic interpretation of the three brains. By Dan Willis from http://www.dswillis.com/gallery/drawings_12brains.htm

Weinschenk used examples of tapping into each of these and concluded the images, personalizing information, and validating behavior were a powerful persuasion tactic. These findings aligned with Yaffe’s Law, which stated “if you give people what they want first, then they are likely to accept anything else you want them to have ... if you give them what you want first, chances are they won’t accept anything at all” (Yaffe, 2007).

In one of Weinschenk’s case studies, the author emphasized that giving the user quality information in regards to how many other users performed an action was a powerful piece of information. In Figure 5, *imdb.com* illustrated this with their informational page about a specific movie. Weinschenk’s recommendations are visibly present. The areas of “Your Rating,” “Add to Watchlist,” “Watch Trailer,” and “Share,” were all options for the user on which to take action. The golden star contained the

average number of ratings that all other users have submitted. Relative to the position of this element, were other contextual data to encourage the user to contribute their opinion. There was a balance of information between what the user had done and what other users have contributed, as well as other areas that persuaded the user into clicking further into the site, which was considered successful to Weinschenk.



Figure 5. Screenshot of the Inception movie page on imdb.com.
<<http://www.imdb.com/title/tt1375666/>>

Many sources of information addressed concepts that built a complete strategy in order to improve areas within a website. Various concepts incorporating data analysis, media and visual theories, and user behavior, are the foundations by which site owners must examine in order to make effective decisions about a website. Determining a strategy to increase user engagement through Bounce Rate analysis was an effective way to increase visitors and loyal readers. This notion implied that organizations that used a strategy as such increased user activity on their site, and these users had more satisfaction while browsing, thus resulting in new or repeat visits and loyal users.

Most research examined in this study had a single point of analysis that allowed a thorough scientific examination. The researchers' intentions were to isolate problems within the online medium and discover solutions. Each study had separate findings that explained the important pieces of a website and how each can affect a user. Other sources had contained valuable information on visual organization, media theory, and fundamental qualities of human behavior. These sources discussed theory application to media whereby websites and other applications within the online medium could benefit.

Websites are constantly evolving. Moreover, websites are complex because of the many inherent characteristics of the online medium through which a user can be exposed. The findings and concepts of previous research were the basis for this strategy. Through the implementation of the amalgamation of the body of research, this strategy incorporated adjustments that previous research had suggested to improve *Virtual Rebel's* online presence. Such an implementation required many areas of modification. However, applying these modifications at intervals exercised the iterative process of improvement that proved to be successful in previous studies.

This strategy intended to construct a blueprint through which *Virtual Rebel* and other similar organizations could use to improve their online presence in various areas. The natural goal of a website is to provide information to users and consequently, users must frequent the website in order to complete this goal. By using this strategy as a baseline, organizations will gain more users and will also be able to identify what areas of their website need improvement.

Methodology

The ubiquitous nature of the open web gives users the freedom to cherry-pick sites to visit and content he or she consumes. Wielding such power to pick-and-choose based on their preference has arguably led to an aggressive competitiveness among news organizations to drive more readers to their sites. While there are significant differences in the presentation and delivery methods of content between media, the functionalities share the same goal in that it must generate value for the user.

Bounce Rate: Google Analytics

Within the online medium, providing visitors with content is an inherent function. Keeping visitors interested on a website is a challenge. If a user was unengaged through miscues of irrelevant content, design failures, or disorganization, then the user became frustrated and left the site immediately ((Morville & Rosenfeld, 2006, p. 12). Previous research of user engagement to maintain visitors had shown that there were multitudes of elements that were a focus and an analysis of user data was the key to success. To perform these analyses, many researchers chose Google Analytics (GA) to record data of visitors on a website. The apparent attraction to using this platform over others was that it was free and there was a vast amount of documentation to support it.

As shown in Figure 6, raw visitor data from websites is convoluted and in order to organize this data, GA came equipped with premade, unique aspects to measure and categorize these metrics (Figure 7). It was implied that these web metrics made inferences toward human behavior (Fagan, 2013). Because web metrics provided such

valuable insight and informed decisions for continual improvement based on up-to-date data, KPIs were a critical part in website maintenance (Loftus, 2012).

```

10.0.117.172 - - [24/Mar/2014:12:57:56 -0700] "GET /becker/ HTTP/1.1" 200 9731 "-" "Mozilla/5.0 (Windows NT 5.01; rv:27.0) Gecko/20100101 Firefox/27.0"
10.0.117.172 - - [24/Mar/2014:12:57:56 -0700] "GET /becker/js/jquery.cycle.lite.js HTTP/1.1" 304 - "http://schools.lia/5.0 (Windows NT 5.1; rv:27.0) Gecko/20100101 Firefox/27.0"
10.0.117.172 - - [24/Mar/2014:12:57:56 -0700] "GET /becker/js/cycle.controls.js HTTP/1.1" 304 - "http://schools.lia/5.0 (Windows NT 5.1; rv:27.0) Gecko/20100101 Firefox/27.0"
10.0.117.172 - - [24/Mar/2014:12:57:56 -0700] "GET /becker/css/global.css HTTP/1.1" 304 - "http://schools.ccsd.edu (Windows NT 5.1; rv:27.0) Gecko/20100101 Firefox/27.0"
10.0.117.172 - - [24/Mar/2014:12:57:56 -0700] "GET /becker/css/classes.css HTTP/1.1" 200 1370 "http://schools.lia/5.0 (Windows NT 5.1; rv:27.0) Gecko/20100101 Firefox/27.0"
10.0.117.172 - - [24/Mar/2014:12:57:56 -0700] "GET /becker/css/defaults.css HTTP/1.1" 304 - "http://schools.ccsd.edu (Windows NT 5.1; rv:27.0) Gecko/20100101 Firefox/27.0"
10.0.117.172 - - [24/Mar/2014:12:57:56 -0700] "GET /becker/css/modules.css HTTP/1.1" 304 - "http://schools.ccsd.edu (Windows NT 5.1; rv:27.0) Gecko/20100101 Firefox/27.0"
www.orborviewhs.net - - [24/Mar/2014:12:57:57 -0700] "GET /error.php?err=404 HTTP/1.0" 200 5027 "-" "-"
10.169.221.56 - - [24/Mar/2014:12:57:57 -0700] "GET /favicon.ico HTTP/1.1" 200 5027 "-" "Mozilla/4.0 (compatible; MSIE 7.0; .NET CLR 2.0.50727; .NET CLR 3.0.4506.2152; .NET CLR 3.5.30729; InfoPath.3; .NET CLR 1.1.4324.4242; .NET CLR 1.1.4322.4242; .NET4.0C)"
10.161.13.121 - - [24/Mar/2014:12:57:57 -0700] "GET /freedom/images/a/3.jpg HTTP/1.1" 200 56277 "http://schools.lia/5.0 (Windows NT 5.1; rv:26.0) Gecko/20100101 Firefox/26.0"
10.2.152.150 - - [24/Mar/2014:12:57:22 -0700] "GET /squires/Students HTTP/1.1" 200 9201 "http://schools.ccsd.edu (compatible; MSIE 7.0; Windows NT 5.1; Trident/4.0; .NET CLR 2.0.50727; .NET CLR 3.0.4506.2152; .NET CLR 3.5.30729; .NET CLR 1.1.4322.4242; .NET4.0C)"

```

Figure 6. Raw log data from a website.

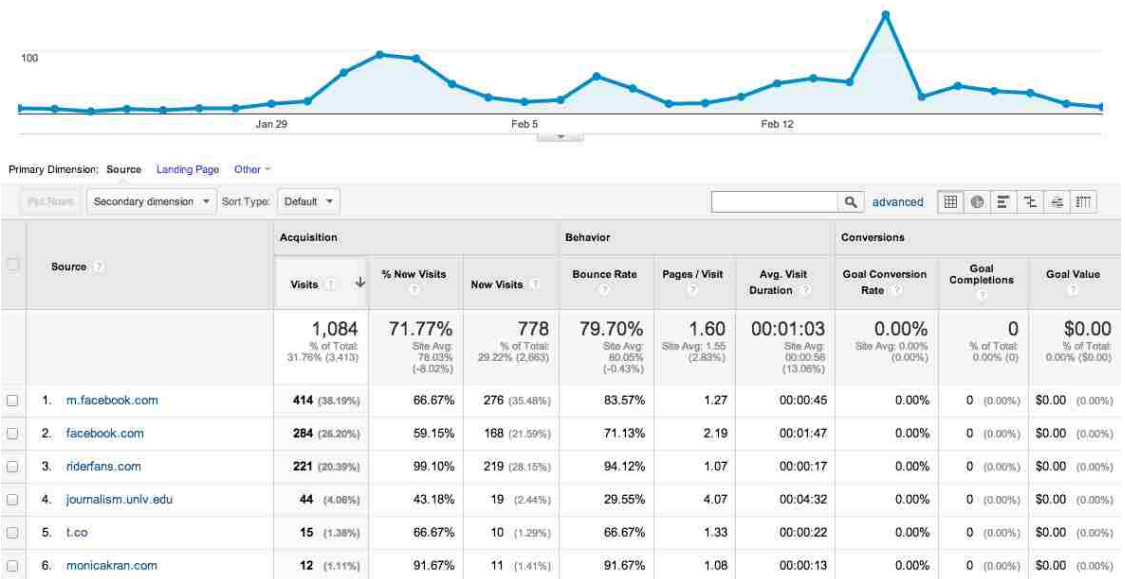


Figure 7. Screenshot of Google Analytics' Key Performance Indicators (KPI).

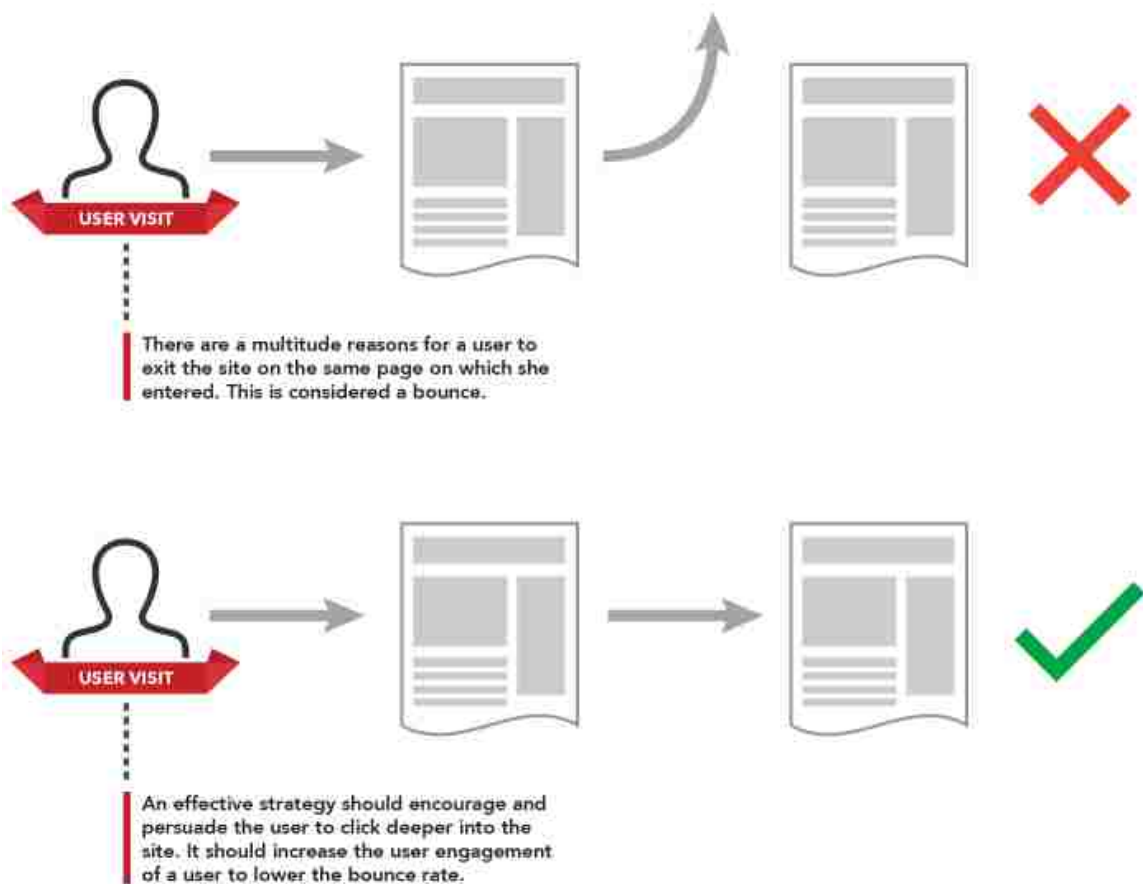


Figure 8. Diagram illustrating a bounce and non-bounced visit.

Bounce Rate: KPI

The strategy of this non-traditional thesis focused on decreasing the Bounce Rate KPI for *Virtual Rebel*. A user that entered a portion of the site and immediately left was considered a bounce. Effectively, this user entered the site, became disinterested in the content on the particular page, and then left the website without clicking any other links, as shown in the top portion of Figure 8. This was indicative of a user that did not have a satisfying or interesting experience while on the page, thus left it without any further clicks into the site. The bottom portion of Figure 8 illustrates a user that was engaged and

persuaded to click further into the site. A high Bounce Rate was considered to have negative connotations on site metrics, since research has shown that it was a measurement of user interest or engagement. By decreasing this ratio, a user was plausibly more interested on the site or was having a better experience. Other KPIs were considered, but given the previous research, Bounce Rate's properties in relation to user engagement and user satisfaction were more closely identified with the strategy than the others.

CHAPTER THREE

FINDINGS

To decrease the Bounce Rate of *Virtual Rebel*, this strategy concentrated on key areas for a better user experience: Information Architecture (IA); application of graphic design principles; and media convergence. Other areas were considered, but this non-traditional thesis used Rubinoff's user-experience (UX) audit for a baseline (Rubinoff, 2004). Rubinoff's four key areas for user-experience were branding, usability, functionality, and content. Branding and usability fell under graphic design principles. Functionality and content fell under IA and media convergence. Other characteristics of improvement were also applied to the study, but these improvements were minor and secondary components of the four areas listed.

Areas of Concentration

Information Architecture (IA)

On the surface, information architecture is viewed as a simplistic function of organizing content with contextual cues (Figure 9). However, IA was not just a grand organization of content like a site map, but also an environment by which users enabled understanding in complexity (Resmini, 2011). Users need to be familiar where they are browsing and where they are within a site. Any variation of confusion may have potential to leave the user dissatisfied with a negative experience. Research has found that dissatisfied users were more likely to leave the site on the first visit (Sculley, Malkin, Basu, & Bayardo, 2009). A site's initial impression was one of the most important aspects under this finding and should be a priority for sites that want to maintain or

generate readership. As such, this strategy's ambition was to take the complexity out of the user's visit, such that *Virtual Rebel's* content was the primary focus. The enormity of the Internet need not be complex so long as information was architected in such a way to reduce the complexity. By applying this philosophy to *Virtual Rebel's* content, it allowed better content organization and less complexity, thus leading to a reduced Bounce Rate and higher user satisfaction.

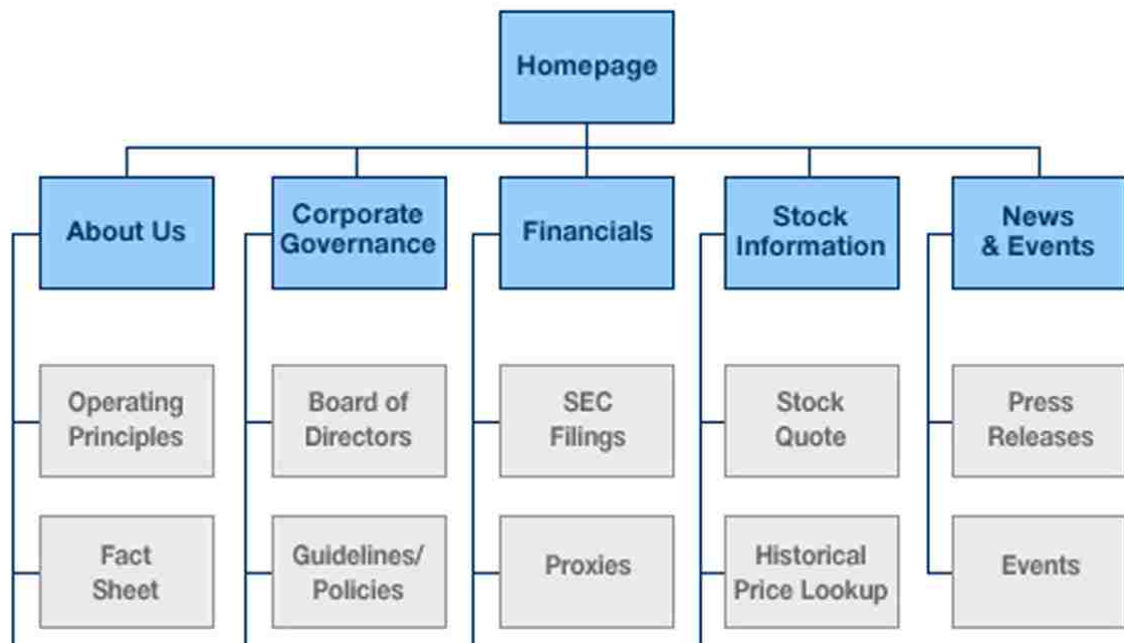


Figure 9. An example of a basic sitemap.

<http://ils.indiana.edu/faculty/smilojev/teaching/s515spring2012/2012springprojects/session11/>

Another important aspect of information included the source code that composed a web page. Any given web page is comprised of source code that tells the web browser on any device of how to render it. Known as Hypertext Markup Language (HTML), it is comprised of many components or elements that feature different meanings that are semantic to the content that is placed inside. Essentially, HTML gives instructions to the web browser on how to render a web page and where to paint the elements. HTML with

meaning, otherwise known as semantic code, enables web browsers to follow the rules provided by the standards and specifications provided by the World Wide Web Consortium, making a more meaningful web experience for users and web crawlers.

For instance, a web page that has a main headline with associated copy and stories that were related to the article would be comprised of a document tree of semantic meaning within the source code (W3C, 2013). Observing the source code of a properly formatted page on WordPress, a headline would reveal that it was an `<h1>` element and the copy associated with the headline would be encased inside a `<p>` element, which would be encapsulated in an `<article>` container. Related stories would be elsewhere in the document tree in other `<article>` containers, but those stories' headlines should be placed into an `<h2>` to signify that it is an important headline, but not as important as the article that is currently being viewed (Figure 10).

```
<article>
  <h1>Delving Deeper into the Dream on a November Afternoon</h1>
  <span>
    By <a href="/students/?author_id=7074" rel="author">Denitsa Yotova-Green</a>
  </span>
  <span>February 27, 2014</span>
  <p>It was a cold and rainy November afternoon.</p>
  ...
  <p>My very own American Dream was just the neighborhood park on a rainy-November
  afternoon.</p>
</article>

<article>
  <h2>Delving Deeper into the Dream in Henderson</h2>
  <span>
    By <a href="/students/?author_id=4706" rel="author">Alison Saclolo</a>
  </span>
  <p>The two-story abode is situated on a generic, typical suburban street and it is not
  hard to imagine a child learning how to ride a bicycle for the first time just down the
  road.</p>
  ...
  <p>My very own American Dream was just the neighborhood park on a rainy-November
  afternoon.</p>
</article>
```

Figure 10. A sample of *Virtual Rebel's* HTML within an article.

Header elements can go up to <h6>, but the idea is to give semantic meaning to related material based on the current article being read. Essentially, what semantic code does is it gives a visual structure to the page for users and an organizational structure for web crawlers. Considering the historical context, larger headlines indicate more importance within the context of the medium, thus using semantic code to address this in the online medium will allow future research to decipher the importance of stories in relation to the timeframe.

Organizing content in the context of site components and functionality was a key strategy for *Virtual Rebel*'s information architecture. According to Andrea Wiggins, "access to web analytics data during the earliest phases of a website redesign process informs the site's architecture" (Wiggins, 2007). The Bounce Rate KPI was related to this statement. Therefore, changes in information architecture had an effect on it. *Virtual Rebel* made decisions from real-time data of the Bounce Rate in order to formulate modifications or apply updates to the site to improve the user-experience or increase user engagement.

Graphic Design Principles

Graphic design principles were the second key area that this strategy introduced as an element to help reduce the Bounce Rate. To maintain UNLV's branding, it was essential to use its established colors of scarlet and a variation of black or greys. The strategy incorporated a minimal color palette such that directing a user's attention was more successful because less color mitigates confusion (Sherin, 2012, p. 14). Using this

as one of the bases of designing the site, other elements within the site were conceptualized.

In its infancy, web design was at a standstill in innovation. One primary example of stagnation was the culture of designing with `<table>` elements. Designing for the web involved an editor, a code based editor or an editor that was graphical, also known as a “What You See Is What You Get” (WYSIWYG) editor. The most common way to build a website then was to structure the design into columns and tables. Because browsers did not adhere to the HTML standard specification, choices for element placement were limited to the most compatible method of designing which was holding elements in columns of tables. Due to this limitation of how tables represented content, it made for an inflexible canvas on which to design.

As technology got better, so did browsers and their support for HTML standards were a top priority. By this improvement, source code started to become semantic in that search engines could identify with better accuracy as to what the contents of the web page. While the semantics of information shares itself with information architecture, it was also an inherent property in the design.

Web design has come to fruition over the recent years with many aspects of print design being adapted to the online medium, such as vast array of type choices and element placement. Previously, there were only a handful of typefaces that could be used due to the limited universal typefaces among different platforms. Due to innovations in how browsers render text, the web community had built functionality and services to extend typeface support so that any chosen typeface would be accessible (Mozilla Developer Network, 2013).

Type treatment was a very important aspect of design. If there were too many different typefaces on a page, the site would look too busy and had potential to create more complexity. Not enough variation could potentially lead to a stale presentation, thus leading to uninterested users. The strategy imposed a healthy balance of typefaces such that content is legible and text is presented to show character (Bringhurst, 1996). During the redesign, it was decided that *Virtual Rebel* would use two typefaces to represent their content: Google’s Open Sans and Bitter.




Figure 11. Type specimens for Bitter and Open Sans typeface.
 <<http://www.google.com/fonts/specimen/Bitter>>
 <<http://www.google.com/fonts/specimen/Open+Sans>>

The type specimens (Figure 11) are indicative of their use and function on *Virtual Rebel* pages. Bitter was used as the typeface for headlines due to its aesthetics and heavy contrast. Open Sans is a sans-serif typeface that was used by *Virtual Rebel* because its extensive family was suitable for body copy and its legibility at smaller sizes. Other characteristics of typography were also examined and improved during the redesign, such as sizing and kerning. Figure 12 shows the type treatment of *Virtual Rebel*’s previous

design and was apparent that it had not given treatment enough attention. Some areas looked confined or overcrowded and a visual hierarchy of information was not present.

FIRST Robotics Competition at UNLV



What is the FIRST Robotics Competition?

According to USFIRST.org "FIRST Robotics Competition (FRC) is a unique varsity sport of the mind designed to help high-school-aged young people discover how interesting and rewarding the life of engineers and researchers can be. The FIRST Robotics Competition challenges teams of young people and their mentors to solve a common problem in a six-week timeframe using a standard "kit of parts" and a common set of rules. Teams build robots from the parts and enter them in competitions designed by **Dean Kamen, Dr. Woodie Flowers, and a committee of engineers and other professionals**. FIRST redefines winning for these students because they are rewarded for excellence in design, demonstrated team spirit, gracious professionalism and maturity, and the ability to overcome obstacles. Scoring the most points is a secondary goal. Winning means building partnerships that last."

Figure 12. Screenshot of an article on the previous design of *Virtual Rebel*.

In Figure 13, proper type treatment was applied to the redesign of *Virtual Rebel* such that body copy was more legible. Sizing and color of type were treated to facilitate a visual hierarchy. Leading and kerning were also applied to text to impose more ‘breathing room’ for the eyes while reading the text.



Members of the Black Student Organization gather before a bake sale to kick off the spring semester. (Photo/Imani Patterson)

Black Student Organization Reaching Out on UNLV Campus

By **LaMetra Miller**
February 21, 2014

0 comments Share article [f](#) [t](#) [✉](#)

The Black Student Organization (BSO) is hoping to increase its membership of African-American students on a campus that is one of the most diverse in the nation.

Imani Patterson, secretary of the BSO, says the group is planning workshops and forums to try to attract new members and raised its dues so it can put on bigger events.

She explains that the BSO is a great organization for the African-American student and that it provides information about internships and scholarships and other great resources.

Patterson, a sophomore and pre-nursing major, got into the BSO to get leadership skills.

The fee to join the BSO is \$25, up from \$15, with the plan to do bigger scale events.

Figure 13. *Virtual Rebel* article redesign.

Figure 14 identifies the functions of type treatment in more detail. Graphic design disciplines, such as typography stamped out confusion of elements and effectively created an enhanced first impression. As previous research had found, users tended to leave sites if content was confusing or if they had a hard time reading it. Furthermore, this applied more so on the first visit. Proper application of typography on content was an important component for *Virtual Rebel* to keep users satisfied because it presented content in a clear and understandable form.

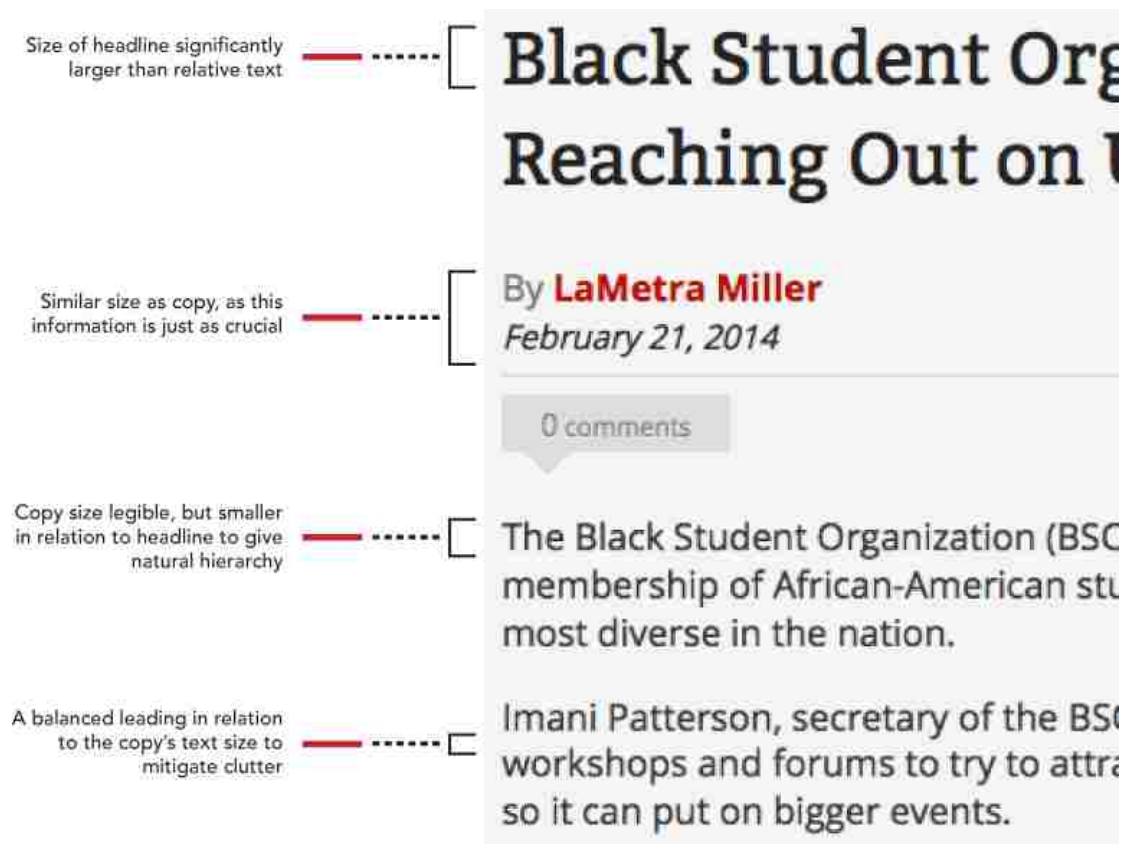


Figure 14. Graphic design typographic treatment to create visual hierarchy.

Without the system legacy limitations, *Virtual Rebel* design took full advantage of core fundamentals of graphic design to appeal to users and persuade them into decisions. The graphic design theory of visual hierarchy was part of the strategy to keep users

interested in the site and visual hierarchy of communication was applied to the composition of each page, with the goals set by *Virtual Rebel* staff as the guidelines.

Converged Media

The platform on which *Virtual Rebel* contains all of its stories and material is a flexible CMS named WordPress. At its very core for *Virtual Rebel*, anyone who has access can post a story and see it on the front page. While this gives editors and staff an efficient workflow to post stories, converging media to these stories and to the site itself has been a primary goal since the inception of VR.

In its current form, the only media relating to a story was either the story's main image (which may also contain a caption) and/or additional photos within the story. Contexts of these images were only applied to the story itself and had no meaningful purpose in any other form. However, part of the strategy was to make a richer experience for users. As such these images were more pronounced in other news stories, taking advantage of the categories and tags that is inherent in WordPress, so that an algorithm of stories that were relative to each article was implemented.

The integration of *Studio G* videos and photography from photojournalists was an integral part of media convergence on VR. *Studio G* is a newscast from inside Greenspun Hall that broadcasts five days out of the week, which also features UNLV students (Studio G, 2013). *Studio G*'s videos are streamed live during the broadcast then uploaded to a video provider (YouTube) so that it can be instantly accessed on demand. Using a video platform such as YouTube enables videos to be organized by categories and tags. This was a very powerful feature for video. News articles on VR were categorized and

tagged through WordPress’s functionality and an algorithm to contextually integrate both was produced. This non-traditional thesis’s strategy converged both elements with the intent to keep a user engaged in the story (Figure 15).

Studio G’s video library will be integrated into relevant stories by comparing meta data gleaned from the source. This can increase the user engagement.

The screenshot shows the 'VIRTUAL REBEL' website interface. At the top, there is a navigation bar with categories: ARTS, EDUCATION, ESPAÑOL, FEATURES, LOCAL, POLITICS, SPORTS, and ABOUT. The main content area features a large video player with a play button icon, overlaid on a background image of people. Below the video player is the article title 'UNLV Researchers Find Hidden Dangers of Hot Sauce' by UNLV News Center, dated July 17, 2013. The article text discusses lead contamination in hot sauces. To the right of the main article is a 'Beats - Campus' sidebar with several smaller article teasers, each accompanied by a small image icon. A dashed line connects the top text box to the video player area, and another dashed line connects the bottom text box to the bottom of the page.

There will be more emphasis on integrating more images into various areas of the site to invoke a response and encourage deeper visits.

Figure 15. Converged media additions to an article page on *Virtual Rebel*.

Convergence of photography within a story has been a feature of *Virtual Rebel* since its original launch in 2008. The strategy shared the same characteristics as video in that images had context for each story that linked to it. The workflow for this required contextual data applied to the image. Getting more granular is a possibility if metadata of the photo is utilized. Essentially, the system would read metadata that related to the location of the photo taken. An algorithm could then be applied to this data, resulting in related imagery to a story that a user is reading.

An effort was made to conjoin stories from VR and *The Source's* podcasts/audio broadcasts, by the use of title parsing, key tags, and categories. Instead of breaking the function of obtaining each piece separately for the user, the strategy converged these media into a unified action (Figure 16 & 17).



It takes at least one visit to each site to get audio and written content. This is highly inefficient and a user is not guaranteed relevant material.

Figure 16. Diagram of non-combined visits.



Figure 17. Example of integrating *The Source's* material into *Virtual Rebel*.

Radio broadcasts from 91.5 FM *The Source* that are online (also known as podcasts) will also be integrated into *Virtual Rebel*'s website. Because of the systems separation, access to *The Source*'s podcasts can be achieved through a syndication mechanism. VR will check this syndicated feed periodically and place the results into a datastore so that it will be easily accessible to VR.

Again, one of the primary goals was to converge media by placing all available media online (audio/video/images) in context with the story being read. It gave these media a contextual frame through which a user can scan and potentially persuade them to clicking further into the site, thus effectively reducing the Bounce Rate.

The Strategy Recapitulation

Having an online presence for any organization has become a standard in the ever-changing models of business. Arguably, if an organization does not have a presence online, then the business is doomed to fail. Entities must adapt. However, it is more complex and competitive to gain an edge online. Entering into the online medium in a desultory fashion could be costly. There must be a strategy for any organization wishing to keep up.

Website owners are able to track user visitation data easily and effectively. With free web analytics tools like Google Analytics, owners can determine a website's problems through analysis of these data. These types of data facilitate iterative review and implementations for improvements. Bounce Rate was one of the more valuable of KPIs, because it was indicative of user engagement and satisfaction. One of *Virtual Rebel*'s goals to gain more visitations and loyal readers validated that Bounce Rate was

an effective measurement to assist with this goal. Tracking the Bounce Rate, as well as other user visitation data, required only a snippet of code to be placed in each page on a website, provided by the chosen web analytics software. Once enough time has passed to glean meaningful data from users, the iterative process of improvements can begin.

Particular areas of *Virtual Rebel* were emphasized to effectively decrease the Bounce Rate. These areas of concentration included information architecture, graphic design principles, and media convergence. Organization of content and the structure of the site were equally as important as how content was laid out on the page. Likewise, the convergence of media was proportionately as significant as the former. These concentrations needed continual treatment to create a positive impact on users.

This strategy provided recommendations on how to improve user engagement by focusing on those three key areas and by using Bounce Rate as the metric or guide to identify if the adjustments to these areas were working. Organizations such as *Virtual Rebel* can apply this strategy to their site and improve their user engagement. By following the recommendations in this strategy, institutions can gain meaningful and insightful information about their readership to make better decisions, which can ultimately add more value to their organization.

CHAPTER FOUR

CONCLUSION

Usage on any website generates data that tell a story about the user and the visit. The stories are composed of raw data that are gathered from these visits and must be processed by web analytics software. Once processed, it is up to site owners to create meaningful relationships between each data fragment of information so that a story can be told. Data gleaned from these web analytics programs illustrate user behaviors within an online presence and they are essential pieces of information for organizations. Having an organized and visual representation of these data can facilitate continual improvements and provide valuable information to extrapolate decisions. Because of the flexibility of these programs, they also permit granular examinations of user data by using key performance indicators such as Bounce Rate. Understanding the functions these KPIs can lead to improved evaluations to make better decisions for the institution and its online presence.

Previous research on the Bounce Rate of web sites and its specific meaning in web analytics software illustrate the importance of this measurement. Through a Bounce Rate analysis, website owners and organizations can identify potential problems in areas that otherwise would not be found or it can find improved methods to approach content management and dissemination. Numerous studies have shown that Bounce Rate was an identifying factor of user engagement and satisfaction. If the overall goal for organizations is to create an immersive online environment by which a user can explore and engage, then it is a fundamental element on which to focus.

Despite Bounce Rate's accuracy of user satisfaction, other KPIs and methods could be used to complement its functionality. For instance, the method of A/B testing entails different modifications to the page; additionally, these pages are served out arbitrarily to determine what page was more successful against the metric being tested. A/B testing method shows advantages from which Bounce Rate could fully benefit. Other KPIs within Google Analytics software can be used in tandem with it. Average Time on Page was widely regarded as an insignificant measurement. However, used with Bounce Rate, it can be an effective metric by which site owners determine critical problems on pages. If a high Bounce Rate page shows a very low Average Time on Page, this would imply that the page should be looked at to determine if it has technical issues or needs improvements.

Utilizing acquisition based KPIs such as New Visits with Bounce Rate is another metric combination from which organizations could glean valuable information. New visitors have potential to become repeat visitors, so this segment was vital element to Virtual Rebel and other organizations looking to acquire more readers. By comparing site-wide Bounce Rate and New Visits, organizations can gain more insight on their user base and can suggest what types of users have higher engagement.

In addition to KPIs, various web development techniques can be used to facilitate a deeper click to lower Bounce Rate. The New York Times tracks how much a reader has read based on where they are in the page (Madrigal, 2014). Depending on the reading spot, a web site will serve an advertisement or article. Ideally, content that is served should be in the context of the paragraph or targeted at the user's interest.

Bounce Rate can serve as a mechanism to demonstrate if the advertisement or article that was served, in relation to the reading spot, proved successful. Institutions could take this a step further by integrating a geo-targeting feature such that a user's Internet Protocol (IP) address would determine the type of content is served.

Hypothetically, a user could be reading an article about the San Gennaro Feast. After the reading placement mechanism is triggered after a paragraph that gives details about a shortage of funnel cakes, the user could be served contextual information to the closest places to buy funnel cakes, articles about other funnel cake shortages, or a blog posting on how to prevent such a catastrophe from happening.

The nature of using a web analytics program does have its limitations since data being utilized is only generated by user visitations. Meaning, it is only a description of the visit and the scope of data being used can only give us indications and direction to where improvements need to be made. Alternative programs such as Clicktail, Chartbeat, or Crazy Egg, could be used in conjunction with Google Analytics to offer a deeper level of understanding on website data and provide extra support in some of inherent limitations.

Clicktail (<http://clicktail.com>) and Crazy Egg (<http://crazyegg.com>) offer data harvesting solutions that are based on a user's mouse movements and clicks. These offerings feature visualizations such as heat maps based on mouse movements and videos replaying a visitor's actions on pages. The feature sets of the aforementioned services embody a few advantages over GA, but website owners should be circumspect to rely solely on mouse tracking for meaningful user data. Clearly, a user's cursor position does not necessarily mean this is an area where the user is focused.

A pairing of the Chartbeat (<http://chartbeat.com>) service and GA could possibly be a better solution over the others as it is primarily oriented on real-time data. Chartbeat is an online web service that features visualizations based on crowdsourced actions on a website in the instant that actions happen. While Google Analytics has their own version of real-time tracking, Chartbeat seems to have the more robust feature set in the instant-data realm that can supplement GA in various ways. Many news organizations would find this beneficial because of the instant identification of the kinds of articles that are trending. Organizations could compare both sets of data from GA and Chartbeat to identify what topics are popular, what stories to promote, or identify significant areas within the website to increase user engagement and gain more audience.

Sharing visitor data between organizations could also lead to a higher quality experience for the user and benefit all parties involved. This strategy could invoke a deeper analysis if data could be gleaned from other sources and by the aggregation of visitor data between various news organizations it would give website owners crucial information of user interest with a higher degree accuracy and refinement.

Bounce Rate is not a comprehensive solution to every need that site owners have. Limitations of this metric present themselves in a few forms, such that Bounce Rate is ineffective, can be an inaccurate reading if a user was fully satisfied with an article, and closed the browser without clicking deeper into the site. A user had a satisfying experience, but because of reasons unknown, did not want to click deeper into the site. A user could have been late to a meeting or clicked an advertisement accidentally that transferred them to another site. These actions are commonplace due to the nature of

human behavior and online activity, but this strategy tried to prevent these actions from happening such that a user's subconscious instinctively clicked deeper into a site.

Bounce Rate alone did not offer a full picture of a site's audience or readership either. It was a powerful KPI that facilitated decisions and displayed accurate results, but it was limited in the sense that if the site owner wanted a deeper understanding on why a user clicked, Bounce Rate would not be able to provide or pinpoint the *reason* for the click. This limitation could be seen as a significant factor for some organizations that intend to gain a granular insight on deeper clicks into the site. Also, *types* of users are hard to discern from the data. Other than the technical aspect of the user such as what browser they used and what IP address they used for the visit, data will be slightly vague to determine if visits were genuine and organic. There's no way to identify if an increase in traffic was solely based on a student's friends visiting the site because the student instructed them to or if the site generated more traffic due to quality content.

While Bounce Rate is a modular metric that can be used with various other KPIs, the goals of organizations will dictate its usage and importance. Bounce Rate was an important aspect to Virtual Rebel since part of their goals was to increase readership and boost their online presence. However, other institutions could have entirely different objectives that would render a Bounce Rate analysis irrelevant. Organizations that focus their resources on obtaining better writers or editors would not need to have Bounce Rate as part of their principal strategy, unless organizations wanted to base work performance on it.

Although there are specific uses for this strategy, there is potential for this study to be applied in various media platforms and devices. Smartphone users are expected to

hit the 2.5 billion mark in 2017 (“Smartphone Users Worldwide”, 2014) and with the number of people consuming news on these devices increasing year over year (Mitchell, Rosenstiel, & Christian, 2012), this implies that more people will be accessing news on these devices. In part of the data gathering that news applications and websites will be performing, this strategy will have relevance in this area. The iterative process of data analysis and modification in the areas of concentration would still apply.

In a rather radical example, this strategy could be analogously applied to the physical shopping experience. A consumer that enters a record shop and listens to a Beatles album then immediately leaves would be considered a bounce. It is unknown how much satisfaction the consumer received from this, but applying the strategy to a situation such as this can potentially lead to a loyal customer. Organized aisles of albums, proper wayfinding, and visual cues that lead to more Beatles content or similar artists could be quite effective in piquing the consumer’s interest. Beaming Beatles’ music videos to the consumer’s smartphone through proximity beacons when they are close to the promotional display could be an example of convergence of experiences. Although these actions seem dissimilar, the data involved with this activity is similar in nature to the online medium. Through this similarity, this strategy can be applied to these concepts and interpretations.

Future research on this topic can help media scholarship advance in many different ways. In the current state of affairs within the online medium, there is a good amount of flexibility of what can be recorded as far as user data. In order to get a full picture of a user and their intentions, site owners will need to know more about their users. Conversely, privacy laws and secure browsers prevent them from knowing

everything. Arguably, privacy laws might become stricter and disallow user tracking altogether. As more user tracking techniques are established, there is a risk that it might become too invasive and the justice system might be reflexive to ban them. Because of this, organizations would need to look for alternative approaches. This strategy's strength is founded in the core principle of iterative adjustments to visual elements in media. If web analytics were to be abolished due to harsher privacy laws, this strategy could still be applied because the areas of concentration for improvement are rooted in the organization's offerings and not in the offerings of user data. Additionally, Bounce Rate could easily be substituted with another form of measurement such as a voluntary survey that measures satisfaction levels.

The scope of web analytics is vast. With new areas of the online medium like mobile devices and converged media experiences, organizations are able to find out many things about a visitor. Web analytics is still in its infancy and new techniques are still being developed. As such, innovative methods to discover why a user came to the site, what the user wants, and what they want on their subsequent visit is not so far off. Media scholars should continue to research the area of web analytics and pursue inventive techniques that reflect the advancement of technology within the online medium. Doing so will require considerable amount of research, but it will give the means to providing organizations with valuable techniques. Techniques by which, they can advance the field of media and give audiences an enhanced experience that can ultimately satisfy their media consumption.

Previous to this strategy, there were no studies that included the combination of using the three areas of concentration with Bounce Rate. However, there was a healthy

amount of research dedicated to each component such that it gave an overall understanding to combine them all. This was a new territory for media scholarship. It introduced some disciplines that are rarely considered for media scholarship, but are integral pieces within the online medium. It was imperative that these areas were examined together.

This strategy is a blueprint to increase user engagement and to gain more loyal readers. Its strengths are founded in the core principle of iterative adjustments to various areas of the site, with the intention to identify problems or gain more insight. Bounce Rate analysis, combined with information architecture, graphic design, and media convergence pieces, illustrate to site owners a better picture about their users' visitations, therefore giving organizations more power and knowledge to make informed decisions.

Institutions that use this will ultimately improve their readership numbers and gain more loyal readers. For profit-based organizations, it's possible to gain a higher return-on-investment. For non-profits, it can facilitate a higher reputation among the community. As with many colleges that have a journalism and media program, they too will be able to apply this strategy to their own websites, such that valuable information about their users can be gleaned.

Technology within the online medium will only get better and more innovative. By using the core concepts from this strategy with newly developed ideas, organizations will still gain valuable information about their audience. Power of the People rule the landscape of online media and it is of unprecedented importance that the audience is always considered in any website decision. By using this strategy, decisions made will be

well informed and insightful and the goal to keeping audiences engaged will not be so obscured.

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VITA
Graduate College
University of Nevada, Las Vegas
Michael Vendivel

Home Address:
11429 Parkersburg Ave.
Las Vegas, NV 89138

EDUCATION

Master of Arts in Journalism and Media Studies, 2014
Hank Greenspun School of Journalism and Media Studies, 2011–2012
University of Nevada, Las Vegas

Thesis Title: *Virtual Rebel* Website: A Strategy to Increase User Engagement through
Bounce Rate Analysis

Thesis Examination Committee:

Chair: Gregory Borchard, Ph. D

Committee Member: Julian Kilker, Ph. D

Committee Member: Gary Larson, Ph. D

Graduate Faculty Representative: Sang-Duck Seo, Assoc. Prof.

Bachelor of Arts in Art; Concentration in Graphic Design, 2008
University of Nevada, Las Vegas

PROFESSIONAL EXPERIENCE

Clark County School District, Web Manager, January 1997 to Present

PRESENTATIONS

Vendivel M. “Virtual Rebel Website: A Strategy to Increase User Engagement Using
Bounce Rate Analysis” Presented at the 5th Annual Graduate Research Symposium, Las
Vegas, Nevada.