
AN OVERVIEW ON USING GOOGLE ANALYTICS TO IMPROVE THE COURSE WEBSITE OF A DATABASE COURSE

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ABSTRACT

As the popularity of online learning has risen over the past decade, so has the usage of learning analytics. Instructors must develop innovative methods to improve student learning online and analyze students' interactions with their digital educational environment as online education continues to expand. This article describes how Google Analytics was used as learning analytics software on a database course website. The study's goal was to figure out which elements of the course website were the most successful in enhancing student learning. Throughout a semester, Google Analytics was utilized to track student activity on the course website in order to better understand how students interacted with it. Patterns and trends in student engagement were discovered by analyzing the gathered data. The discovered patterns were then linked with different internet page characteristics such as the degree of interaction and page content type. The most significant element for boosting student engagement with course material was the interactivity of a course website, according to the findings. In-page quizzes, in particular, were found to be very successful in increasing student engagement with the site. This pilot research demonstrated how Google Analytics might be a useful tool for monitoring and improving online student learning.

KEYWORDS: Database, Google Analytics, Learning Analytics, Online Learning.

1. INTRODUCTION

Virtual education has been transformed as information technology and the Internet have advanced. Digital training has become a critical component of the education systems as a consequence of this transformation. According to Allen and Seaman¹, the total number of students taking at least one online course has surpassed 7.1 million, accounting for 33.5 percent of all students enrolled in degree-granting post-secondary universities. Web made possible Courses with 1 to 29 percent of content delivered online, Blended/Hybrid Courses with 30 to 79 percent of content delivered online, and Online Courses with 80 to 100 percent of content provided online are the techniques educators are using for online learning, according to a survey conducted by the Babson Survey Group in January 2014. According to the study, 90% of academic leaders predict that in five years, the bulk of higher education students would be enrolled in at least one online course. To understand how students engage with their learning environment and course content, researchers and instructors have depended on watching students in the classroom in a face-to-face situation until recently. However, teachers are increasingly incorporating internet material into conventional classes. Some teachers, in particular, use online texts and assignments.

Other teachers, however, use the pedagogical approach of a flipped classroom, in which students watch and study lectures prior to class so that professors may concentrate on exercises during class. Instructors may not always have the freedom to watch their students in a face-to-face environment, thanks to the rise of online courses and course materials, as well as the increasing

usage of online information in conventional classes. As a result, tracking students' progress and recording their interactions with online learning material is critical. Learning Analytics seems to be a potential answer to this problem. Understanding, analyzing, and sharing data are all aspects of analytics[1]. Baker and Siemens describe analytics and data mining in general terms as "methodologies for extracting valuable and actionable information from big databases." Learning analytics (LA) is the process of gathering and analyzing relevant data generated by students as they engage with their learning environment. Learning analytics was defined as “the measurement, collection, analysis, and reporting of data about learners and their contexts for the purposes of understanding and optimizing learning and the surroundings in which it occurs” at the First International Conference on Deep Learning and Knowledge3 in 2011. The main goal of this research is to see whether Google Analytics, a more broad analytics tool, can be modified to help with the assessment of the learning system or course website based on the data collected by Google Analytics. The paper's primary goal is to see whether Google Analytics can be used to identify parts of the learning program or program website that need to be enhanced[2].

1.1 Google Analytics:

Collected Data & Management, Data Consolidation, Data Analytics & Reporting, and Data Activation are all features of Google Analytics, a web analytics tool. This application's goal is to evaluate, monitor, and measure website traffic. Google Analytics is a flexible tool that provides unique metrics (also known as quantitative measures) for tracking how users interact with your website. User data, session data, traffic sources, system or device used to access the site, page tracking, content grouping, site speed, social interactions, application tracking, event tracking, and many other types of data may be gathered using Google Analytics. 4 Google Analytics can reveal which devices people are using to visit the site, including desktop computers, mobile devices, and tablets. This information may provide valuable insight into how to build the layout of the website depending on how students access it from an instructional design standpoint. Following the collection of measurements, Google Analytics arranges the data in a user-friendly, easy-to-understand manner. It does it by using charts, graphs, and other tools. Dimensions and metrics are the two kinds of data that Google Analytics distinguishes. As shown in Table 1, dimensions define the characteristics of users, their sessions, and their activities. Metrics and dimensions are comparable in that they both describe quantifiable measures of users, sessions, and activities. Both kinds of data are included in every report. When opposed to commercially available learning analytics solutions, Google Analytics takes a far more dynamic approach to the types of data collected. For example, via session engagement, Google Analytics will automatically monitor how students interact with the site[3].

TABLE 1: GOOGLE ANALYTICS DIMENSIONS

Dimensions	Description
Pageviews	Pageviews is the total number of pages viewed. Repeated views of a single page are counted.
Unique Pageviews	Unique pageviews is the number of sessions during which the specified page was viewed at least once. A unique pageview is counted for each <i>page URL + page Title</i> combination.
Average Time on Page	The average amount of time users spent viewing a specified page or screen, or set of pages or screens.
Entrances	New versus returning users, frequency & recency, engagement, user-ID coverage, site speed, site search, site content
Bounce Rate	Bounce rate is the percentage of single-page visits (i.e., visits in which the person left your site from the entrance page without interacting with the page).
% Exit	% exit is (number of exits) / (number of pageviews) for the page or set of pages. It indicates how often users exit from that page or set of pages when they view the page(s).
Browser	The browsers used by visitors to your website.
Operating System	The operating systems used by visitors to your website. Includes mobile operating systems such as Android.

1.2 Target Website and Participants:

The curriculum portal for a computer course (IST 210-Organization of Data) at Penn State University's Berks College is being analyzed using Google Analytics[4]. The website is designed to be an online interactive textbook that uses a problem-based approach to bringing databases to life. The university's Word Press platform was used to create the course webpage. For IST 210 learners, the website serves as their sole textbook resource, allowing them to view their textbook from anywhere they have Internet access. The course website is also mobile responsive for students who are utilizing a tablet or even other mobile device. In-page activities and evaluations are integrated into the section pages of the website, enabling learners to perform and demonstrate their knowledge as they progress. Google Analytics relevant features is embedded on each page of the website, enabling the analytic tool to collect in-page statistics using cookies and JavaScript. The tracking code is connected to a Google Analytics account that allows account owners to access statistical data. IST 210 is a first-year and second-year IST course with a large number of first-year and second-year students. In this study, 44 students from both portions of the course participated. While this course involves a traditional face-to-face meeting, the textbook and student participation are mainly reliant on the internet[5].

1.3 Data Gathering:

The data collected by Google Analytics was collected and converted into an Excel sheet after each weekly meeting of the IST 210 sections. Furthermore, the data were collected into a bespoke report to assess dimensions and metrics related to the study's goal of establishing whether Google Analytics might be tailored to aid in the assessment of the learning system or course website. Page, date, operating system, session duration, and hour were the individual dimensions chosen. Page hits, lower bounce, and average amount of time on page were the key metrics used for the study, as previously mentioned[6]. Page views and average time on page were the major metrics considered in the investigation. These measurements were used to compare the amount of expected student interaction with each web page and the information on the page. Between the 10th of January and the 4th of March, a total of 2297 data points were gathered. Only pages containing course content from the chosen time period were included in the analysis. Each of the website's pages was categorized depending on the level of interactive components that the page had in order to examine the students' relationship with the IST 210 course website. The goal of categorizing the website's pages was to figure out the connections between the collected data (dimensions) and the website's interaction features. As a result, the characteristics of pages that most interested students could be identified[7].

2. LITERATUREREVIEW

Fang et al. studied about Google Analytics is a free online analytics tool that gives webmasters valuable insight into how users find and engage with their webpages. We used Google Analytics to investigate two of our webpages in this case study: the Rutgers-Newark Law Library main website and the New Jersey Digital Law Library webpage. For 3 months, it was utilized to track our users' browsing and watching activities. We updated our website based on the findings of our Google Analytics data. Our new design better meets the information demands of our visitors and librarians, according to data collected by Google Analytics. Google Analytics is a powerful tool that can be applied to nearly any website. We feel that employing Google Analytics will benefit other libraries as well. Based on our experience with Google Analytics, we also analyze its limitations[8].

According to Luo et al. this research looks into the advantages and disadvantages of utilizing Google Analytics to analyze and visualize learning analytics in advanced degree online programs. This study has revealed significant official statistics learners' characteristics, online learning behaviors, and technology use during a three-and-a-half-year period using a graduate-level, open-

access online course as a case study. The findings are likely to highlight useful elements of Google Analytics and its visualization tools, deepen our understanding of learners' online learning practices at the course level, and guide the design and development of online educational materials and websites for college settings[9].

Hasan et al. Despite the significance of good usability in e-commerce websites, there are few studies that evaluate the usability of such sites in the literature. Those that were discovered focused on identifying usability issues and making recommendations for how to make the sites under review more usable. However, little research has looked into the impact of increasing an e-commerce website's usability on its web usage and performance. This study evaluated the changes in usability of an e-commerce website after it was revamped based on an initial evaluation of its usability using a matrix of advanced web metrics produced with Google Analytics software. The matrix of advanced web metrics was found to be a valuable tool for illustrating changes in a site's usability and performance in the study. The study also shown that increasing the usability of an e-commerce website has a substantial impact on its web usage and performance. However, given the measurements revealed possible usability concerns, more investigation is required. The following stage will be to use the user test methods to confirm the metrics' improvement indicators[10].

3. DISCUSSION

Google Analytics was found to be an effective option as a teaching analytics tool in this exploratory investigation. Google Analytics can collect sufficient student event data, which may then be examined to better understand how people interact with the course website. As a result, we now know how to better personalize the course website to the needs of the students. Google Analytics, on the other hand, was unable to collect data that can be linked to specific pupils. This is a limitation of the Google Analytics edition utilized in the study. Instructors who use an institutionalized version of WordPress do not have access to all of the capabilities available to non-institutionalized users. This version does not allow for changes to the code or other features in order to achieve the goal of tracking individual users. A non-institutionalized user would be able to edit WordPress code and create a unique tracking ID for each user. This might therefore enable for the examination of each user's behavior on the site on an individual basis. The conclusions of this study's research revealed several interesting facts concerning students' interactions with the course website. The study's initial finding was which interactive element students found most useful while reviewing course material. Students said the in-page quizzes were the most useful component on the course website for reviewing. Students can get immediate feedback on their grasp of the topic by taking these quizzes. Students prefer to spend more time on a page if it includes a quiz, according to Google Analytics statistics. Instructors who have course websites should include in-page quizzes in the content, according to student comments. Students can use these in-page quizzes to assess their learning and reread the material that they found useful on their own. Exercises, according to students, were ineffective since they did not provide immediate feedback or allow them to self-assess their learning.

4. CONCLUSION

This study demonstrates how Google Analytics may be used to gather data for better course website design and to determine the homepage features that most interest students. Such information, when joined with information collected through course management systems, can be utilized to improve student learning in both online and traditional courses that rely significantly on online content. This study demonstrates the potential of Google Analytics and the considerable impact it can have in the field of education, based on the steadily increasing percentages of students enrolled in online and hybrid courses. Google Analytics provides educators and professionals with the chance to use an analytics tool that helps them to track and analyze how users interact with their website, allowing for possible optimization.

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