

Leveraging Google Analytics to Enhance User Engagement: A Case Study of a State University Library Website in Sri Lanka

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ABSTRACT

This study aimed to examine the effectiveness of a university library website using Google Analytics, which tracks and analyses website traffic and user behaviour to inform performance optimisation. With the Global Site Tag integration, data were collected over a twenty-four-month period from July 2022 to July 2024. Descriptive statistics and correlation analysis were employed to examine user behaviour patterns, traffic sources, and engagement metrics. The analysis revealed approximately 46,000 users, of whom approximately 44,000 (94.9%) were new users, indicating that a high proportion of visitors were first-time users. Engagement metrics included an engagement rate of 61.06% and an average engagement time of 1 minute and 53 seconds. The website also recorded a bounce rate of 42.7%, which warrants consideration alongside other engagement indicators. Correlation analysis identified significant relationships between selected variables. A moderate positive correlation was reported between device category and average engagement time ($r = .560$, $p = .002$), while strong positive correlations were observed between new users and sessions ($r = .925$, $p < .001$), event count and average engagement time ($r = .780$, $p < .001$), and engaged sessions and

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average engagement time ($r = .926, p < .001$). The findings indicate that device type, user interactions, and session characteristics were significantly associated with website engagement. The recommendations include (i) mobile optimisation for the substantial mobile user base, (ii) enhanced search engine optimisation strategies to increase organic traffic, (iii) website redesign with improved navigation, (iv) targeted marketing initiatives, and (v) continuous performance monitoring through Google Analytics. Overall, the study demonstrates the value of web analytics in informing data-driven decisions to enhance digital library service effectiveness.

Keywords: *Google Analytics, Global Site Tag, User Engagement, University Library Website*

Introduction

The accelerated digital transformation within higher education has positioned university libraries as critical infrastructure for accessing scholarly resources in the digital environment. As these platforms assume increasing prominence in supporting academic endeavors, optimizing their functionality and ensuring alignment with the evolving requirements of the academic community has become imperative. This study examined the application of Google Analytics to evaluate and enhance the digital services rendered via the library website in the selected university, with special focus on improving user engagement, resource accessibility, and content relevance.

The selected state university library website, established in 2001, functions as a comprehensive digital platform offering an extensive array of services and resources. The website provides integrated access to major databases, the Institutional Repository (IR), Learning Management Systems (LMS), and the Online Public Access Catalogue (OPAC), alongside diverse scholarly resources designed to serve the heterogeneous needs of the university's academic community.

Web analytics has emerged as an established methodology for analysing and optimizing web-based educational resources. As Loftus (2012) notes, web analytics encompasses the collection, analysis, reporting, and visualization of web metrics data, yielding detailed insights into user behaviour, acquisition patterns, and content utilisation. Through comparative analysis of visitor behaviour, web analytics can inform strategic improvements in site content and design (Plaza, 2011), facilitating the achievement of organizational objectives while enhancing user satisfaction and engagement (Bekavac & Garbin, 2015).

Ravikumar and Ramanan (2021) noted that usage statistics obtained through Google Analytics can be effective; however, these statistics are accessible only to the repository administrator and are not visible on the repository interface in Sri Lanka. This provided additional impetus for undertaking the present study to use Google Analytics to explore traffic to the library website and identify ways to improve user engagement.

This study employed Google Analytics as an analytical framework to conduct a comprehensive examination of the selected university library website. Hence, the research aimed to develop a nuanced understanding of website utilisation patterns and identify opportunities for enhancement, ensuring that digital library services remain responsive to user needs and maintain relevance within the rapidly evolving digital scholarly ecosystem.

Problem statement

Despite the comprehensive digital resources offered by university libraries, systematic understanding of user interaction patterns with these platforms remains limited. User engagement with library websites frequently falls below optimal levels, manifesting in elevated bounce rates and insufficient utilisation of available resources. A key challenge is the limited use of empirical, data-

driven strategies to optimize these platforms based on actual user behaviour and interaction patterns. This study addresses this critical gap by employing web analytics to generate actionable insights into user engagement dynamics and identify targeted opportunities for platform enhancement.

Significance of the study

This study holds significant scholarly and practical value as it generates empirical insights capable of substantially enhancing the utilisation and effectiveness of digital library services. By leveraging Google Analytics as a robust analytical instrument, the research not only examines current user interaction patterns with the library website but also develops evidence-based strategies to optimize these interactions and elevate user satisfaction. The study demonstrates the transformative potential of data-driven methodologies in rendering library digital resources more accessible, intuitive, and valuable for the academic community.

Furthermore, the findings contribute to the broader discourse on digital library optimisation by establishing a replicable analytical framework that other higher education institutions can adapt to enhance their own digital platforms. This research thus extends beyond the immediate institutional context, offering methodological insights and strategic recommendations with applicability across diverse academic library environments seeking to strengthen their digital service delivery and user engagement outcomes.

Objective of the study

The main objective of this study was to evaluate user engagement and interaction patterns with the university library website using Google Analytics and to identify opportunities for improving the usability and effectiveness of the website based on the observed user behaviour. Accordingly, the study addressed the following objectives:

- i. To analyse user engagement, traffic patterns, and content utilisation of the university library website using Google Analytics.
- ii. To identify opportunities for improving the usability, accessibility, and user engagement of the university library website based on Google Analytics findings.

Relevant literature

In the digital era, academic libraries are increasingly leveraging data analytics to understand user behaviour, evaluate web performance, and improve service delivery. As physical visits decline and virtual interactions rise, the library website has become the central hub of user engagement. Tools such as Google Analytics (GA) provide valuable insights into how users interact with digital interfaces, helping institutions make data-driven decisions about usability, accessibility, and content design (Yu, Bekerian, & Osback, 2024). This review critically examined global and regional studies on the use of GA in academic libraries, focusing on its implications for enhancing user engagement, usability, and decision-making in higher education contexts, particularly within Sri Lanka.

Several academic libraries globally have used GA to identify underutilized sections of their websites. For example, Cribbs et al. (2025) found that only a small portion of users accessed digital archives and open access repositories, prompting redesign efforts to make these services more visible. Similarly, Ogrodniczuk et al. (2021) demonstrated that tracking user flows revealed high bounce rates on library instruction pages, leading to targeted redesign and improved engagement metrics.

Beyond technical evaluation, GA also assists in aligning digital strategies with institutional missions. According to Jones et al. (2020), analytics enables libraries to assess whether their online presence effectively supports learning outcomes and research activities. Roy and Habib (2024) mention that such data-driven insights bridge the gap between library administration and IT teams, fostering collaborative efforts to enhance digital infrastructure and

academic performance. User experience (UX) and usability are key determinants of engagement in digital library environments. Research suggests that effective information architecture, clear navigation, and responsive design are fundamental to sustaining user interest (Syamala et al., 2025). GA metrics such as average session duration and user return rate serve as proxies for assessing UX quality (Wang & Hu, 2024).

In the Sri Lankan context, a study by Wijayaratne (2013) reported usability issues in several university library websites, citing outdated structures and lack of feedback mechanisms as barriers to engagement. In this regard, as Gkikas and Theodoridis (2024) state, incorporating GA would allow institutions to identify patterns such as high drop-off points, low engagement pages, and device-specific accessibility issues. Moreover, Lu and Lin (2025) note that the adoption of analytics could significantly improve the user-friendliness and digital sustainability of academic library websites in developing regions. Similarly, Ranasinghe and Kartheeswaran (2018) demonstrated the effectiveness of Google Analytics in devising digital marketing strategies to allure customers and Search Engine Optimisation (SEO) to enhance user experience (UX). Gunawardana (2025) demonstrated the value of Google Analytics data in improving the user experience in e-commerce. In the university library context, Pratheepan and Jeyakananthan (2021) emphasize the usefulness of Google Analytics in determining audience behaviour, content preference, and traffic from both national and global perspectives.

Research gap

The reviewed literature demonstrates that Google Analytics and other web analytics approaches can provide valuable evidence regarding website visibility, user behaviour, content utilisation, and digital service performance. Studies conducted in Sri Lanka have also demonstrated the usefulness of Google Analytics in evaluating library web portals and understanding online visibility. However, limited attention has been given to examining multiple

dimensions of university library website engagement simultaneously, including traffic sources, device categories, geographic distribution, page-level behaviour, and relationships among engagement indicators. Furthermore, relatively limited empirical evidence is available on how such analytics findings can be translated into specific website usability and digital service improvement strategies within the Sri Lankan university library context. The present study addresses this gap by examining Google Analytics data over a two-year period and using the observed patterns to identify evidence-based opportunities for improving the university library website.

Methodology

This study employed a quantitative research design to evaluate user engagement and interaction patterns with the website of a state university library in Sri Lanka. The study used web analytics data generated through Google Analytics to examine patterns of website use and identify areas requiring improvement. The analysis focused on user behaviour, traffic sources, device categories, geographic distribution, page-level usage, and selected engagement indicators.

Data Source and Study Period

The study utilized Google Analytics data collected from the university library website over the period from July 2022 to July 2024. Google Analytics was selected as the principal data source because it provides systematic information on website users, traffic sources, user interactions, content utilisation, and engagement behaviour. The analysis was based on the usage data generated through the library website during the specified study period.

Google Analytics Implementation

Google Analytics was implemented on the library website through the Global Site Tag. A dedicated Google Analytics account was established for the library, and the relevant tracking code was incorporated into the website

source code. This enabled the systematic collection of information concerning website users and their interactions with the available digital resources. The collected data included information relating to users, new users, sessions, engagement, views, events, traffic sources, device categories, countries, and individual website pages.

Variables and Measures

The analysis considered several Google Analytics measures to evaluate website usage and user engagement. These included the number of users and new users, sessions, engagement rate, average engagement time, engaged sessions per user, views, event count, bounce rate, exit data, traffic sources, device categories, geographic distribution, and page-level usage. These measures were selected to provide a broad assessment of the ways in which users accessed and interacted with the library website.

Traffic-source data were examined to identify the major channels through which users reached the website, including direct, referral, organic social, and organic video traffic. Device-category data were used to identify differences in website access through desktop computers, mobile devices, and tablets. For the correlation analysis, device category was coded numerically as Desktop = 1, Mobile = 2, and Tablet = 3, and the coded values were used with average engagement time to examine their relationship. Geographic data were analysed to identify the distribution of users across countries. Page-level data were examined to determine which library resources and services attracted the greatest number of views and levels of engagement. Pearson's correlation analysis was conducted using selected Google Analytics metrics to examine relationships between user and engagement measures. The correlation coefficients (r) and corresponding p -values were calculated from the exported Google Analytics data and analysed using SPSS, with statistical significance assessed at the 0.05 level.

Data Analysis

The collected data were analysed using descriptive statistics and correlation analysis. Descriptive statistics were used to summarize the overall level of website usage and engagement, including the number of users, new users, sessions, engagement rate, average engagement time, views, event counts, traffic sources, device categories, and page-level usage.

Correlation analysis was used to examine the relationships among selected website usage and engagement variables. In particular, relationships between device category and average engagement time, new users and sessions, event count and average engagement time, and engaged sessions and average engagement time were examined. The correlation coefficients and corresponding significance values were considered when interpreting the relationships among the variables.

The analysis was undertaken to address the two research objectives. The first objective was addressed through the analysis of user engagement, traffic patterns, device usage, geographic distribution, and content utilisation. The second objective was addressed by interpreting the observed usage patterns and identifying areas where improvements to website usability, accessibility, navigation, content visibility, and user engagement could be considered.

Pearson's correlation coefficient was used to examine the relationships between Google Analytics metrics, including device category and average engagement time. The correlation coefficient (r) and corresponding p-value were calculated using the Google Analytics data exported for the study period and analysed using SPSS.

Findings

The study examined data from July 2022 to July 2024. During this period, 45,852 users accessed the university library website, of whom 43,510 were new users (94.9%). This high proportion indicates that a substantial share of website users during the study period were first-time visitors.

The engagement metrics reveal several notable patterns. The website

recorded an engagement rate of 61.06% and an average of 1.40 engaged sessions per user. The average engagement time was 1 minute and 53 seconds. In addition, the website recorded approximately 229,000 views and a total event count of 674,179. The event count includes the events recorded by Google Analytics and should therefore be interpreted together with the specific event definitions used. Most users (54.9%) accessed the site on desktop devices, 43.7% used mobile devices, and 1.4% used tablets.

Figure 1

Overview of user engagement and website traffic metrics for the university library website, July 2022–July 2024

↓ First user prim...Channel Group) ▾ +		New users	Engaged sessions	Engagement rate	Engaged sessions per user	Average engagement time	Event count All events ▾
		43,510 100% of total	64,236 100% of total	61.06% Avg 0%	1.40 Avg 0%	1m 53s Avg 0%	674,179 100% of total
1	Referral	1,099	1,606	74.46%	1.41	1m 54s	14,139
2	Organic Video	1	0	0%	0.00	0s	3
3	Organic Social	102	70	50.72%	0.69	35s	657
4	Organic Search	22,948	29,210	63.2%	1.24	1m 33s	306,796
5	Direct	19,360	33,298	57.53%	1.57	2m 15s	352,584

Note. Data obtained from Google Analytics (2024).

Traffic Sources

The analysis of traffic sources identified differences in engagement across the major channels through which users accessed the library website. Direct traffic recorded an engagement rate of 57.44% and approximately 44,800 sessions. Referral traffic demonstrated the highest engagement rate among the major sources at 70.3%, with an average engagement time of 57 seconds and 7.12 events per session. These results indicate that users arriving through external referring websites demonstrated relatively high levels of interaction with the library website.

Organic Social traffic recorded an engagement rate of 67.15%, although the average engagement time was relatively short at 24 seconds. This pattern suggests that social media platforms may be effective in directing users to the library website, but the relatively short engagement time indicates the need to examine whether users arriving through social channels are reaching content

that corresponds closely with their expectations.

Organic Video traffic recorded only one user and one session during the study period and therefore provides insufficient evidence for drawing meaningful conclusions about the effectiveness of this channel. Consequently, the organic video result should be interpreted cautiously rather than generalised to the overall performance of the website.

Overall, the differences among traffic sources indicate that the library could benefit from monitoring not only the volume of traffic generated by each channel but also the quality of engagement associated with each source. This would enable the library to prioritize digital communication and promotional activities based on both reach and user interaction.

Overall Website Usage

According to Figure 1, the average engagement time on the website was 1 minute and 53 seconds. During the period from July 2022 to July 2024, 45,852 users accessed the university library website, of whom 43,510 were new users (94.9%). The high proportion of new users indicates that the website reached a substantial number of first-time visitors during the study period.

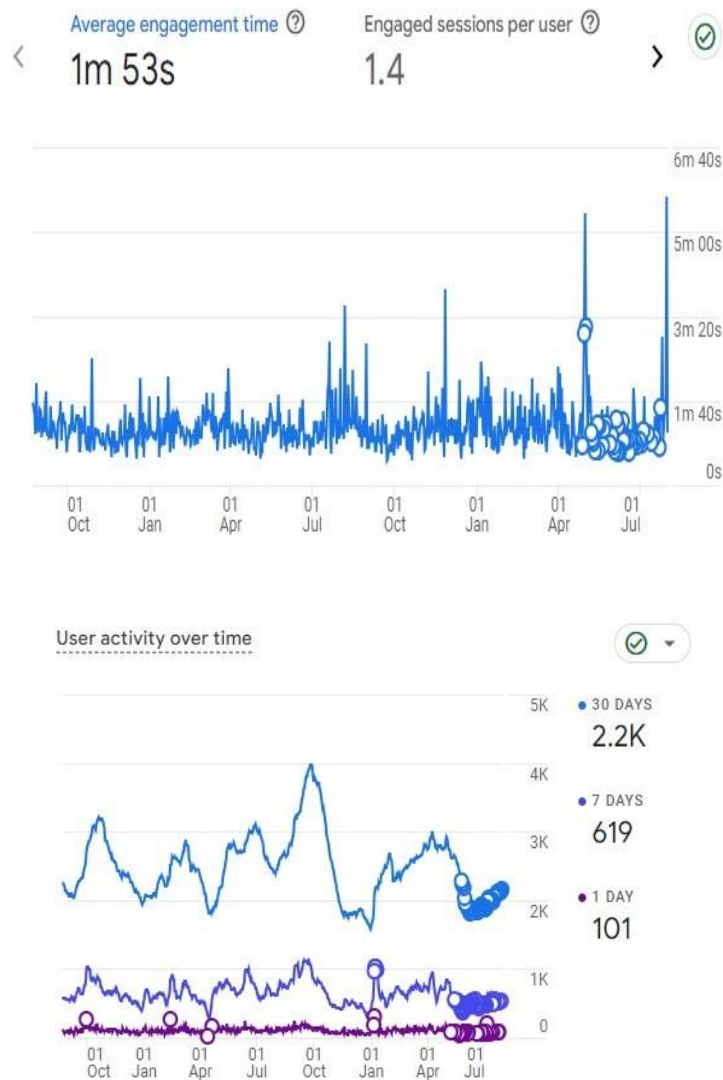
The website recorded an engagement rate of 61.06%, while the average engagement time was 1 minute and 53 seconds. The average number of engaged sessions per user was 1.40. In addition, the website recorded approximately 229,000 views and a total event count of 674,179. These figures indicate substantial levels of activity across the website during the study period. However, the interpretation of these indicators should consider the nature of the individual resources and user tasks performed on the website, as a short session may reflect the successful completion of a specific information need rather than necessarily indicating poor engagement.

Regarding device usage, 54.9% of users accessed the website through desktop devices, while 43.7% used mobile devices and 1.4% used tablets. Although desktop devices represented the largest category, mobile users accounted for a substantial proportion of total website users. Therefore, mobile

accessibility and responsive website design remain important considerations for the effective delivery of digital library services.

Figure 2

Website session activity and user traffic patterns across selected time periods, July 2022–July 2024



Note. Data obtained from Google Analytics (2024).

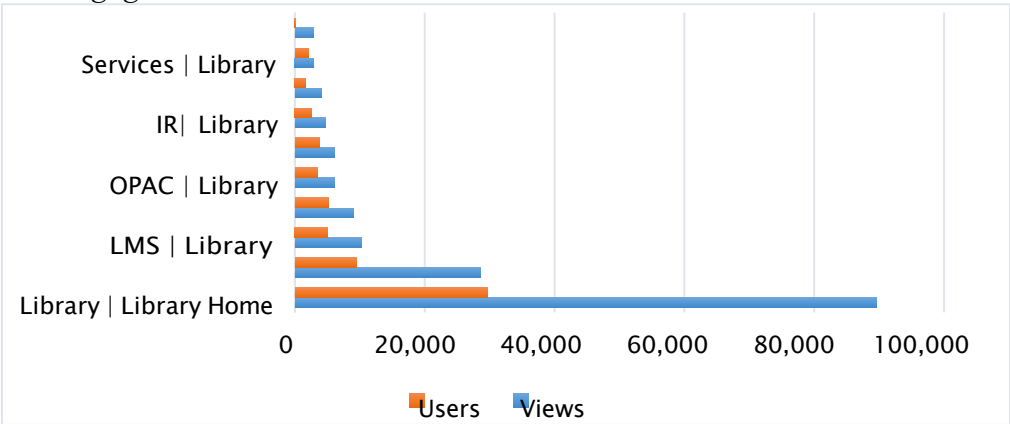
- Trend Overview: The data shows that user activity tends to be higher over longer periods, with a peak at the 30-day mark and a noticeable

drop-off in recent days. This could be indicative of overall steady engagement with periodic dips.

- **Activity Patterns:** The reduction from 2,200 sessions over 30 days to 101 sessions in a single day suggests that while the site maintains a consistent level of interest over time, there are fluctuations in daily activity. These fluctuations could be influenced by various factors such as recent events, changes in content, or external factors affecting user behavior.
- **Potential Insights:**
 - **Engagement Strategies:** If daily sessions are significantly lower than the weekly or monthly averages, it may be beneficial to investigate daily user engagement strategies. Regular content updates, targeted promotions, or improved user notifications might help sustain higher daily activity levels.
 - **Monitoring and Adjustments:** Continuously monitor these trends to identify patterns or anomalies. Implementing A/B testing or user feedback collection could provide insights into what drives spikes or drops in daily activity.

Figure 3

Most frequently accessed library website pages and their corresponding user engagement indicators



Note. Data obtained from Google Analytics (2024).

Top Pages Drawn from Google Analytics

The analysis of individual website pages revealed considerable variation in user activity and engagement. The Library Home page recorded the highest number of views, with 89,537 views from 29,656 users and an average engagement time of 1 minute and 7 seconds. The Databases page recorded 28,534 views from 9,464 users and an average engagement time of 1 minute and 20 seconds. These results indicate that the library homepage and database-related services constitute important points of interaction with the library's digital platform.

The LMS page recorded 10,272 views from 5,105 users, but the average engagement time was only 16 seconds. Similarly, the E-Books page recorded 9,041 views from 5,142 users, with an average engagement time of 39 seconds. The comparatively short engagement times on these pages warrant further examination because they may reflect either quick completion of specific information-seeking tasks or difficulties in locating and interacting with the available content. Google Analytics data alone cannot establish the underlying reason for these patterns; therefore, further usability testing or user feedback would be useful for determining whether navigation, content presentation, or other factors contribute to the observed behaviour.

The Newsletter June Issue 2023 page recorded 2,901 views from only 171 users, resulting in 16.96 views per user and an average engagement time of 24 seconds. The relatively high views-per-user value suggests repeated access to this particular content among a smaller group of users. This pattern may indicate concentrated interest in the newsletter, although additional qualitative investigation would be required to determine the reasons for repeated access.

Overall, the page-level findings demonstrate that website usage is not evenly distributed across the available resources. The results therefore provide useful evidence for prioritising frequently accessed services while also identifying pages that may require further evaluation of content presentation, navigation, and usability.

Figure 3 shows that usage varied considerably across website pages. The Library Home page received the highest number of views, while some other pages attracted smaller but more concentrated audiences. The Newsletter June Issue 2023 page, for example, recorded a high views-per-user value, suggesting repeated access by a smaller group of users.

Figure 4 provides an overview of the geographic distribution of website users and engagement across countries. Sri Lanka recorded the highest number of users (41,061), with an engagement rate of 61.41%. India and the United States recorded engagement rates of 59.34% and 47.82%, respectively, while Indonesia and Australia recorded 64.52% and 65.37%. These figures illustrate variation in both user volume and engagement across countries and can support continued monitoring of the website's international reach.

Figure 4

Geographic distribution of university library website users and engagement rates by country

Country ▾ +		↓ Users	New users	Engaged sessions	Engagement rate	Engaged sessions per user	Average engagement time
		45,852 100% of total	43,510 100% of total	64,236 100% of total	61.06% Avg 0%	1.40 Avg 0%	1m 53s Avg 0%
1	Sri Lanka	41,061	38,799	60,760	61.41%	1.48	1m 58s
2	India	795	784	648	59.34%	0.82	1m 09s
3	United States	709	672	471	47.82%	0.66	45s
4	China	544	481	284	48.05%	0.52	2m 57s
5	Indonesia	311	222	320	64.52%	1.03	1m 21s
6	Singapore	241	206	205	60.65%	0.85	46s
7	United Kingdom	177	166	157	61.33%	0.89	1m 00s
8	Australia	164	155	134	65.37%	0.82	1m 09s

Note. Data obtained from Google Analytics (2024).

Bounce Rate Analysis

The website recorded a bounce rate of 42.7%. This indicates that a proportion of visits did not result in an engaged session according to the measurement framework applied in Google Analytics. The finding warrants further examination of landing-page performance, content relevance, navigation, and page-loading experience. However, bounce rate should not be interpreted

independently as evidence of poor website usability because users may leave after quickly obtaining the information they require. Therefore, bounce-rate analysis should be considered together with engagement time, page views, traffic sources, and page-level behaviour.

Exit Analysis

The website recorded 684 exits. Exit data are useful for identifying pages from which users most frequently leave the website and can therefore support further investigation of possible navigation or content-related issues. However, an exit does not necessarily indicate dissatisfaction because users may leave the website after successfully completing an information-seeking task. Consequently, exit patterns should be interpreted alongside other engagement indicators and, where possible, complemented by user feedback or usability testing.

Pearson's correlation coefficients were calculated using the selected Google Analytics metrics exported from the website analytics platform. The exported data were analysed using SPSS, and the correlation coefficients (r) and corresponding p-values were used to determine the strength, direction, and statistical significance of the relationships at the 0.05 significance level.

Table 1
Correlation Analysis

Comparison	Correlation Coefficient	p-value	Interpretation
Device Category & Average Engagement Time	0.560	0.002	Moderate positive correlation, statistically significant.
New Users & Sessions	0.925	<0.001	Strong positive correlation, statistically significant.
Event Count & Average Engagement Time	0.780	<0.001	Strong positive correlation, statistically significant.
Engaged Sessions & Average Engagement Time	0.926	<0.001	Strong positive correlation, statistically significant.

Source: Authors' compilation, 2024

The analysis reveals varying degrees of correlation between key metrics on the university library website, with statistical significance providing insights into user engagement. A moderate positive correlation ($r = 0.560$, $p = 0.002$) was found between device category and average engagement time, indicating that device type is moderately associated with engagement time. Strong positive correlations were observed between new users and sessions ($r = 0.925$, $p < 0.001$), event count and average engagement time ($r = 0.780$, $p < 0.001$), and engaged sessions and average engagement time ($r = 0.926$, $p < 0.001$), all of which were statistically significant. These findings indicate that new users, user interactions (events), and engaged sessions are strongly associated with engagement time, providing useful insights for optimizing the user experience of the library website.

Discussion

The findings demonstrate the usefulness of Google Analytics for examining user engagement, traffic patterns, and content utilisation within a university library website. Rather than relying solely on conventional website usage counts, the analysis provides a more detailed view of how users reach the website, which devices they use, which resources they access, and how they interact with different sections of the platform. This supports the broader argument that web analytics can provide libraries with evidence for continuous improvement of digital services (Loftus, 2012; Plaza, 2011).

The predominance of new users is one of the notable findings of the study. Approximately 95.7% of users were identified as new users during the study period. This indicates that the library website served as an important access point for first-time visitors and potentially contributes to the visibility of the library's digital services. However, a high proportion of new users should not automatically be interpreted as evidence of continuous growth or sustained engagement. Instead, it highlights the importance of understanding how newly acquired users interact with the website and whether they subsequently return to use its resources. This finding reinforces the importance

of using web analytics not merely to count visitors but to examine patterns of interaction and content use over time. Previous research has similarly emphasized the value of web analytics for understanding website users and improving digital service delivery (Bekavac & Garbin Praničević, 2015; Pratheepan & Jayakananthan, 2021).

The overall engagement rate of 61.06% and average engagement time of 1 minute and 53 seconds indicate that a substantial proportion of visits involved interaction with the website. At the same time, the relatively short average engagement time suggests that many users may have accessed the website for specific information needs and completed their tasks within a relatively short period. Therefore, engagement time should not be interpreted in isolation as a direct measure of website quality. This is consistent with the broader understanding of web analytics, in which individual metrics need to be interpreted in relation to user behaviour, website purpose, and the type of content being accessed (Loftus, 2012; Plaza, 2011). For an academic library, a short session may represent either efficient information retrieval or limited engagement with available resources. Consequently, combining quantitative analytics with usability studies and user feedback would provide a more comprehensive understanding of the reasons underlying observed behaviour.

The device analysis further demonstrates the importance of responsive digital library services. Desktop devices accounted for 54.9% of users, while mobile devices accounted for 43.7%. Although desktop access remained dominant, the substantial proportion of mobile users indicates that mobile accessibility should be considered an essential component of library website design. This finding is particularly relevant to research on user experience and interface design, which emphasizes the importance of accessible and user-oriented digital environments (Syamala et al., 2025). The results therefore suggest that the library should ensure that navigation, search functions, databases, electronic resources, and other important services remain easily accessible across different screen sizes and device types.

The analysis of traffic sources also provides important implications for

digital library promotion. Referral traffic produced the highest engagement rate at 70.3%, while organic social traffic achieved an engagement rate of 67.15%. These findings indicate that the source through which users reach the library website may influence subsequent interaction. Referral traffic may represent users who have already encountered the library or university through another relevant information environment and therefore arrive with a specific information need. In contrast, social-media users may arrive through promotional or informational content and may require clearer links to relevant library resources. Previous research has demonstrated the potential of web analytics for evaluating online visibility and digital marketing activities (Ranasinghe & Kartheeswaran, 2018; Pratheepan & Jayakananthan, 2021). Accordingly, the library can use traffic-source data to evaluate which promotional channels generate not only higher traffic volumes but also meaningful engagement.

The page-level analysis provides further insight into users' information priorities. The Library Home page received the highest number of views, followed by the Databases, LMS, and E-Books pages. The relatively high use of the Databases page, together with its average engagement time of 1 minute and 20 seconds, suggests that access to scholarly information resources remains an important function of the library website. In contrast, the LMS page recorded an average engagement time of only 16 seconds. This short engagement time should not automatically be interpreted as a usability problem because users may have visited the page simply to access a link or obtain a specific piece of information. Nevertheless, the finding identifies the LMS page as an appropriate target for further usability investigation. The same principle applies to the E-Books page, where the average engagement time was 39 seconds. These findings demonstrate how page-level analytics can help library managers identify both high-value resources and pages requiring further investigation.

The results for the Newsletter June Issue 2023 page are also noteworthy. Although the page received substantially fewer users than the main library

pages, it recorded 16.96 views per user. This indicates repeated access by a relatively small group of users. Such a pattern may reflect specific interest in the newsletter content or repeated access to the information provided on that page. However, because Google Analytics does not directly capture users' motivations, further qualitative investigation would be required before drawing conclusions about why this page was repeatedly accessed. This illustrates the importance of interpreting web analytics as behavioural evidence rather than as a complete explanation of user motivations.

The bounce rate of 42.7% also provides an important area for consideration. A relatively substantial proportion of visits did not result in an engaged session, suggesting that some landing pages or user journeys warrant further investigation. Previous research has highlighted the value of web analytics in identifying underperforming pages and informing improvements to website structure and content (Loftus, 2012; Plaza, 2011). However, bounce rate should not be regarded as a direct measure of dissatisfaction because users may leave after successfully obtaining the information they require. Therefore, the library should examine bounce patterns together with landing-page content, traffic source, engagement time, navigation pathways, and user feedback before undertaking redesign decisions.

The correlation analysis provides additional evidence regarding relationships among website engagement indicators. The strong positive relationship between new users and sessions ($r = .925, p < .001$) indicates that increases in new-user activity were closely associated with increases in sessions during the period examined. Similarly, the strong positive relationships between event count and average engagement time ($r = .780, p < .001$) and between engaged sessions and average engagement time ($r = .926, p < .001$) demonstrate that higher levels of recorded interaction were associated with longer engagement. These relationships support the usefulness of combining multiple Google Analytics indicators. The moderate positive relationship between device category and average engagement time ($r = .560, p = .002$) further suggests that the device through which users access the

website may be associated with differences in engagement behaviour.

The findings are broadly consistent with previous research emphasizing the value of web analytics for understanding digital user behaviour and informing website improvement (Bekavac & Garbin Praničević, 2015; Plaza, 2011). They also extend the Sri Lankan library context by demonstrating how Google Analytics can be applied to examine not only general website visibility but also user engagement, traffic sources, device usage, page-level behaviour, and geographic distribution. Pratheepan and Jayakananthan (2021), for example, demonstrated the usefulness of Google Analytics for evaluating the visibility of a Sri Lankan university library web portal. The present study builds on this perspective by examining a wider set of engagement indicators and using the results to identify specific areas for website improvement.

From a digital library management perspective, the findings suggest that Google Analytics can function as a continuous evidence base for website development. Library managers can use traffic-source data to evaluate digital promotion, device data to guide responsive design, page-level data to prioritize content improvements, and engagement indicators to monitor changes in user behaviour. Nevertheless, analytics data should not be treated as a substitute for direct user assessment. As website metrics reveal what users do but generally cannot explain why they behave in a particular way, future evaluation should combine Google Analytics with user surveys, interviews, usability testing, or other qualitative methods. Such an integrated approach would enable the library to move from descriptive monitoring toward evidence-based and user-centred digital service development.

Conclusion

This study evaluated user engagement and interaction patterns with a university library website in Sri Lanka using Google Analytics data collected from July 2022 to July 2024. The findings demonstrate that web analytics can provide valuable evidence regarding website reach, traffic sources, device usage, content utilisation, and user engagement. The website attracted 45,852

users, with 43,510 new users accounting for 94.9% of the user base. The overall engagement rate was 61.06%, while the average engagement time was 1 minute and 53 seconds.

The findings also revealed important differences in user behaviour according to traffic source, device category, geographic location, and website content. Although desktop devices accounted for the largest proportion of users, mobile users represented a substantial share of website traffic, highlighting the importance of responsive design and mobile accessibility. The high engagement observed among referral and organic social traffic also indicates opportunities for strengthening digital promotion and online visibility. Page-level analysis further identified the Library Home and Databases pages as important areas of user activity, while pages such as the LMS and E-Books sections warrant further usability investigation.

The correlation analysis identified significant positive relationships among selected website engagement indicators, particularly between new users and sessions, event count and average engagement time, and engaged sessions and average engagement time. These results demonstrate the value of examining multiple analytics indicators when evaluating digital library website performance.

Overall, the study demonstrates that Google Analytics can serve as a useful evidence-based tool for the continuous assessment and improvement of academic library websites. However, analytics data primarily describe user behaviour and do not fully explain users' motivations or perceptions. Therefore, combining web analytics with user feedback and usability assessment would provide a more comprehensive basis for developing user-centred digital library services.

Recommendations

Based on the findings of the study, the following recommendations are proposed to improve the usability, accessibility, visibility, and user engagement of the university library website.

Improve Mobile Accessibility

Although desktop users represented the largest proportion of users, mobile devices accounted for 43.7% of website access. The library should, therefore, ensure that the website is fully responsive and that key services, including catalogue access, databases, electronic books, and learning resources, can be accessed easily through mobile devices. Page-loading performance, navigation, font size, and interactive elements should be regularly tested on different mobile devices.

Improve Website Navigation and Information Architecture

The variation in page-level engagement indicates the need to ensure that users can locate important resources efficiently. Frequently used resources such as databases and electronic books should be clearly positioned within the website structure. Related resources should be linked where appropriate to encourage users to continue their information-seeking activities within the library website.

Strengthen Search Engine Optimisation and Online Visibility

The library should use traffic-source information to strengthen its search engine optimisation strategies. Relevant keywords, page titles, descriptions, metadata, and regularly updated content should be optimized to improve the discoverability of library resources through search engines.

Strengthen Digital Promotion

The relatively high engagement associated with referral and organic social traffic indicates the potential value of external digital channels. The library should strengthen its use of institutional websites, social media platforms, academic communication channels, and other relevant referral sources to promote databases, electronic resources, library services, and new content.

Review Pages with Low Engagement

Pages recording relatively short engagement times, such as the LMS and E-

Books pages, should be reviewed through usability testing and user feedback. The purpose should not be simply to increase the time users spend on a page, but to determine whether users can efficiently locate and use the information or service they require.

Monitor Website Performance Continuously

Google Analytics should be used as part of a continuous website assessment process rather than as a one-time evaluation. Key indicators such as users, engagement rate, traffic sources, device usage, page views, and engagement time should be monitored periodically to identify changes in user behaviour and emerging areas for improvement.

Complement Analytics with Direct User Assessment

Because Google Analytics identifies patterns of behaviour but does not fully explain users' motivations or perceptions, future website evaluations should combine analytics data with user surveys, interviews, usability testing, or focus group discussions. This mixed approach would provide a stronger evidence base for user-centred digital library development.

Conduct Comparative and Longitudinal Studies

Future research should examine Google Analytics data across multiple university libraries and over longer periods to identify similarities and differences in digital library user behaviour. Comparative studies involving universities in Sri Lanka and other South Asian countries could further strengthen understanding of the contextual factors influencing digital library website engagement.

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