

# **6MARK017W – Digital Marketing, Social Media and Web Analytics**

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## Individual Coursework - 2

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# 1. Task 1

## 1.1. Definition of GA4 Events.

In Google Analytics 4 (GA4), event is a concept that allows tracking of all the interactions or activities done by users on a particular website or mobile application (Barba et al., 2013). There are four types of GA4 events: automatically collected events, enhanced events, recommended events, and custom events. Some examples of GA4 events are given below.

1. Clicking on a button.
2. Submitting a form.
3. Scrolling through a page.
4. Viewing a page

## 1.2. Function And Role of Events.

Events can be considered as the foundation of GA4 (Duncan, 2023). There are several roles and functions of events and they are described in the table below.

Function/Role	Description
Track user interactions, measuring engagement of users	GA4 Events track user interactions and engagement, providing businesses with insights into the most-interacted elements of their websites. For example, measuring the frequency of occurrences, such as clicking a button, the duration a user stays on a website, etc., gives insights on user behaviour in mobile applications or websites (Barba et al., 2013).
Help create personalized experiences.	As mentioned above, GA4 provides insights into user interactions, which can help understand trends and

	patterns followed by users. This information can be used to understand customer segments' preferences, enabling marketing campaigns and personalised content, such as targeted ads (McGuirk, 2023).
Providing support to increase conversions.	GA4 tracks conversion-related information, helping businesses understand marketing campaign success, user flows, and areas for improvement. For example, if users abandon a form half-way, it could indicate a blockage in submitting the form (Salon, 2023).

*Table 1:Function/Roles of GA4 Events*

### 1.3. Event Properties and How They Are Tied to User Interactions

In GA4 event properties provides more additional information that helps get a better understanding on an event. Some of the event properties and how they are tied with user interactions are given below.

Property name	How it is tied with user interactions
Event Name	This is tied to user interaction by providing an understanding of the exact type of event or user interaction that happened (Power, 2021). For example, if the event name is "page_view," it gives the idea that the user has viewed a page.
Event Parameters	This property provides additional information about events that happened and provides deeper insights into user interactions (Sharma, 2023). For example, if the event name was page_view, some of the parameters such as page_title, page_location, etc. will help organisations understand the

	pages on which users interacted and the location of pages, giving a better understanding of the page_view event.
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Table 2:Event properties of GA4 and how they are tied with user interaction

### 1.4. Events in relation to Microsite as A Case-Study.

As shown in Figure 1, Google Analytics has tracked user interactions on the site, such as page views, scrolling, and the event count. In addition, Figure 2 shows how GA4 displays information on each event type, such as the page\_view. Other than that, event parameters such as page location, shown in Figure 3, which describes the event types further for the microsite, are tracked as well. Through tracking of these, GA4 provides insights on events such as pages that are most visited, user paths, etc., which gives a better understanding of user behaviour and engagement. In addition to this, more insights for the microsite can be obtained through the setting up of custom. For example, as shown in Figure 4, there is a button named “Subscribe” on my home page, and if this were tracked, it would show the users who were interested in subscribing.

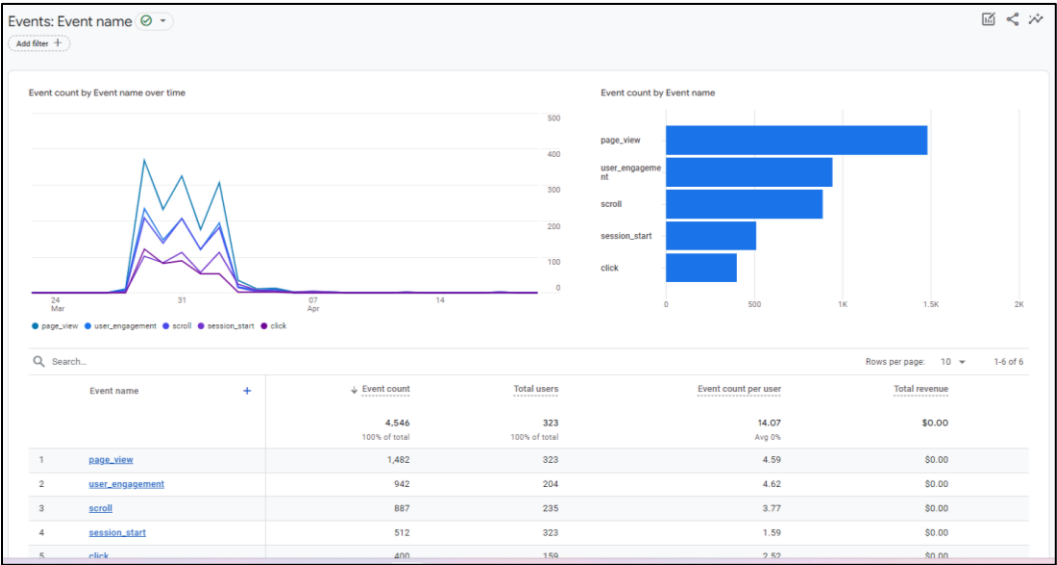


Figure 1:Events names

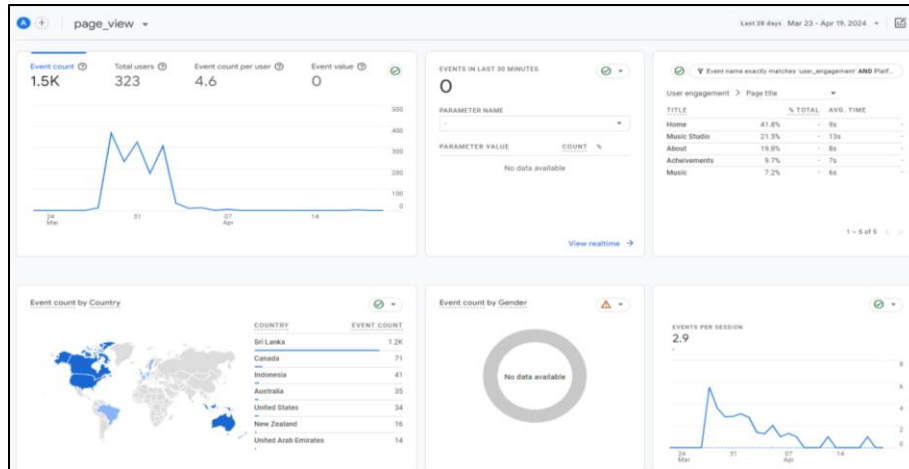


Figure 2: Page View event detailed report

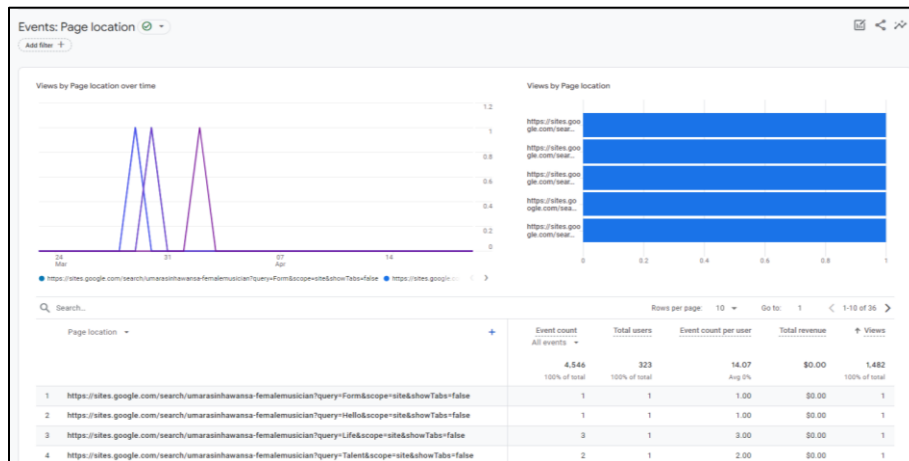


Figure 3:Page\_location parameter

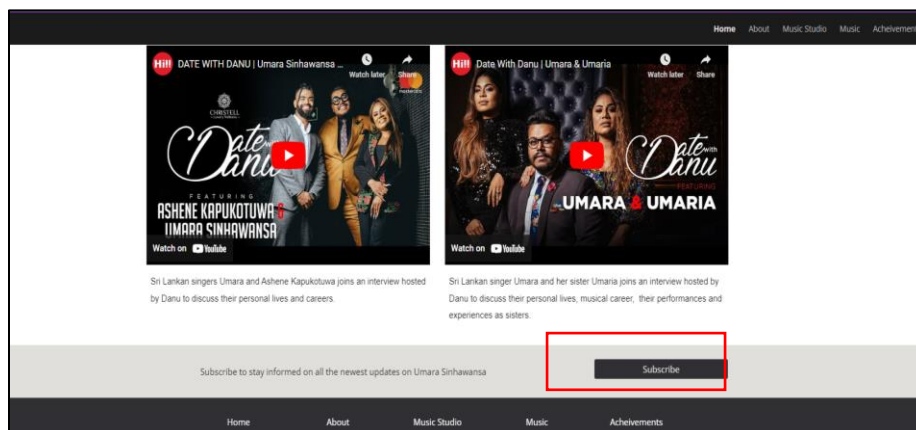


Figure 4: Screen with subscribe button - to set up custom event



## 2. Task 2

### 2.1. Steps Followed to Create Google Analytics Account and Connect It to the Microsite.

1. Selected “Get Started button” in google marketing platform to start account creation process.
2. Then selected on “start measuring” button and completed the 5 sections mentioned below.
  - a. account creation – Section to add account name and confirm account data sharing settings.
  - b. property creation – Section to add property name, select time zone and currency.
  - c. Business details – Section to select industry category, size of organization
  - d. Business objectives – Section to select objectives of the business.
  - e. Data collection - Section to select type of platform to collect data. In this scenario “Web” platform was selected.
3. After completing the above, in the set-up web stream page, I added the website URL and stream name, kept the enhanced analytics option as on, and clicked on the “Create stream” button to create the web stream. Once a web stream was created, web stream details were displayed, as shown below in Figure 5.

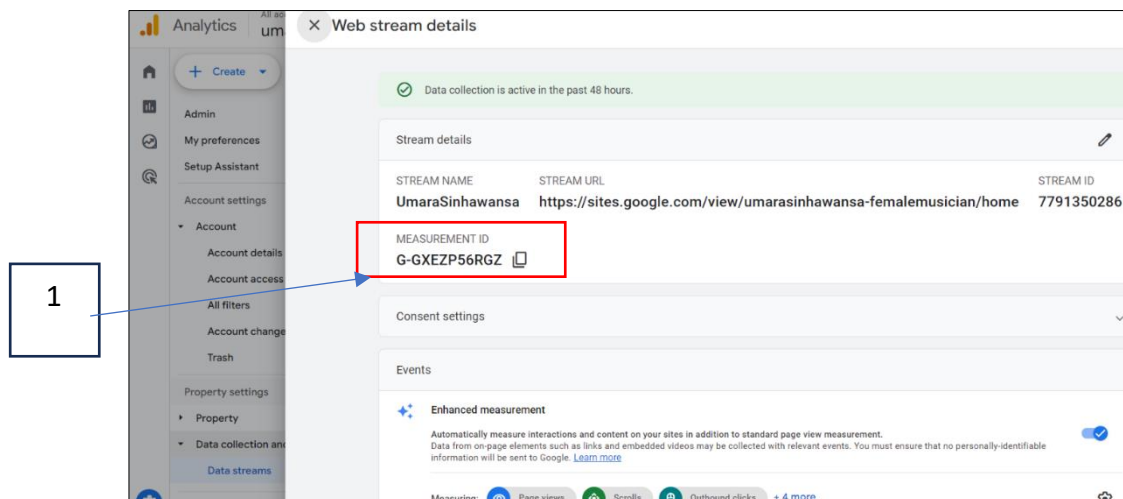


Figure 5: Web stream details including measurement Id

4. I copied the measurement Id (Refer to section 1 in Figure 5) from web stream detail page.
5. Opened my microsite in google sites and clicked on settings icon (outlined in red in Figure 6).

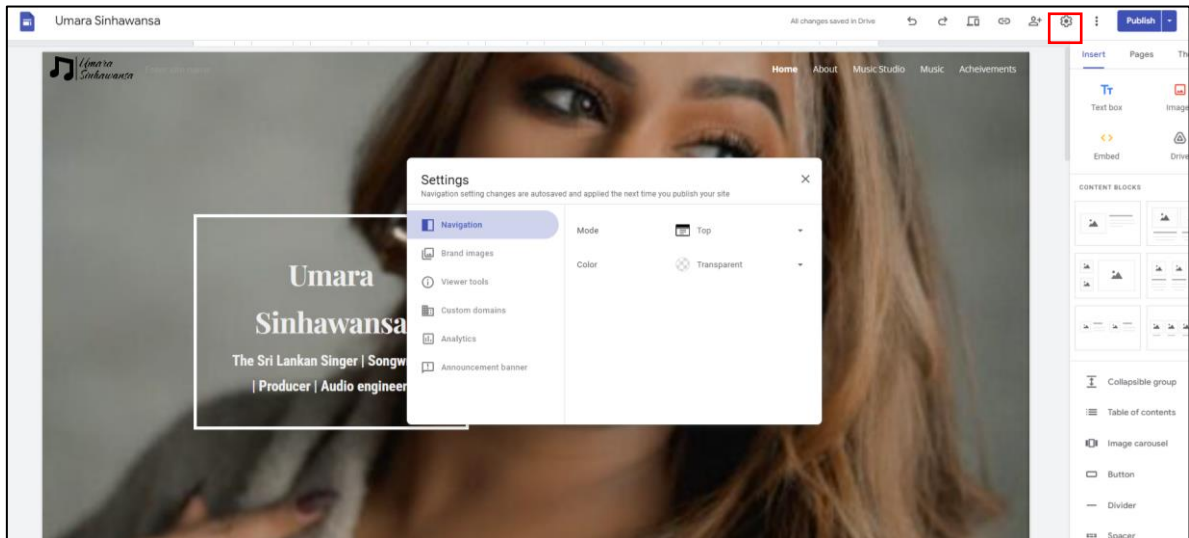


Figure 6: Settings tab in Google sites

6. Then from settings, I selected “Analytics” option, added the measurement Id and enabled analytics from toggle button to connect the microsite to Google Analytics as shown in Figure 7.

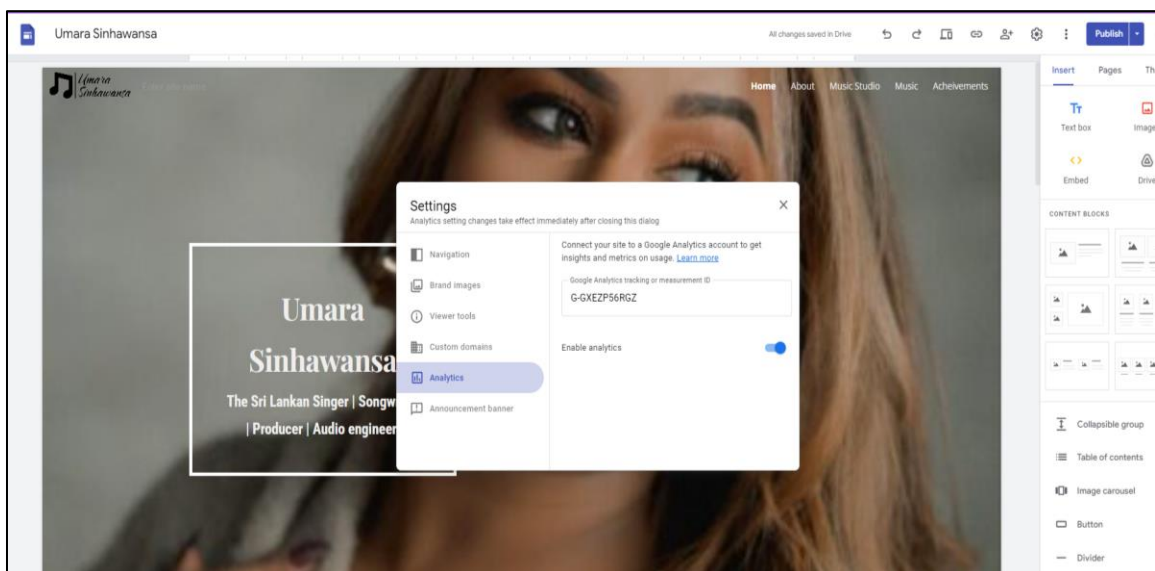


Figure 7: Analytics settings in Google sites:

### 3. Task 3

#### 3.1.1. Definition of HTTP Cookies.

An HTTP cookie is certain information sent by a server to a user's web browser when they access a website and is available mostly in text form (Pantelic, Jovic and Krstovic, 2022). They enable web browsers to manage user sessions and recognize users. For example, cookies will help web browsers in recognize users by identifying whether a request came from the same browser or not. In addition, cookies also help track user behaviour and personalisation (Cahn et al., 2016).

#### 3.2. Problems Overcome by Cookies

Problem	How Cookies overcome the problem
Authentication and session management issues.	The stateless nature of the HTTP protocol prevents saving data like passwords and items added to the cart, but cookies overcome this by storing a unique ID referencing a session in browser files, allowing servers to recognize users, automatically authenticate, and save information like shopping cart details (Khu-smith and Mitchell, 2001).
Providing personalized experiences.	Through placement of text files in the browser files in client end, data is collected when user queries webpages. This allows the web browser collect information on user behavior/preferences and create a more personalized experience for the users based on information collected (Sanaei and Abbassi, 2022).

Table 3: Problems Overcome by Cookies

### 3.3. Limitations of Cookies.

Limitation	Description
Life span	Cookies has a set life span and expires after that. Hence cookies are not a viable option to store data for longer periods (Verma, 2024).
Security	Cookies are vulnerable to security risks, including cross-site scripting (XSS) attack, cross-site request forgery (CSRF) attack, and these attacks can allow attackers to control the affected party's cookies, execute malicious code, and manipulate the user's browsing history etc. leading to a compromise of security in cookies (Khu-smith and Mitchelll, 2001).
Size and storage	Cookies has limited limit around 4KB. This makes it harder to save larger amount of data in a cookie (Verma, 2024).

Table 4:Limitations of cookies

### 3.4. Stateless Web and HTTP Cookies

When a user visits a website, a HTTP request is sent to the server. Server considers each of these requests as unique. Hence by default the server does not identify unique users who visits a website (client), since requests that are sent to the server does not have any reference to the past requests. This is called the stateless web or stateless nature of HTTP protocol. Cookies are used to overcome this problem through building state between the server and client (Biselli, Utz and Reuter, 2024). HTTP cookies overcome stateless nature by collecting data in name value pairs into small text files that are saved in clients browser files (Demir et al., 2024). And when sending requests to server, cookies are also included enabling the server retrieve data from cookies and recognize the users across multiple requests (Khu-smith and Mitchelll, 2001).

### 3.5. Diagram Showing the Key Stages in The HTTP Process and Data Flows Between Client and Server.

Below diagram shows the key stages in the HTTP process and data flows between client and server, this process also included how cookies are being used in the process to overcome the stateless nature of HTTP protocol.

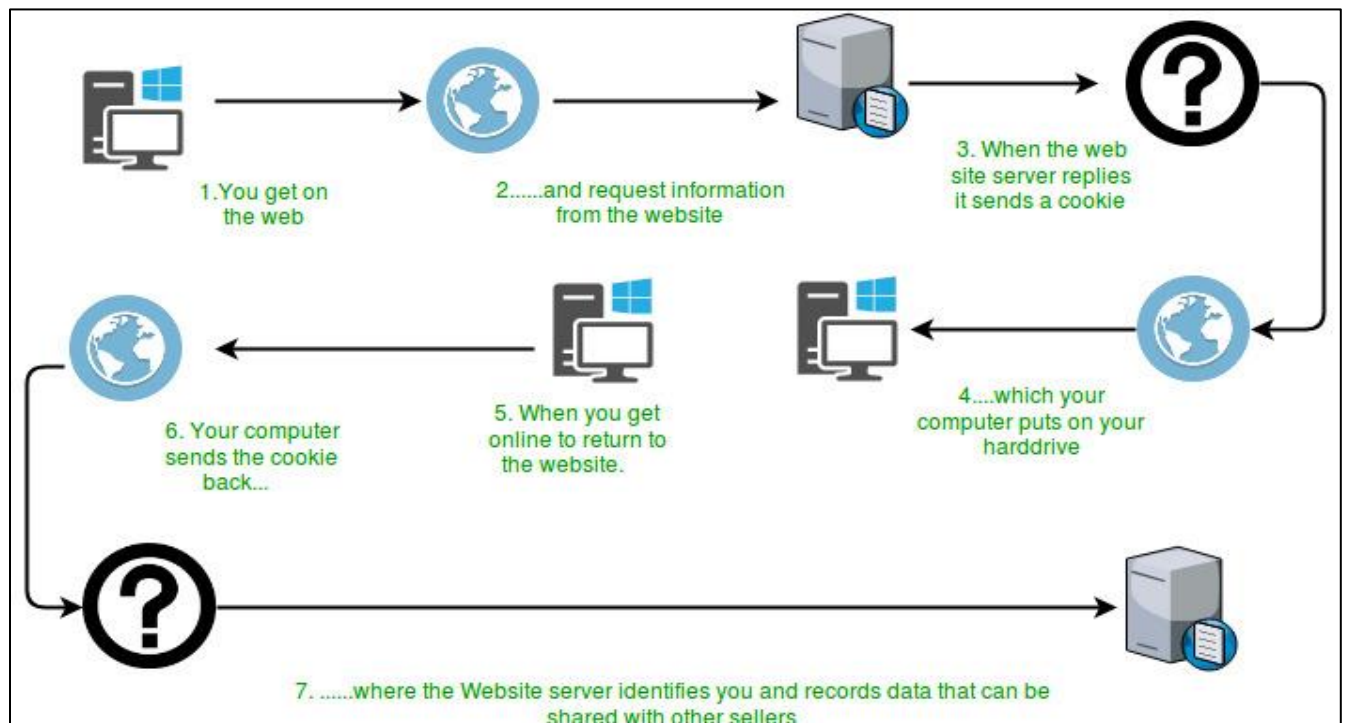


Figure 8:Diagram Showing the Key Stages in The HTTP Process and Data Flows Between Client and Server (geeksforgeeks.org, 2019)

## 4. Task 4

To complete task 4 traffic was generated for the microsite over 5 consecutive days from 29<sup>th</sup> March 2024 to April 2<sup>nd</sup> 2024.

### 4.1. Users by Browser Over Time.

Time period selection

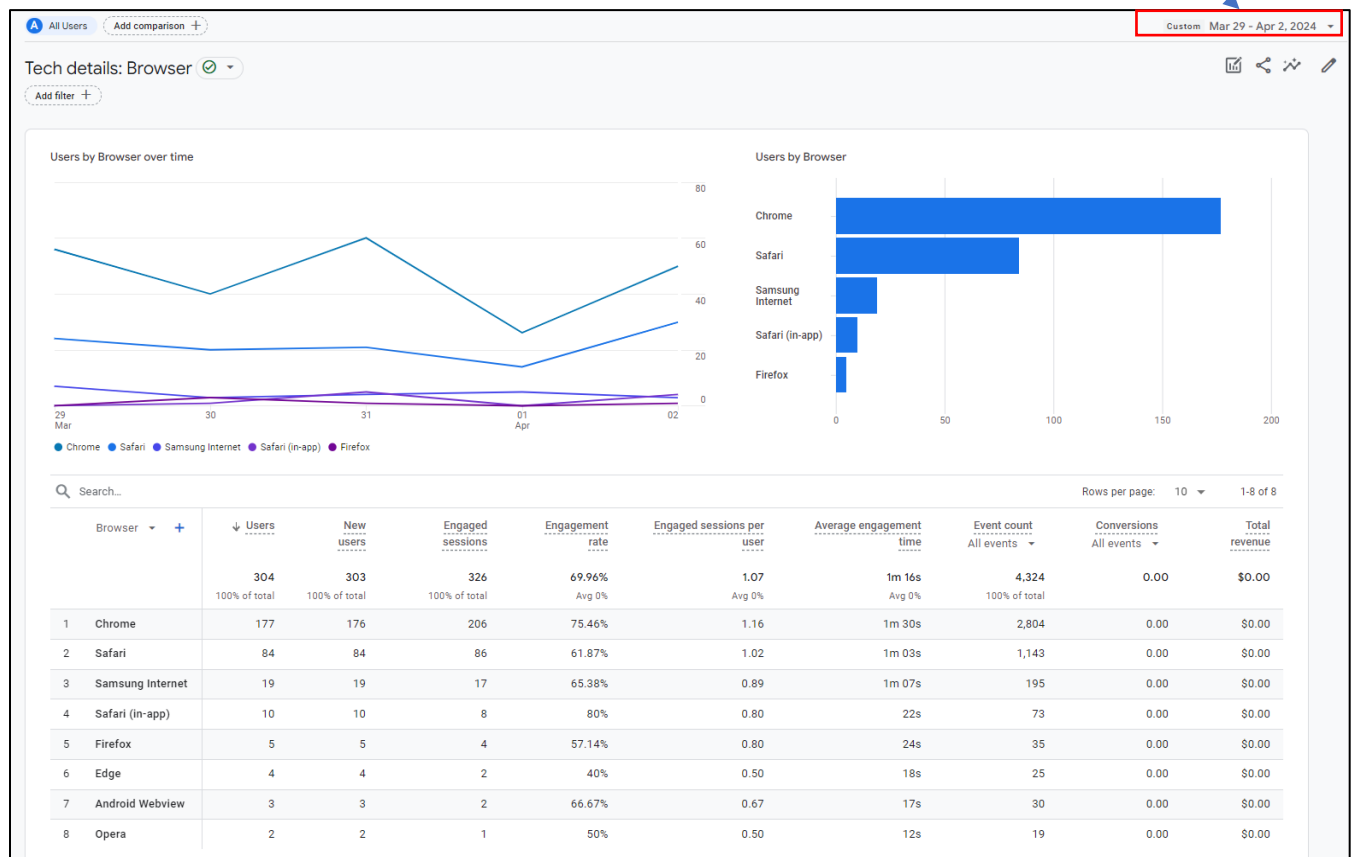


Figure 9: Google Analytics Report for Users by Browser Over Time

The above report shows that Google Chrome is the most used browser with 177 users, accounting for over half of total users. This is followed by Safari and Samsung Internet browsers, with 84 and 19 users, respectively. In addition, Chrome also has the highest average engagement time of 1m 30s, followed by Safari with 1m 03s, suggesting that users have

engaged with the site well using Chrome; hence, when optimizing websites for web browsers, Chrome and Safari could be prioritized.

## 4.2. Views by Page Title and Screen Class Over Time

Time period selection

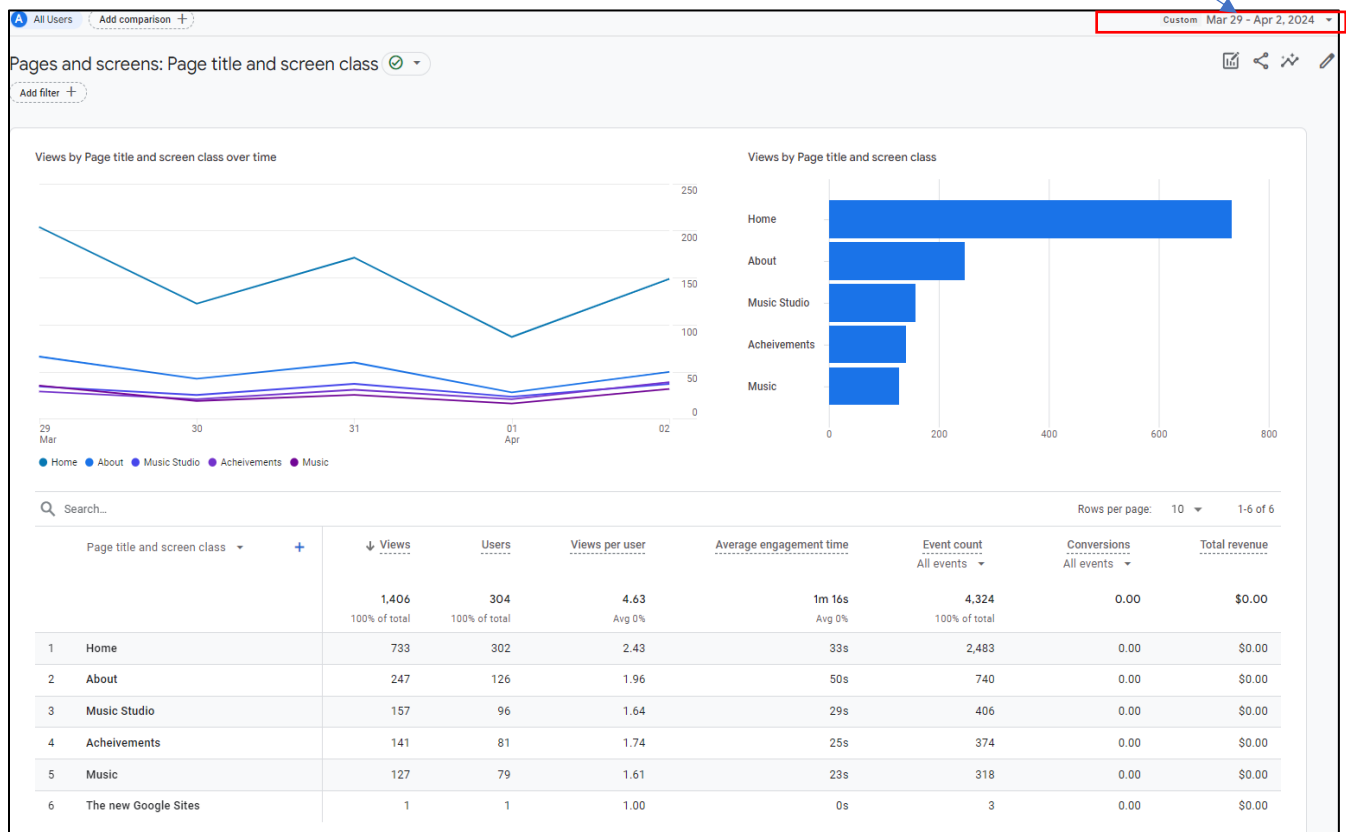


Figure 10: Google analytics Report for Views by Page Title and Screen Class Over Time

The above report shows that the most viewed page is "Home" page with 733 views, followed by "About" page with 247 views. In addition, the "Home" page takes precedence in the event count as well. One of the reasons for having increased views and event count for "Home" page could be because when sharing the website, it was the "Home" page link that was shared. However, the decrease in page views and events count after the home page is quite significant; hence, in the future, certain improvements can be made to optimize the website to increase traffic.

### 4.3. Sessions by 'Session Default Channel Grouping'

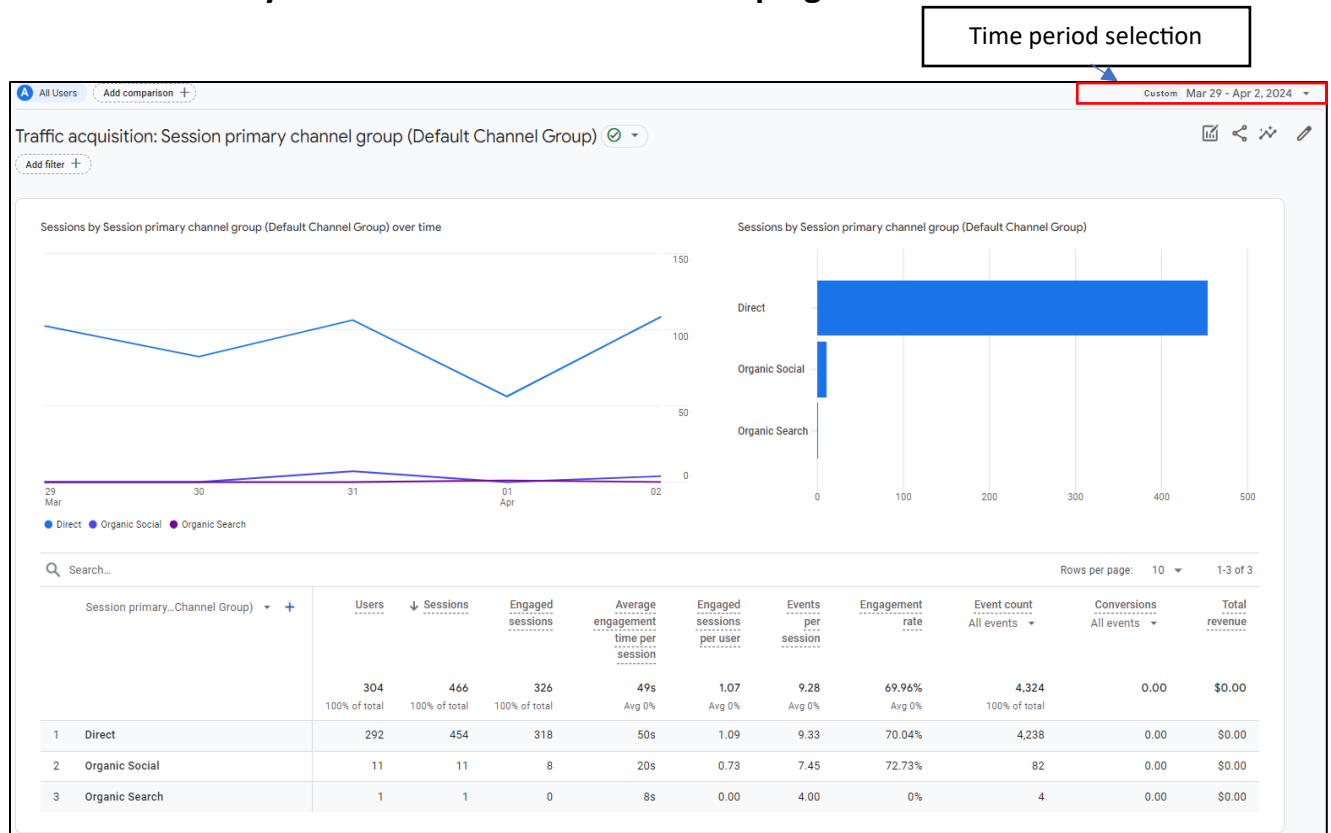


Figure 11: Google Analytics Report for Sessions By 'Session Default Channel Grouping'

The above report shows that direct channel was used by most user sessions, that is, 454 sessions, accounting for over three-quarters of total sessions. This channel also has the highest average engagement time of 50s and the highest number of events per session is 9.33. Organic social and organic search channels didn't have a significant number of sessions, suggesting that direct channel was used by preferred by most users. However, in the future, the use of good marketing strategies in organic social and organic search channels will be important in website promotion.



## 4.4. New Users by 'First User Default Channel Grouping'

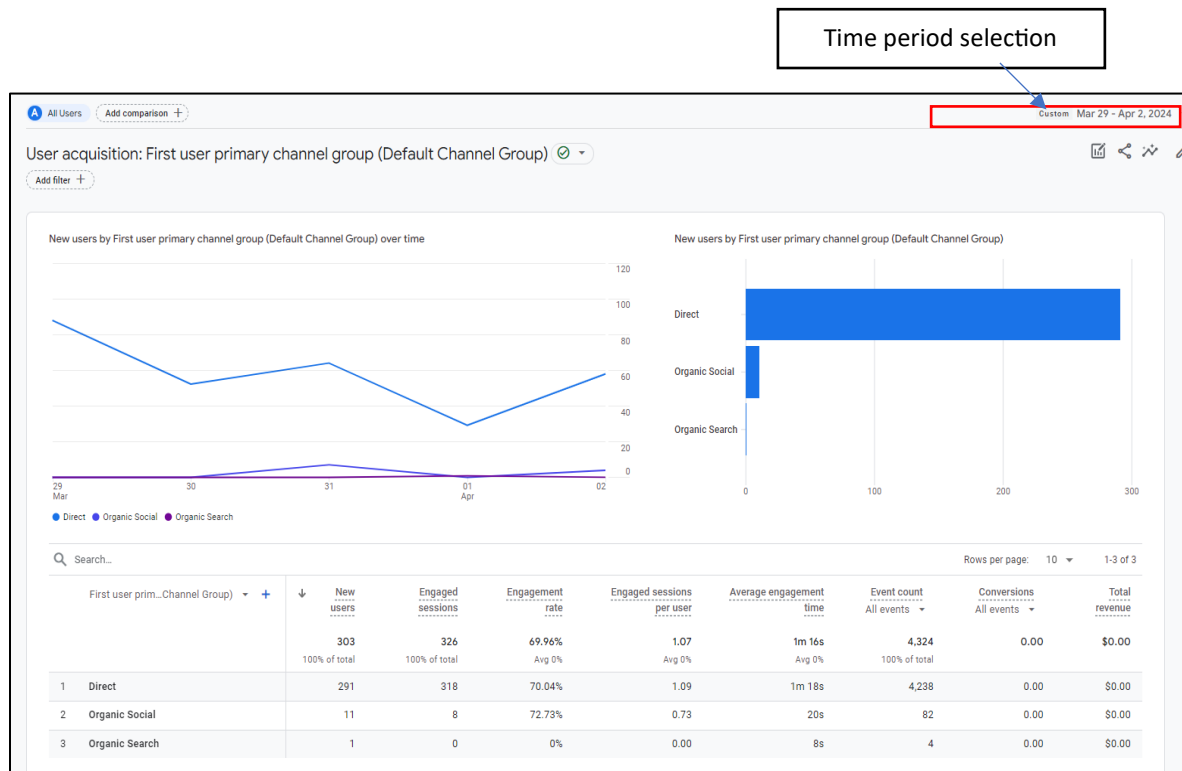


Figure 12: Google Analytics Report for New Users By 'First User Default Channel Grouping'

The above report shows that direct channel was the most successful channel for user acquisition, with 291 new users gained, accounting for over 3 quarters of the total new user count, suggesting its high success rate. Other channels, like organic social and organic search, weren't used by a significant number of users. Hence, direct channel can be considered a good channel for user acquisition, but in the future, campaigns to gain users from other channels can be considered important as well.

## 4.5. User Engagement (Overview)

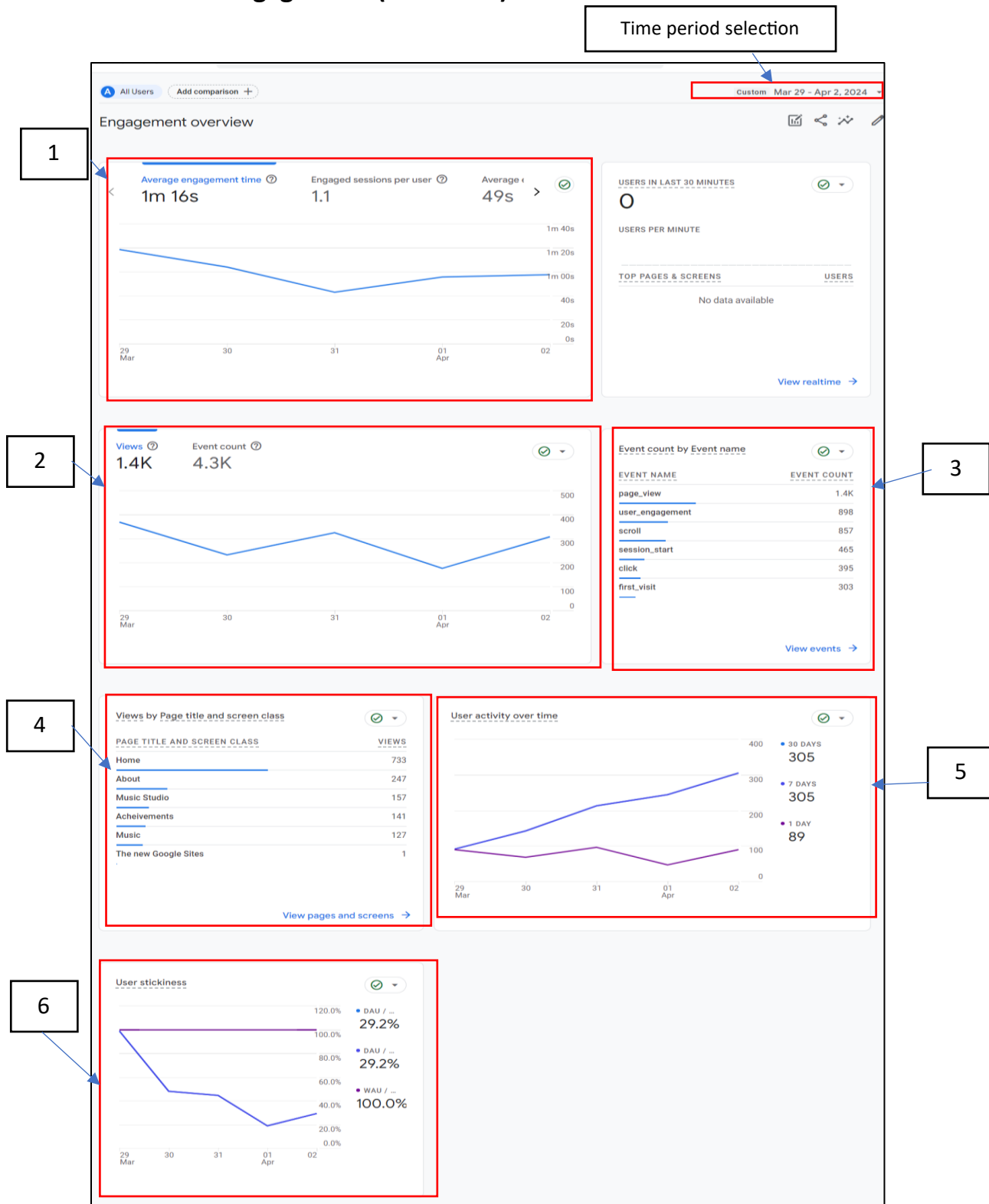


Figure 13: Google Analytics Report for User Engagement Overview

The above report provides an overview of user engagement over the period. There are several charts in this report. Here, chart 1 shows an average user engagement time of 1m 16s and 1.1 sessions per user, with a decline in engagement on the third day but a gradual increase in the last two days. Chart 2 show 1.4K views and 4.3K event counts, with a decline in views and events over time while chart 3 shows that Page views is the most frequent event. Chart 4 shows page views by page title and screen class, and to get a better understanding on this, refer to section 4.2. Chart 5 shows an upward trend in user activity, with day 4 having the lowest activity. The upward trend suggests that strategies taken towards having good user activity were successful, while chart 6 compares active user engagement over a short period and a broader time period, showing a 29.2% DAU/WAU, suggesting a moderate level of user retention or sticking. Considering all these findings, it can be said that user engagement is good, but continuous monitoring and adjustments are needed to sustain and enhance engagement.

#### 4.6. User Retention (Overview)

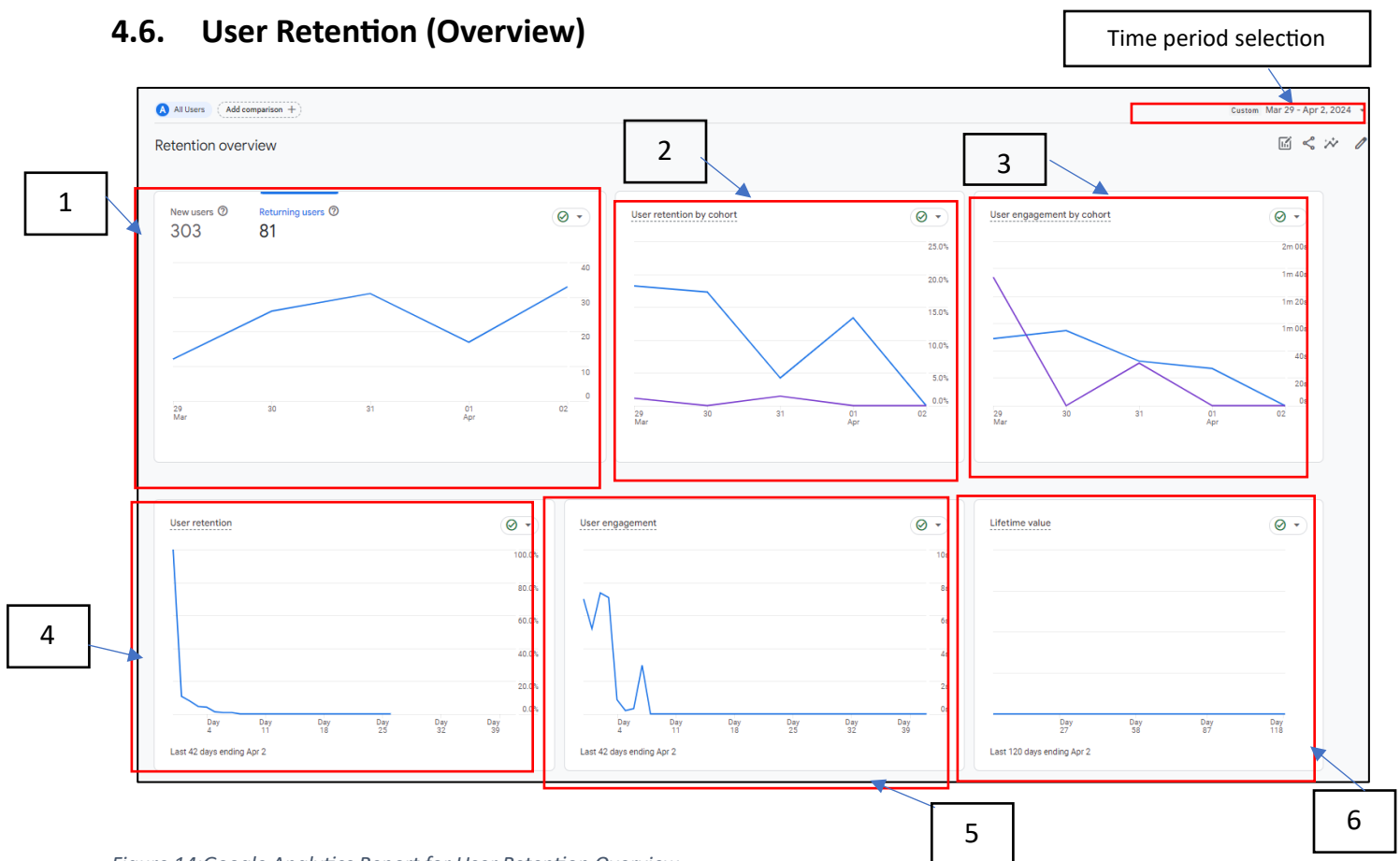


Figure 14: Google Analytics Report for User Retention Overview

The above report provides an overview of user retention over the 5-day period, with several charts. Chart 1 shows an upward trend, with day 4 having the lowest returning users. The total of 81 returning users indicated a 26.64% returning user rate. However, as shown in chart 2, user retention by cohort shows a declining trend. Here, user retention by cohort describes how well a site retains users by cohort, where the cohort is the day, the user is acquired. This suggests that over the period, user retention has been poor, while chart 3 too shows a declining trend, suggesting that returning users have spent less time on the site after their first visit. Charts 4 and 5 show an overall declining trend for user retention and engagement over a 42-day period. While Chart 6 shows average revenue generated by new users over 120 days, as the microsite lacks revenue generation, it's not crucial for understanding its retention. Considering all the above, it can be said that even though the returning user count is moderate and the user retention area needs continuous monitoring, adjustments are needed to enhance the retention levels of users.

## 4.7. Users by City

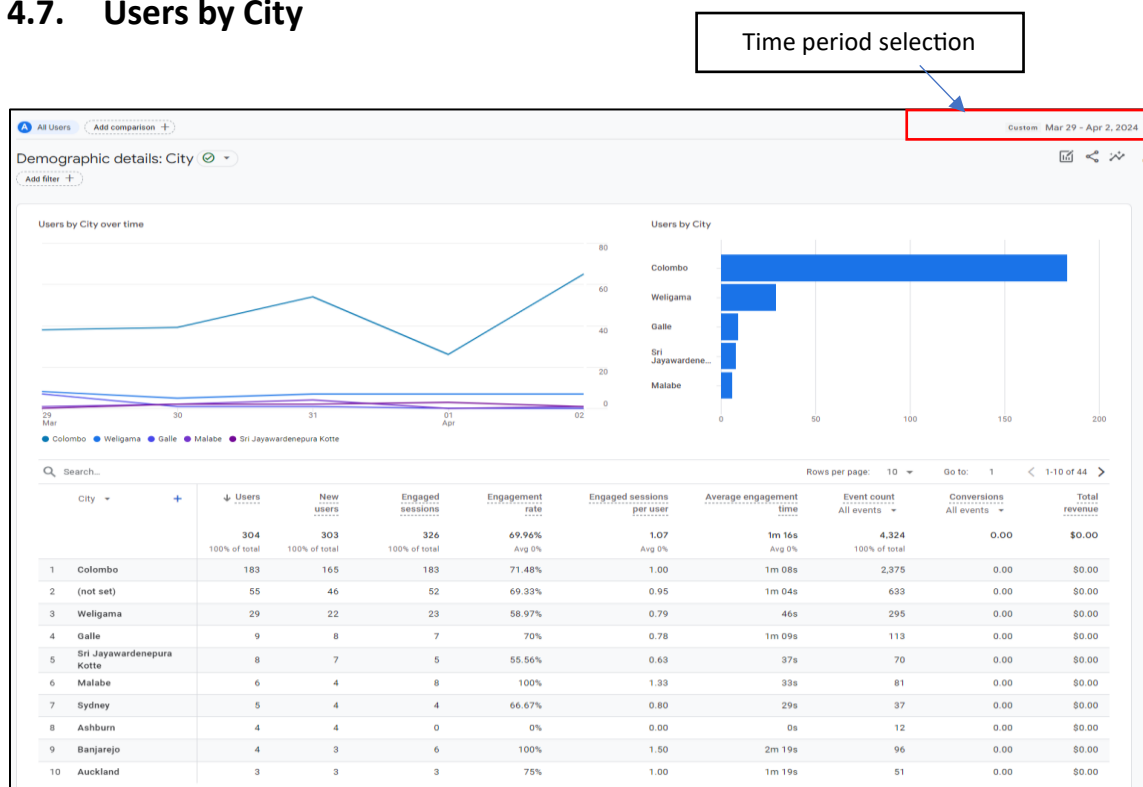


Figure 15: Google Analytics Report for Users by City

The above report provides city information about the users over 5-day period. As per the report, Colombo city has the highest number of users, which is 183, followed by Weligama with 29. Sydney, Australia, takes precedence internationally, but this is not significant compared to local users, suggesting that local users contribute most to traffic generation; hence, marketing campaigns to ensure the gain of users globally and campaigns to retain users from cities like Colombo are important. Here, the "not set" wording refers to the inability to capture the IP address to identify the user's location, resulting in the cities of 55 users not being identified.

#### 4.8. Returning Users by Device Category

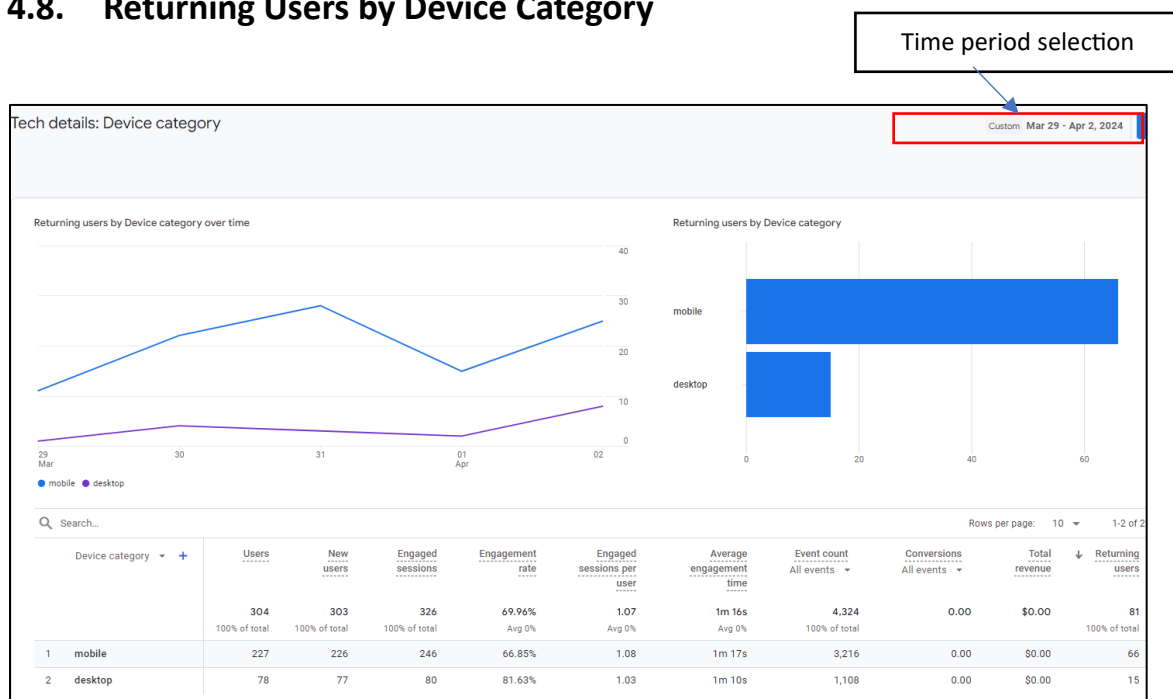


Figure 16: Google Analytics Report for Returning Users by Device Category

As per the above report, the most used device category when accessing the site is mobile devices, with 66 returning users, while desktops were only used by 15 returning users. This shows that user retention was most successful on mobile. Hence, in the future, when optimization is done for devices, mobile view should be focused as well in order to sustain user retention.

## 4.9. New Users by Screen Resolution

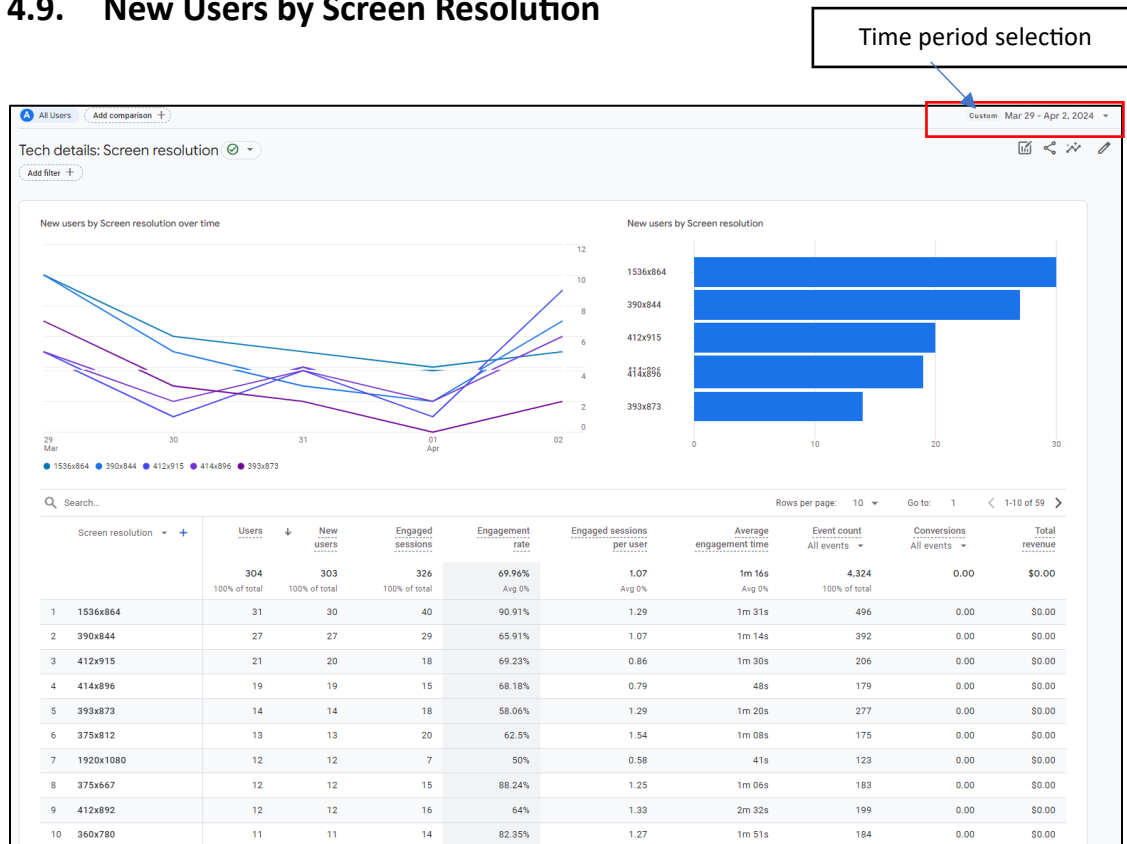


Figure 17: Google Analytics Report for New Users by Screen Resolution

As per the above report, the device screen resolution that was used by most new users when visiting the site for the first time was 153 x 864 with 30 new users, followed by 390 x 844 with 27 new users. In addition, in terms of engagement time too, 153 x 864 screen resolution takes precedence with 1 m 31s. Hence, it is important to ensure that when optimizing for screen resolution of 153 x 864, screen resolution is considered prioritized in order to increase the acquisition of new users.

## 5. Task 5

### 5.1. State KPI

Increase the user retention rate by 10% by the end of 2024.

### 5.2. Justification based on Task 4

Through the task 4 analysis, for the user retention overview report given in Figure 14, it was identified that user retention is not that good because even though the returning users have an upward trend, there is an overall declining trend in user retention, user retention by cohort charts. This indicates that user retention is not that good after first acquisition, emphasizing that the user retention is poor. In addition, having a loyal customer base or good user retention rate is an objective expected by stakeholders as well. The selected KPI of increasing user retention by 10% by the end of 2024 supports this need to improve user retention, hence justifying the selection of the KPI. Further, this KPI is achieved under the customer perspective of the balance score card because it focuses on improved customer loyalty, retention, and satisfaction (Chopra, 2024).

### 5.3. Justification of the sections of KPI

Section	Value	justification
Description	Increase the user retention rate.	This helps overcome the decline in user retention by cohort and overall user retention, helping to build loyal customer base.

Exact change	10% increase	This is an achievable target since currently there is moderate rate of returning users and if the necessary changes are done the it will be possible to increase the user retention rate by 10%.
Time	End of 2024 (from end of April 2024 to December 2024 it is an 8-month period)	This will enough time to do the necessary development that needs to be done in website and the marketing, customer success teams to conduct campaigns directed at the loyal customers who have subscribed the website.
Changes to be done	<ol style="list-style-type: none"> <li>1. Conduct campaigns directed at the loyal customers</li> <li>2. Improve content, experience of the site.</li> </ol>	Marketing targeting repeat customers, including specialized offers and discounts for them, helps build long-term customer loyalty and attracts customers to revisit (Hofman-Kohlmeyer, 2016). In addition, having good-quality content with easy navigation is vital to helping visitors engage with the site.
Monitoring period	Twice a week	Monitoring period is kept twice a week because it allows to continuously monitor progress and if there are any concerns they can be addressed without any delay of time.

Table 5:Justifications for KPI sections



## 6. Task 6

The flyer is designed with a grey background and features silhouettes of a band performing. The header section includes the Umara Sinhawansa logo and the main title. The body section contains a photo of a smiling woman, a discount announcement, and a call to action button. The footer section includes social media icons, contact information, and a disclaimer.

**Header with Logo and Title**

Umara Sinhawansa

# DON'T MISS OUT ON EXCLUSIVE CONCERT DISCOUNTS

**FOR UMARA LIVE SHOW  
JULY 5TH 2024**

**20% DISCOUNT**  
VALID ONLYTILL  
MAY 6TH 2024

**Body with description**

HERE'S A SPECIAL TREAT FOR OUR LOYAL FAN BASE TO EXPERIENCE UMARA'S MESMERIZING PERFORMANCE AT A FRACTION OF THE PRICE

TICKETS AVAILABLE EXCLUSIVELY THROUGH OUR OFFICIAL WEBSITE

**Call To Action button**

VISIT WEBSITE TO BOOK YOUR TICKET NOW

**Footer**

f i t

FOR ANY INQUIRIES CONTACT 0770762154

**IS THIS MAIL NOT FOR YOU?**  
CLICK TO UNSUBSCRIBE

2024 ALL RIGHTS RESERVED BY UMARASINHA WASA

Figure 18:Email Flyer

## 7. Task 7

### 7.1. Challenges related to the calculation of the number of unique visitors to a website.

- **Deleting or blocking of cookies** – There is an option to block cookies in most sites, and users have a tendency to use this option to block them (Dainow, 2017). This causes an issue in calculating unique visitors because as mentioned above HTTP protocol is stateless and without cookies analytics tools will not be able to calculate unique visitors properly, resulting in an incorrect unique visitor count (Meredith, 2023).
- **Using of multiple devices** – Users can have more than one device with them, and because of this, a single user can access a particular site from more than one device, leading to showing more unique users than there should be, creating an incorrect unique visitor count (Jansen, 2009).
- **Using shared devices** – In the usage of multiple devices, there is an increase in visitors, while in this scenario, there is a lower number of users than what it should be because, if multiple users use the same device, analytics tools will not be able to calculate the unique visitor count properly (Jansen, 2009).
- **Dynamic IP address** – There is a possibility of IP addresses changing hence, this creates a possibility of a user being calculated more than once. This too will cause an incorrect increase in unique visitors (Jansen, 2009).

## 7.2. Differences between “visitors”, “new visitors” and “unique visitors”

	Visitors	New Visitors	Unique Visitor
<b>Definition</b>	Total number of users who visited the site including, repeated users over a selected time period.	users who visit and interacts with website for the first time within a particular time frame (Jansen, 2009).	Distinct Users who visit and interacts with the site more than once during a particular time frame and this can calculate with use of cookies (Jansen, 2009).
<b>How the visitor count is taken</b>	Can be counted more than once in a period of time. For example, if a user visits a site in 2 days it will be counted as 2 visitors	Counted only once during a period of time and the returning users are not included (Jansen, 2009).	Counted only once even if they visit a number of times during a particular time frame (Jansen, 2009).

Table 6:Differences between “visitors”, “new visitors” and “unique visitors”

## 7.3. Challenges associated with measuring session duration and quantifying the amount of time spent on an individual web page

Challenge	Description
<b>Misleading session timing due to calculation process of bounce rate.</b>	When calculating the engagement (bounce rate) of users' through analytics platforms, the session duration is recorded as zero if a user visits a page on a website but does not go and interact with another page, considering the visit

	to be a single visit. This causes an underestimation of engagement and session timing calculations (Jansen, Jung and Salminen, 2022).
<b>Users working on different tabs and being inactive in pages.</b>	Currently users have the option to open a number of tabs, and in certain instances may not properly engage making the web pages inactive or else they can be going from one tab to another and keep the pages running. This can cause an overestimation or underestimation of time users spent in sessions or in a page (Lehmann et al., 2013)
<b>Issues in identifying session duration</b>	It is not possible to say if a user session is ended from transactional log files, this is mainly due to the fact that users usually do not log out from sites and just keep it as it is. This makes it difficult to find when the session exactly ended (Huntington, Nicholas and Jamali, 2008).
<b>Session Time Out delimiter</b>	Sessions have set timeout settings to end sessions. If a session time is long, it will combine 2 sessions that happened separately. Hence these concerns related with session time out can cause an overestimation or underestimation of session durations (Huntington, Nicholas and Jamali, 2008).
<b>Using proxy server and shared IP addresses</b>	Due to the use of shared IPs, in the session logs multiple users can be shown hence this can create difficulties in accurately track sessions (Huntington, Nicholas and Jamali, 2008).

*Table 7:Challenges associated with measuring session duration and quantifying the amount of time spent on an individual web page*

#### **7.4. Explain what is meant by the “hotel problem”**

The hotel problem is a hypothetical situation that is used to describe the misinterpretations that can happen in web analytics and the difference of unique visitors and total visitors.

In the below table it can be seen that in each day hotel had two visitors, and over the period, room A had two unique visitors and room B had two unique visitors.

	Day 1	Day 2	Day 3	Total Unique visitors
Room A	Anne	Anne	Sarah	2
Room B	Sarah	Katy	Katy	2
Total visitors	2	2	2	3

Table 8:Hotel problem

Here if unique visitor per day is summed up the total would be four. And if the total visitors per day is summed up will be six. However, in reality during this 3-day period the hotel had only three guests. This shows that

- Unique visitors + unique visitors are not equal to total number of unique visitors
- New visitors + repeat visitors are not equal to total number of visitors.

The reasons for these incorrect calculations that led to duplication of visitors is because when calculating total visitors and unique visitors' certain factors are not considered. They are

- Visitor switching rooms, for example Sarah has switched to Room B in day 3.
- Visitor staying in more than one day in a room. For example, Anne has stayed in Room A for 2 days

Similarly, this could happen in web analytics as well. For example, if a person who visits a site switch device like the hotel visitors switched room or if multiple users visit website from one device like a room being used by more than one person over a time the web analytics will not be properly calculated.

Hence in overall hotel problem shows how data can be misinterpreted due to certain situations and highlights importance of knowing how analytics tools track data, the difference between total visitors and unique visitors, related challenges that cause misinterpretation which will help to properly understand the user engagement, user count and related web analytics.

## **7.5. Other Problems related to data misinterpretation in web analytics.**

- Sampling errors – When analyzing data most analytics tools sample the data after reaching a certain limit of actions. In addition, these analyzing of sample sets can cause inaccuracies and hence this can lead to misinterpretation since the business or the people who need the analytics to arrive at decisions based on analytics of sampled data (Jansen, Jung and Salminen, 2022).
- Misleading engagement Rate: The user behavior of visitors is different from each other, For example some users take a long period to read pages. In this sort of scenario, just because the engagement time is high it cannot be assumed that the user engagement is good. This shows that the engagement rate can be misleading (Agarwal, 2016).
- Limited data accuracy due to ad blockers – Due to certain technical limitations such as browser settings, ad blockers or all the data will not be collected properly. This is because ad blockers can stop the pages from rendering properly making it difficult for the analytics tool to do tracking through asset blocking and element hiding. Hence the reports generated will not show accurate data. This will result in misinterpretation of data (Donica, 2022).

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