

Strategising the New Media Role for Engaging the Public

Case Study: Total Solar Eclipse

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The total solar eclipse (TSE) in Indonesia during the first quarter of 2016 was a very popular event in the Southeast Asian region and became a popular topic for both traditional and new media. Many digital media outlets had live coverage of this event. For the astronomy website langitselatan, a new media website, preparation for this event began in 2015. In this instance we used our available channels, which included interactive social media platforms, to share information regarding the 2016 TSE. We used a special domain, gerhana.info, to cover everything about this particular eclipse. This article explores our strategy in utilising new media for astronomy communications using gerhana.info as a case study and its impact up to the day of the eclipse. We also explore the impact on people's awareness of astronomy topics and events after the TSE via our main website langitselatan.

Introduction

In 2016, astronomy became a very popular discussion point in Indonesia due to the then-upcoming TSE. It was a special moment for astronomy in Indonesia as the whole country prepared for and then experienced a total or partial solar eclipse on 9 March 2016.

TSE-related news began picking up with some traditional media such as TV channels and newspapers in 2015. langitselatan¹ (LS) began its coverage of the TSE in March 2015, almost a full year prior to the eclipse. LS spun off a new website that focused on eclipses called gerhana.info² (GI) (Figure 1), gerhana being the Bahasa Indonesia term for "eclipse". This website pointed to a subdomain gerhana.langitselatan.com. As of 26 October 2019, the website currently provides information on the upcoming Annular Solar Eclipse in Indonesia on 26 December 2019.

Before the 2016 TSE, we made articles and infographics regarding the basic sciences of an eclipse, why and how they happen, how often they happen, etc. LS also put out maps of the TSE and lists of cities where people could enjoy a total or partial eclipse. We focused on infographics as the media of choice for our science communication as we noticed that many web media groups at the time were using infographics to explain many non-science issues. As a service to foreign eclipse chasers

who contacted LS, we began to post information about these TSE viewing sites in English, including information on how to get to the viewing location.

This new website was our initial experiment into infographics.

Basic Statistics of New Media in Indonesia

Indonesian internet users had grown rapidly in 16 years, from two million users in 2000 to 132.7 million users in 2016. With a population of over 250 million people, this meant 51% of the Indonesian population were active internet users in 2016 according to a report from the Indonesian Internet Service Provider Association (APJII)³ (APJII, 2016).

The highest internet activity came from social media, as 89% of Indonesians internet users were active users on social media, and mobile internet was the most popular means of connecting, with 326.3 million SIM subscriptions, or 126% versus the population in 2016 (Kemp, 2016). This meant multiple users have two SIM cards or mobile numbers on average leading up to 2016. Around 85% of internet users use a mobile phone (all types) as their main device to access online information, while 43% carry smartphones. Only 15% of users access the internet from a laptop or desktop. This difference impacts the average duration of people

accessing news from their device (Kemp, 2016). The total daily screen minutes of Indonesian people is 291 minutes per day for tablets and mobile phones, much greater than the 117 minutes per day spent on laptops or computers, based on a 2017 report (ASEAN Up, 2017).

The increasing amount of social media usage can also be seen from the statistics of each social media platform, where Indonesia is frequently near the top of the list of countries with the largest number of users. In 2016, Indonesia had the 4th highest number of Facebook⁴ users, following India, the United States and Brazil (Nguyen, 2017), increasing from 79 million users in January 2016 to 106 million users by January 2017 (Kemp, 2016; Kemp, 2017). In 2019, Indonesia was the third leading country for the number of Facebook users (Clement, 2019). According to a 2016 report from Statista, Facebook was the most accessed social media in Indonesia, followed by Instagram⁵, Twitter⁶, Path⁷ and Google+⁸. BBM⁹ and WhatsApp¹⁰ were the most accessed instant messaging platforms in Indonesia followed by Facebook Messenger¹¹ and LINE¹².

Indonesian internet users are the most prominent target for LS and GI to share news and information, as they could create a snowball effect to reach those with no internet access or those who choose not to have any online profile based on our work at LS. Indonesian

social media users in particular have become the main target for passing on any information, including educational information such as that for the 2016 TSE.

History of TSEs in Indonesia

The TSE on 9 March 2016 in Southeast Asia started in the Indian Ocean and ended in the Pacific Ocean. The path of totality extended from the most southwesterly point of Indonesia's territory to its most eastern point. The narrow path of totality in Indonesia passed through 12 provinces. Even outside of the path of totality, many viewers in Indonesia were able to see at minimum a 50% partial solar eclipse. It was a special opportunity for the Indonesian public to experience totality and build astronomy awareness.

However, Indonesia has a long history with the previous TSEs that has prevented people from observing solar eclipses (Wahyudi, 2016). Since Indonesia's independence in 1945, Indonesia has had 18 partial solar eclipses, nine TSEs, and six annular solar eclipses. During the early years of independence, the government had to manage folkloric beliefs as many people were still illiterate and relied on superstitions to explain natural occurrences. For the 1983 TSE, the government advised the public to not view the solar eclipse, directly touting the dangers of eye damage if one did (Wiguna, 2016). However, it was during this TSE when professors from the Institut Teknologi Bandung's Astronomy Department began to inform the public that eclipses are a naturally occurring event, not a bad omen, and, most importantly, that it was safe to view them (Okw, 2016). Unfortunately, during this time the public governmental announcements were in conflict with this message, and the public followed the government's instructions to not observe the solar eclipse (Tempo.co, 2016). After the 1983 TSE, despite the government's recommendations to not observe the solar eclipse, amateurs astronomers had grown in numbers and started to hold public observations at schools in Jakarta because of the curiosity for astronomical events, such as the 1986 flyby of Halley's Comet and the then-forthcoming 1988

TSE (Yamani, 2011). Then, for the 1988 TSE, the government did not release instructions recommending that the public not observe the eclipse (Kurniawan, 2016). The increasing number of internet users in Indonesia, along with more blogging and science websites such as LS, helped spread scientific information and that TSEs were a natural phenomenon. In 2016, the government even saw the TSE as a good opportunity for tourism (Kementrian Pariwisata Republik Indonesia, 2016; Khabibi, 2016).

langitselatan

In Indonesia, astronomy has been known since ancient times to be for maritime and agricultural life (Yamani, 2015). For centuries, different cultures in Indonesia have had different stories and each celestial event always brought public attention and curiosity (Kusumaningrum, 2009). Astronomy can provide exciting gateways into science, culture and technology, but to do so we needed a media to communicate this wonder to the public.

langitselatan translates to "southern sky" in Bahasa Indonesia, the official lingua franca of Indonesia and the main

language of all our websites. LS was chosen due to Indonesia's location being predominantly in the Southern Hemisphere (1°N to 8°S). Established in 2007, LS was established by a group of alumni from the Astronomy Department at Institut Teknologi Bandung (langitselatan, 2019) and had become the leading website for astronomy communication in Indonesia by 2016.

Until 2005, even though most daily newspapers had covered astronomy news, a specialised media (online media or printed media) in astronomy in the Indonesian language was nearly non-existent (Nataresmi, 2006). At the same time, the public need for astronomy information had increased, especially after several events such as the Mars Opposition in 2003, the transit of Venus in 2004, and solar and lunar eclipses. In 2005, we published the astronomy magazine Centaurus and started Centaurus Online as the first astronomy-focused media in Indonesia, but both were discontinued in 2007. We changed to an easily searchable name in addition using the more interactive blog format (O'Reilly, 2015) in establishing the LS website to better reach the Indonesian public and share astronomy information. We chose online media as our main service medium because of the



Figure 1. The Bahasa Indonesia landing page for the GI website. Credit: langitselatan

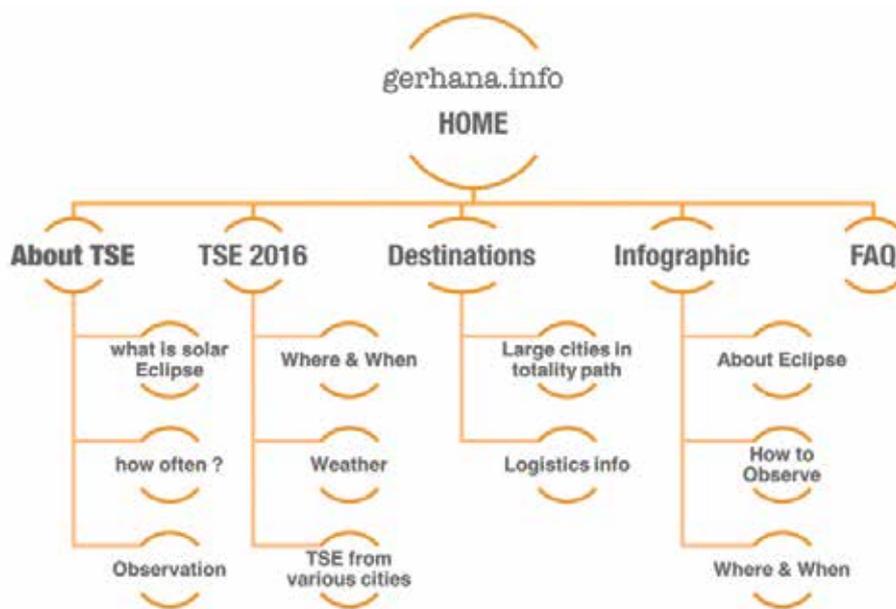


Figure 2. Sitemap for GI. Credit: langitselatan

increasing numbers of internet users in Indonesia.

LS also shares astronomy tools and education material with the public. Simple hands-on tools are provided on the website and can be downloaded.

The Challenges Before the 2016 TSE

Professional astronomers, amateur astronomers and communicators worked together through the National Eclipse Committee to spread the information and to educate people in the country but the biggest challenge was the Indonesian territory itself. Indonesia is comprised of 13 000 islands, with over 300 ethnicities and 742 local languages and dialects. In an emerging market such as Indonesia, where internet penetration is still relatively low, information distribution can become another challenge. While there are several channels of information distribution in Indonesia, both traditional and new media, this dispersion required us to find the most effective way to disseminate and share TSE information.

Based on a Google search of TSE news, print and electronic media massively covered the story two months to a few days before the event. General

information about TSEs and tourism opportunities had been covered by some news outlets since early 2015 (Wahyuningsih, 2015), while information on how to observe the eclipse, particularly without proper filters, was not covered until January 2016 (Muslimah, 2016). The latter was especially necessary to people who lived in the path of totality since most of these areas are remote with little or no access to the internet, let alone astronomy.

Scientific information was also needed since the Indonesian public has had a low-level understanding of astronomy since the decline of natural science content in many middle school texts in 2013.

Thus, the challenge was how to reach people effectively. This is an age-old question in media and still holds true for new media, particularly in Indonesia, the 7th largest country in the world.

There were some considerations to be had such as readers' technical and scientific knowledge as well as writers' knowledge and capabilities. According to the 2016 Program for International Student Assessment (PISA), Indonesia ranked 62 out of 70 countries overall in science, maths, and reading in 2015 (OECD, 2016), lagging behind other

middle income economies and East Asian neighbours. To overcome this issue, we attempted to use language as colloquial as possible to explain all the basic concepts.

Other technical challenges were browser and device compatibility. To overcome this problem, we built a user-friendly website which could be accessed by any browser or device.

Local and national traditional media had the widest reach in Indonesia as they could reach people in areas with a low penetration of internet users. According to APJII report (2016), 65% of internet users were in Java, followed by Sumatra with 15.7% users. Internet penetration in other islands was less than 6.5%. Traditional media covered a much wider area, such as the state-run television station (TVRI) which had a 93% coverage area (Badan Pusat Statistik, 2018).

On the other hand, the number of new media users was rapidly growing, along with the increase in mobile users. Based on an APJII (2017) report on internet users behaviour in 2016, 47.6% of users accessed the internet through mobile phones, with 50.7% using mobile phone and computer. The type of content that was accessed the most was social media (97.4%) with 54% of users visiting Facebook and 97.5% of those users used social media for sharing information (APJII, 2016). Facebook (70.94%), LINE Today (50.64%), and WhatsApp (27.39%) become the main platforms to get daily news or current issues, while 46.8% looked for the news directly from a media outlet website (DailySocial Id, 2017). Raising astronomy awareness also had another advantage with the growth of the internet and social media users in Indonesia. We needed to provide information that was easily accessible and shareable through social media and instant messaging platforms. These reasons lead us to combine a blog with social media and social messaging platforms to share the TSE information and reach a wider audience in the country.

A New Eclipse Website: gerhana.info

Ideally, we could have used LS as our main platform to raise awareness of the TSE. LS was already well known and had a steady and solid reader base. However, one issue with this is that it would be very inconvenient for new readers and readers searching for only TSE information as LS has astronomy information unrelated to the TSE. Secondly, it would be uncharacteristic of LS to provide non-astronomy information for tourists to Indonesia. As noted above, many readers had asked LS for travel-specific information, i.e. how to get to a certain viewing site, hotels and modes of transport near these viewing sites, etc. Additionally, by having a separate website we were able to specifically measure the interest for the TSE and our contribution to it.

The Name

A common challenge in starting a new website, aside from growing the traffic and increasing the numbers of readers, is choosing a name. We required a short, simple and specific name for readers who were looking for information regarding just the TSE, hoping this would make the name easy to remember and share by word-of-mouth. We choose Gerhana, which means eclipse in Bahasa Indonesia, as the name of the website. Originally we designed the website to be a subdomain of LS, but this was prone to misspellings and misdirections. We chose the .info generic top-level domain (GTLD) for the final combination of GI.

The new website was dedicated to eclipse information in general but made use of the TSE momentum so we could grow its traffic from the keyword “eclipse”. The basic idea of this new website was to share any scientific information about solar eclipses, including how and where to observe. However, we took advantage of multiple aspects of the TSE such as tourism and photography and provided supportive information on these topics.

As we started the new website in March 2015, we realised that not all destinations in the path of totality had proper information for tourists, especially for foreign visitors. As many eclipse chas-

ers and tourists were planning to observe totality from Indonesia, we decided to provide bilingual translations to cover a global audience. Hence, we have GI in Bahasa Indonesia as the main language and English as a secondary language for the website.

The Content

GI is a niche website that aims to communicate and educate the public about solar eclipses, and the content plays an important role in fulfilling this purpose. To meet our readers’ needs, we defined and classified the content that we needed to provide. General information on solar eclipses became our first topic as people needed to know the fundamental science of an eclipse. Once we had that, we provided specific information about the 2016 TSE including when it would happen, where to observe it and how to safely observe it with simple tools. As for touristic information, we provided information on destinations in the path of totality including the closest airports, accommodations, tourist attractions, local transport and a link to the local government or tourist centre. This information was distributed without collaboration with travel agencies or local governments.

In addition to that, we also provided information about TSEs, solar observations, and the 2016 TSE coverage area map in a series of infographics as people are easily attracted to visual information. All of this information was bilingual to attract non-Indonesia language speakers and written with simple English, which is easier to translate with Google Translate.

Sitemap

There are five sections on the GI website (Figure 2). We started with a section titled “About Total Solar Eclipses” and provided the basic scientific information about eclipses in general. In the next section, we provided information specifically about the 2016 TSE including where and when it was happening, general information about the weather in Indonesia, and the eclipse obscuration in various cities in Indonesia. The third section covered basic travel information for the various destinations in the path of totality. The last two sections were infographics and frequently asked questions.

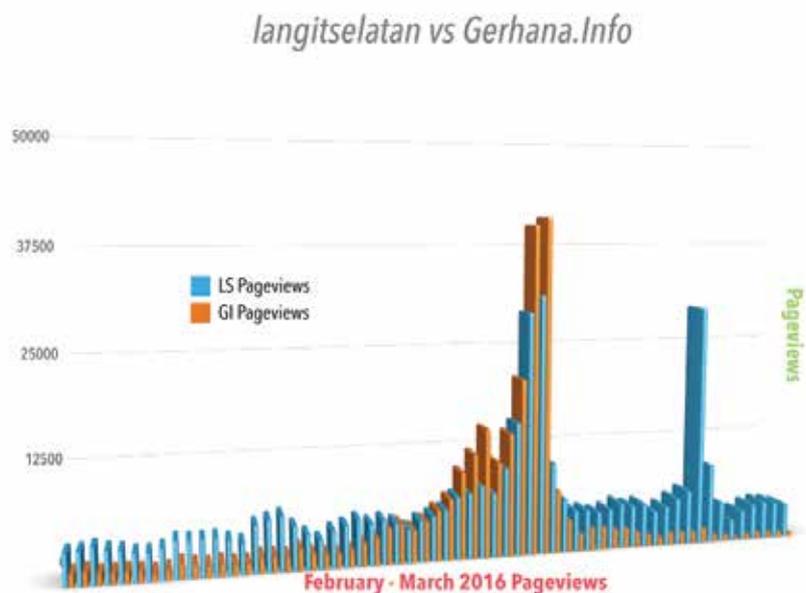


Figure 3. Site comparison of the number of pageviews between langitselatan (blue) vs gerhana.info (orange) from February-March 2016. Each set of blue and orange bars is one day beginning on 1 February 2016. The greatest peaks on the GI website occurred on 9 March 2016 and 10 March 2016. Credit: langitselatan

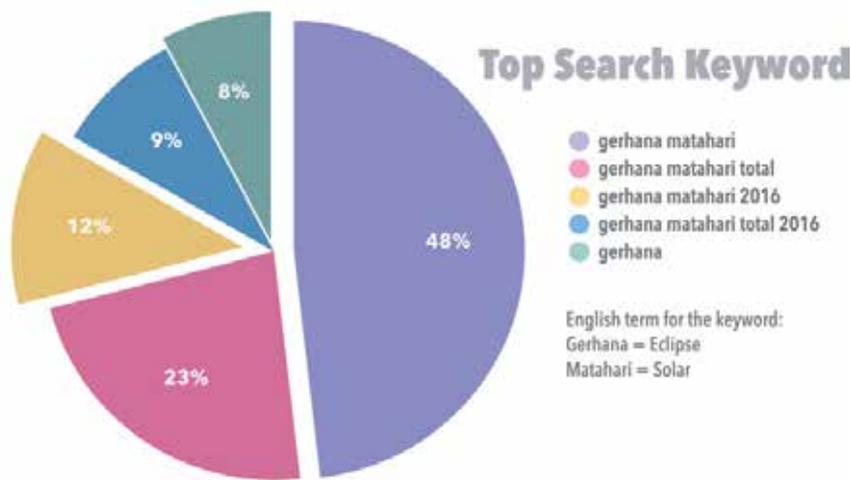


Figure 4. Keyword combinations people used to find the GI website through any search engine, with Google as the leading search engine. Credit: langitselatan

Popularising Strategy

We were able to quickly popularise GI by using our main social media channels: two Twitter accounts (@gerhanainfo¹³ (previously @gerhana2016), @langitselatan¹⁴), LS Facebook¹⁵, LS Google+ and langitselatan itself. All eclipse-related news and articles would direct users to the GI website. Both websites benefited from this cross-referencing, as once a person was on the eclipse article on the LS website, they would be exposed to links to other articles that may or may not be related to the eclipse.

We would post during primetime in the morning at 08:00 WIB and again in the evening at 19:00 WIB. The authors would re-share the information through their personal accounts and the posts were iteratively shared later as well. We mainly used Facebook page statistics to define the best times to post every day. However, posting during primetime created some challenges. First, we would be in competition with whatever was happening at that time. Secondly, other astronomy websites could post before us and “steal the thunder.” As for infographics, we posted them on GI and shared them through social media and messaging platforms.

At several points during the campaign, the LS team would be interviewed by traditional media. Each interview resulted

in a spike in pageviews on both websites even though this only had a short-term influence on both websites’ growth. To distribute information, including infographics, to areas without internet access, we actively sent information in print or electronic format to local collaborators to share with their peers and journalists for local and national audiences.

During the 2016 TSE, we were part of the National Eclipse Committee and articles on GI were reposted on the official eclipse website. We also collaborated with local government and the Ministry of Tourism to share information to the areas in the path of totality.

Results

In general, the response was much better than anticipated. GI pageviews pre- and post-eclipse surpassed LS statistics.

In Figure 3 we can see pageviews versus time. The pageviews spiked several times corresponding to the citations or aforementioned interviews, notably on 18 February (2628 pageviews), 26 February (4761 pageviews), 29 February (6229 pageviews), and 4 March (15 651 pageviews). Most news did not have a backlink to GI or LS, but on 4 March, the LS eclipse team was featured on Kompas, a national newspaper, for the

DIY pinhole projectors (Utomo, 2016). On 6-8 March, the LS team was again covered in printed media such as Kompas and Jawa Pos as well as a special talk show on CNN Indonesia.

Unfortunately, we could not define if the pageview increase was affected by the aforementioned interview only, because according to Google Trends, searches for TSE started increasing on 1 March and reached its peak on 8 March.

The top keyword searches showed us that visitors visited GI by searching for the keyword combination of “total solar eclipse 2016” and “solar eclipse” in Indonesian terms (Figure 5). This showed us that the public prefers to visit a website with a direct, short name that is easy to find and easy to remember, as we suspected.

From the referral websites to GI we learned that several traditional media and institutions had cited our material as their source, including the National Eclipse Committee website. The website also became an information source by users of international travel websites such as Cloudy Nights, Stargazers Lounge (2016) and Trip Advisor (2016). All backlinking from foreign websites made up 1.83% of contributions to the website’s pageview.

The most visited articles in GI also proved that visual information and shorter articles were preferable. The FAQ (67 348 pageviews) became the most visited articles followed by our infographic series. This infographic series has proven effective at providing key information such as “Time and Location of TSE 2016” (28 499 pageviews) and “How to Observe Solar Eclipse” (11 539 pageviews). Both infographics reached more than 16 000 people on Facebook. The English version of the infographics received 650 pageviews, especially “Time and Location of TSE 2016”.

Infographics became popular because people could share the image through social media without visiting the website, but this, in turn, meant we have no information on their reach. These were, however, effective on GI because the new visitors on average only spent 1 minute 47 second while returning visitors would stay for 3 minutes 22 second.

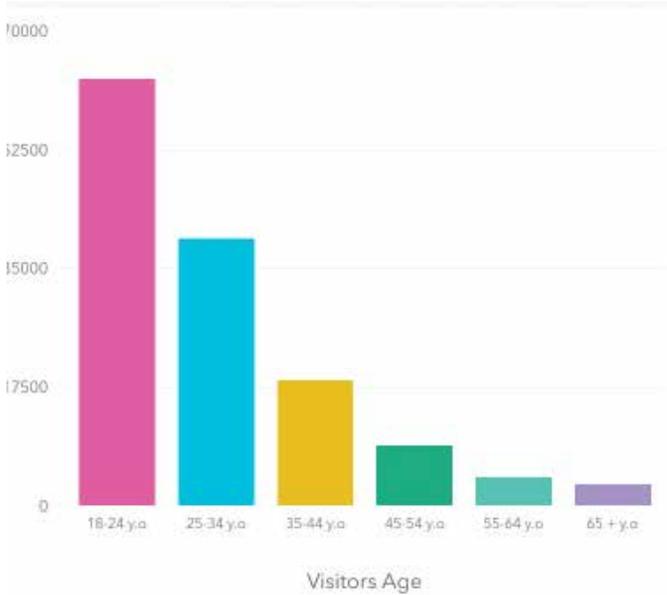


Figure 5. Age ranges of visitors to GI from February to March 2016. The x-axis is the visitors' age and y-axis is the number of visitors to the website. Young visitors (18-24) to GI dominated viewership age ranges. Credit: langitselatan

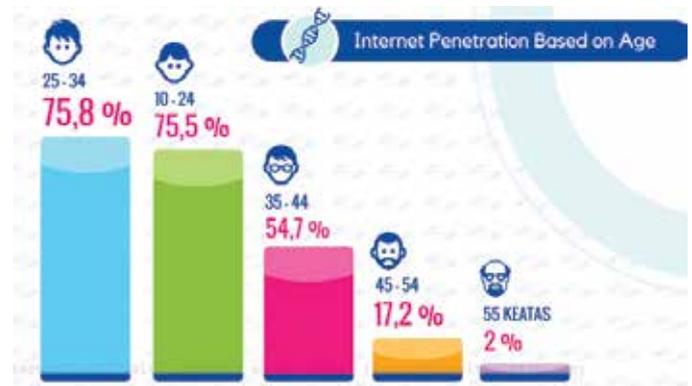


Figure 6. Internet penetration in Indonesia as a whole based on age. Credit: APJII

From Figure 5 we can see that LS was popular among young readers at the post-high school age. This is supported by the internet dispersion data in the 2016 APJII report that 75.8% internet users were young adults (Figure 6).

Among the visitors, most of them were new visitors. From our statistics, 170 000 visitors found us through search engines and 7000 from social media, with 6500 new visitors from Facebook. The short and direct domain became the main advantage for people to find the website easily through search engines. Facebook accounted for 5% of visitors to the website, as people in Indonesia were actively accessing this platform. Based on Twitter analytics of @gerhanainfo, "TSE from various city", "FAQ", and "Infographic: How to observe the sun" received high engagement and potential reach from being retweeted by LS and followers of LS or GI accounts (Twitonomy, 2017; Twitter Analytics, 2017).

From Figure 7, we can see that most visitors to the website were those who could also experience a partial solar eclipse in Southeast Asia. These visitors were looking for information about the eclipse or destination information for travelling to Indonesia, despite the language barrier. In the end,

we could drive more foreign traffic to the website.

According to our statistics, 67% of our readers accessed GI through a mobile device (Figure 8). This is consistent with the increasing numbers of mobile internet activities in Indonesia (APJII, 2016; Kemp, 2017).

From geolocation data, GI visitors came from 87 cities in Indonesia (Figure 9) and 110 countries in the world. By the end of the 2016 TSE, we still could not reach the whole of Indonesia by website alone because of the limitation of internet access in many areas.

Evaluation & Future Plan

By using a niche website for an event such as the TSE, visitors with specific queries in mind could find answers more efficiently and not be distracted by other astronomy-related information. Through feedback via email, the comment section of our website and social media, we learned that our visitors came from a broad range of groups with various backgrounds and interests. Some were laypeople interested in watching the solar eclipse as a tourist (domestic and foreign). By having all eclipse information in a single website for the TSE, it helped

the visitors find answers. For visitors with an interest in astronomy, they tended to look for information on the LS main website. A direct affiliation between the websites resulted in the GI website gaining trust from visitors, and visitors were more likely to return and stay longer. Referral statistics for GI showed that LS was the third-highest referral connection to the GI website in 2016. From LS statistics, direct links from GI resulted in GI being the fourth-highest referral website to LS articles in 2016.

Statistics showed us that information delivery via GI was effectively done in comparison with the main website and it was an efficient combination of domain and subdomain. Direct to domain was the most often used method for effective Search Engine Optimisation (SEO), a process of increasing visibility for a website, for the 2016 TSE. Having a subdomain containing all the articles and infographics to the eclipse saved readers time while using general search terms that were used by the public to look for this information resulted in an effective SEO keyword combination to increase traffic.

The infographics with basic information about eclipses were very useful for the public as they could grab people's attention in a short time and provide quick



Figure 7. Visitors to the GI website from February-March 2016 came from many different countries. Visitors from Indonesia constituted the highest percentage of these visitors, followed by visitors from the United States. Credit: langitselatan

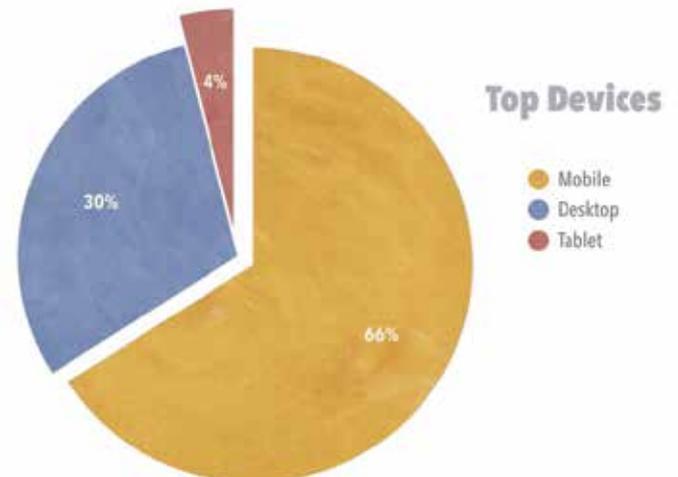


Figure 8. Percentages of devices used to access GI from February-March 2016. Mobile phones dominated the devices used. Credit: langitselatan

information about the TSE. Infographics were also easy to share, hence visitors could share the graphics across social media networks and instant messaging platforms. Infographics were a powerful tool to build solar eclipse and astronomy awareness, as well as our brand awareness. We received short, informal reports from people using our articles, infographics, and do-it-yourself eclipse material in their eclipse activities (Amarduan, 2016; Purwanti, 2016). Some people sent us the observations they made using the material we provided. We also received an article about our activities being used at 15 schools. All the aforementioned stories have been featured on LS-related websites.

Our strategy to utilize social media was the most effective way to reach the Indonesian public aged 18-24. Facebook was the top social media platform which led visitors to GI. Twitter was not optimal without the utilization of an influencer.

We accomplished what we set out to do, and even after the 2016 TSE, GI continues to serve the public. Since 2016, GI has provided lunar eclipse infographics and an e-book (Yamani, 2018). The website has also provided information on future eclipses in general and specifically the 26 December 2019 annular solar eclipse in Indonesia and other Southeast Asian countries. GI continues to provide weather and

tangential logistical information for travel for these eclipses. Since 2016, GI has reached readers in 342 cities in Indonesia and 178 countries (Figure 10), and will continue to be used by LS for lunar eclipses and solar eclipses that occur in Indonesia.

Niche websites like this can quickly and easily be implemented for other events or in different languages for other countries, and it will raise astronomy awareness in many different places.

Notes

- 1 langitselatan: <https://langitselatan.com>
- 2 gerhana.info: <http://gerhana.info>
- 3 APJII: <https://apjii.or.id/welcome>
- 4 Facebook: <https://www.facebook.com/>
- 5 Instagram: <https://www.instagram.com/>
- 6 Twitter: <https://www.twitter.com/>



Figure 9. The coverage area of GI in Indonesia in 2016. Much of the coverage was centred in cities. Credit: langitselatan

- 7 Path: <https://path.com/>
- 8 Google+: <https://plus.google.com/>
- 9 BBM: <https://www.bbm.com/>
- 10 WhatsApp: <https://www.whatsapp.com/>
- 11 Facebook Messenger: <https://www.messenger.com/>
- 12 LINE: <https://line.me/en/>
- 13 GI Twitter: <https://twitter.com/gerhanainfo>
- 14 LS Twitter: <https://twitter.com/langitselatan>
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Figure 10. The coverage area of GI in Indonesia in 2019. Most readers are based on the Java and Sumatra islands. Credit: langitselatan

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