



An application of log analysis on multilingual strategies of digital libraries: a case of the Taiwan e-Learning and Digital Archives Program

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Abstract:

The article aims to explore, by means of log analysis, the multilingual strategies and sustainable progress concerning the contents of digital archives. This research observes the open access exhibitivite websites regarding the results of Taiwan e-Learning and Digital Archives Program (both Chinese and English version), comparing the differences in the behavior of users from Taiwan, USA and UK. By utilizing 15 indicators of the Google Analytics, we look into the issues surrounding the planning strategies and sustainable progress of digital libraries websites when facing users from different cultures with different languages. Initial research results point out that users from Taiwan, USA and UK vary greatly in their motivation, ways of search and the contents they browsed, which indicates the multilingual strategies of digital libraries are not limited to just translating the contents into foreign languages; instead, the

user-differentiated strategy should be adopted, and the displayed contents should be adjusted in the aspects of collection selection and webpage design in order to address the need of users with different languages.

The research findings not only present statistical data that can be used with respect to the multilingualization issues of digital libraries, demonstrating the necessity of user-differentiated service, but also provide useful insights for non-English-speaking countries in their planning of English digital libraries, or English-speaking countries in their attempt to build Chinese digital libraries.

1. Introduction

According to Borgman's definition (2000), "...They (digital libraries) are an extension and enhancement of information storage and retrieval systems that manipulate digital data in any medium and exist in distributed networks," digital libraries are a new way to deal with knowledge generated in response to the development of information technology. Through the borderless feature of the Internet, digital libraries enable the preservation, indexing and circulation of information or knowledge at any time and places. However, if we hope the circulation and distribution of information could be ubiquitous all over the world, it is imperative for digital libraries to provide the service of global access, with which people are allowed to search and browse the contents of digital libraries easily. Four issues that affect usability usually need to be considered regarding the planning strategies of cross-lingual/cultural digital libraries (Borgman and Rasmussen, 2005): language, objective culture¹, subjective culture² and content³. If the goal for cross-lingual/cultural digital libraries is merely to solve the problem of "language" issue by translating the content of websites into another language, according to Tedd and Large's elaboration on the principle of establishing global digital libraries (2005), it adopts the strategy of "internationalization"⁴. Digital libraries would use such strategy for

¹ For example, dates, time, measurements, numbers and so on.

² For example, preference for certain colors, shapes and signs.

³ "Content" refers to the specific meanings of objects in cultural contexts, for instance, an object with historical significance in Culture A may connote offensive meaning in Culture B.

⁴ According to the definition of Tedd and Large (2005), "internationalization" means "...to design an interface in one language, and then simply translate it into other language."

the concern that there are fewer users during the early period of their establishment (Nielsen, 2000). However, the designs of “internationalization” could be affected by different language and writing systems. Even simply translating the texts of the buttons or menu items would become a great hindrance for the web page design. As a result, most digital libraries often adopt the strategy of “localization⁵,” that is, to design a specific digital library for each language. The design of “localized” websites could be carried out on two levels based on various cultural factors (Sun, 2001): one is the surface level, which means to adjust the cultural factors on the objective level in terms of the user’s habits, including the customary usage of dates, numbers and units of measurement, etc.; the other is culture level, which is to make adjustments on cultural factors, such as aesthetic appeal, image, logic, and functionality etc, to conform to the user’s own culture on the subjective level. For a global digital library aiming to be cross-lingual/cultural, the design of localization on the cultural level is most recommended.

Taiwan e-Learning and Digital Archives Program (TELDAP)⁶ is the first national program that combines the prominent archives institutions (both public and private) and public sectors to digitize the nation’s significant cultural and natural assets and conduct related research. Since 2002, we have digitized more than 3.2 million pieces of important national cultural relics and collected the digital contents from private sectors. This program has set up a digital library “Taiwan e-Learning and Digital Archives Portal⁷” (hereafter referred as to “digitalarchvies.tw”) to preserve the digital contents and allow the user to browse, retrieve and search for the information. In order to extend the international usability of Taiwan digital archives as well as to improve the visibility of Taiwan’s archives and academic resources among the international society, this program adopts the policy of “multilingualization of archive catalog and websites”: a foreign language team will be responsible for selecting and translating the representative sections of the website (digitalarchvies.tw) into English (including the program result websites, themed exhibits and the selected items of the “TELDAP Union Catalog”). They also establish and plan the foreign language version of digitalarchvies.tw – “Digital Taiwan -

⁵ According to the definition of Tedd and Large (2005), “localization” refers to “each language version can be designed independently to take account of the particular demands that language imposes...”

⁶ <http://teldap.tw/en>

⁷ <http://www.digitalarchives.tw>

Culture and Nature⁸,” (hereafter referred as “Digital Taiwan”) in which the translated content shall be presented. The detailed introduction about the websites will be described in the next section.

As a global digital library, Digital Taiwan has solved the “language” problem, one of the four usability factors aforementioned, through the strategy of multilingualization. Nevertheless, since the website content mainly displays the essence of Taiwan digital archives, its design concerns less about the factors of “culture” and “content” for international users. Whether it could attract international users to access, and achieve the goal to “become the window of information circulation for international users to search and retrieve Taiwan digital archives” (Li ed., 2008) remains an unevaluated and unexamined issue.

Borgman and Rasmussen (2005) believe that the planning of digital libraries should put emphasis on factors such as usability and sensitivity to cultural differences; besides, the establishment of criteria and evaluation mechanism is required to examine whether digital libraries achieve their goals or not. The commonly seen methods of evaluation include laboratory experiments, regional, national, and international surveys, time-series analyses, online monitoring of user-system interaction and observation of use, etc. In order to understand the usability and cultural relevance of Digital Taiwan-Culture and Nature, this research analyzes and observes users from Taiwan, US and UK by one of the methods of online monitoring of user-system interaction: Log Analysis, a non-intrusive research methodology to examine the interaction between online information systems and their users (Covey, 2002). This methodology, on one hand, could help our understanding of how the users access information, improving the structure and organization of websites; on the other, it could also identify where the users come from, enhancing the planning of websites promotion strategies. Based on the two reasons above, Log Analysis is regarded as a relatively objective and useful tool in research on user behavior (Jones et al., 2000; Huang et al., 2008). In addition to analyzing the user behavior in Digital Taiwan, this paper studies the behavior of users from Taiwan, US and UK in

⁸ <http://culture.teldap.tw/culture>

“digitalarchives.tw” by means of Log Analysis, in order to compare and contrast the two websites and examine their insufficiencies in web design respectively. TELDAP website’s policy of multilingualization and its management and planning will also be investigated through the comparison of user behaviors and features displayed in the two websites.

The structure of the paper is as follows: in section two, the websites of digitalarchives.tw and Digital Taiwan will be introduced. How the log records of the two websites are collected and analyzed by certain tools in this research will be illustrated in section three, while in section four the initial statistical data obtained from these analyzing tools will be described. In section five, the behavior of the users from Taiwan, US and UK of the two websites will be examined based on the statistical data mentioned above. The websites will also be evaluated to see if the goal and efficacy originally set have been achieved. Section six will be our conclusion on the management strategy of digital libraries in building global websites and will further explore possible future research directions.

2. Taiwan e-Learning and Digital Archives Portal (Digitalarchives.tw) and Digital Taiwan-Culture and Nature (Digital Taiwan)

“Digitalarchives.tw” is an exhibition platform established in 2007 by TELDAP in order for the public to have access to the digitized results. This platform has gathered digital collections from hundreds of archives and e-learning institutes. Its content ranges from natural science to historical cultural relics and its media contains texts, images, audio and video, etc. The website homepage presents the digitized achievements of TELDAP in six categories, providing a quick path for users to get the information they need. For example, “TELDAP Treasures” introduces the variety of Taiwan’s archives in terms of themes, such as the endemic species in Taiwan, the selected famous paintings in National Palace Museum, and the clothing, rituals and daily life of Taiwanese aborigines. “Catalog Browse” offers users a single searching interface to search among more than 3 million digitized items from hundreds of institutes via union catalog. “Technical Experience” exhibits the Internet technologies developed by TELDAP,

allowing users to experience the archives by operating various kinds of tools. “Education and Learning” provides a platform that integrates websites related to e-learning, which could be browsed according to different disciplines or users. “Academic Research” incorporates hundreds of professional archives databases established by major domestic archives institutes to facilitate research in various fields. “Value-added Creativity” lists out the digital archives websites that could be the base for cultural and creative industries, acting as a channel for the public and manufacturers to develop business value for digital archives. Figure 1 is the homepage of digitalarchives.tw.



Figure 1 : The homepage of digitalarchives.tw

Set up in 2008, “Digital Taiwan” is an English version of TELDAP’s digitalarchives.tw. Its content mainly displays representative and exquisite piece

of Taiwan's cultural and natural assets, hoping to serve as a window for international general users and professional communities to learn about Taiwan's natural and cultural diversity and digitization achievements. The seven units in this website are as below: TELDAP Collections, A Slice of Wonder, Facets of Taiwan, Exhibition, Educational Resources, Photo Gallery and Multimedia. The selected multilingualized contents from digitalarchives.tw aforementioned are distributed in four parts: A Slice of Wonder, Facets of Taiwan, Exhibition, and Educational Resources. Moreover, this website gathers photographs, video and audio materials that demonstrate the beauty of Taiwan from Government Information Office and Tourism Bureau, and situate the materials in the units of A Slice of Wonder, Exhibition and Gallery. On the other hand, in order to enable overseas users to quickly understand and find the content of Taiwan digital archives, and increase the international visibility of TELDAP's archived collections, the website is different from the Chinese one, whose Union Catalog presents archived pieces in terms of item level. Instead, the archived content is rearranged in terms of collection; a "collection level description" is developed for illustrating the collections that the archived pieces belong to. This specific design permits international users to grasp the essence of each collection in a short time and the full picture of Taiwan's digital archives through the collection level description established by this program. Figure 2 presents the homepage of Digital Taiwan and the content of a collection level description.

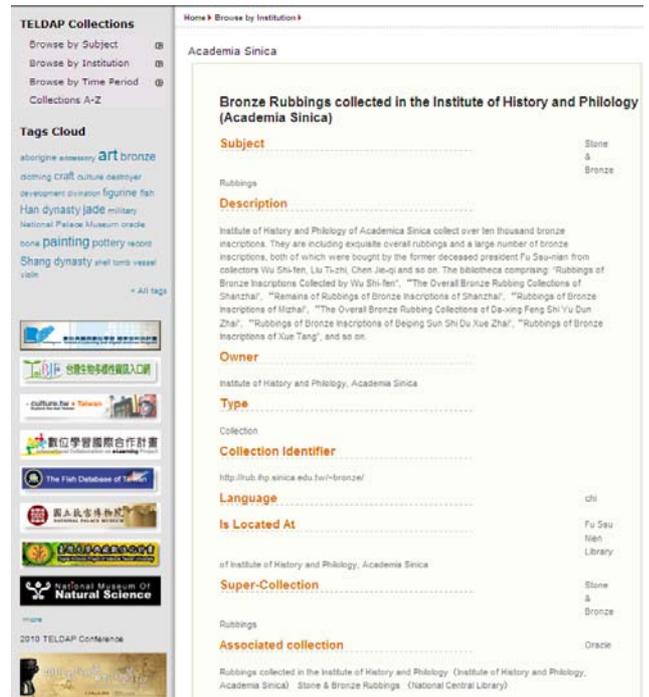
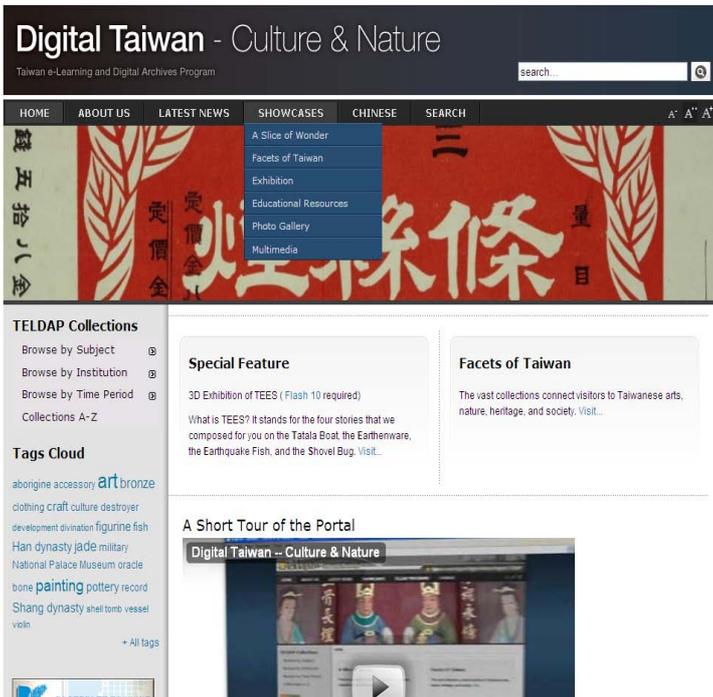


Figure 2 : (Left) The homepage of Digital Taiwan (Right) An example of collection level description “Bronze Rubbings collected in the Institute of History and Philology, Academia Sinica”

3. Method

We use Google Analytics⁹ as the log data collecting tool for its free analytical function, easy installation, few restrictions on system requirements, unlimited number of analytical pages, and it offers multiple analytical indicators (as in Appendix A). There are a total of 52 analytical indicators in four types in Google Analytics. Regarding the options of analytical indicators, this research excludes: 1) Business activity indicators, such as AdWords, because the two websites we study are both for public use and non-profit-making; 2) Indicators of similar statistical types, such as Visitor Loyalty and New vs. Returning; 3) Indicators unrelated with the purpose of this research, such as Browsers and OS, Screen Resolutions; 4) Indicators with difficulty in data collecting, for example, Goals and other similar indicators. Eventually we selected 15 indicators, whose distribution in 3 types of Google Analytics is displayed in Table 1:

⁹ Google Analytics: <http://www.google.com/analytics>

Table 1. The 15 indicators

Visitors¹⁰	Traffic Sources¹¹	Content¹²
Visits Time on Site (by hours) Length of Visit Map Overlay New vs. Returning Page Views Average Page Views Per Visit Average Page Views by Day	All Traffic Sources Top 10 Traffic Sources Site Top 10 Search Keywords Search Engines	Top 10 Pages Top 10 Landing Pages Top 10 Exit Pages

This research observed the usage weblog of users¹³ from Taiwan, US and UK that accessed Taiwan e-Learning and Digital Archives Portal (digitalarchives.tw) and Digital Taiwan-Culture and Nature (Digital Taiwan) from July to December in 2009. User behaviors are compared and analyzed based on the features presented in the 15 indicators. For the convenience of description, this paper will categorize the pairing of websites and referrers into four types: 1) Digitalarchives.tw users from Taiwan are abbreviated as DA-TW; 2) Digitalarchives.tw users from US and UK are abbreviated as DA-USUK; 3) Digital Taiwan users from US and UK are abbreviated as DT-USUK; 4) Digital Taiwan users from Taiwan are abbreviated as DT-TW.

4. Analysis of Summary Statistics

In this section, we will discuss the behaviors of the users from Taiwan, US and UK exhibited by the 15 indicators according to the three categories of Google Analytics: visitors, traffic sources and content.

4.1 Visitors

4.1.1 Visits¹⁴

From Table 2, we could know that the websites most people visited during July to

¹⁰ **Visitors:** These indicators can drill down and view the characteristics of different visitor segments and examine the different factors that make up visit quality.

¹¹ **Traffic Sources:** These indicators can provide an overview of the different kinds of sources that send traffic to the site.

¹² **Content:** These indicators provide an overview of pageview volume and lists the pages.

¹³ Whether users are from Taiwan, US or UK is defined by their IP address.

¹⁴ Here **Visits** means the number of visits of website users; each visit is only counted when the visiting time is over 30 minutes. For instance, if User A accesses the website homepage and then clicks the refresh button immediately, repeating this action 30 times in 10 minutes, the total number of visits will not become 30, for the action would be counted as merely once.

Table 2. Visits

	DA-TW	DA-USUK	DT-USUK	DT-TW
Visits	87,402	2,130	5,897	6,649
Visits per Day	475.01	11.58	32.05	36.14

December in 2009 is DA-TW, while the other three types were visited by less than 1/10 users of DA-TW. Although the visits of DT-USUK are less than 1000 per month on the average, it is growing gradually month by month (Figure 3). Through the path analysis, it is revealed that most visitors from UK and US browsed the web page about the Taiwanese painter Shih-Chiao Lee¹⁵ – In Memory of an Old Painter in Taiwan—Shih-Chiao Lee¹⁶. The main reason for the sudden rise in traffic might be the result of TELDAP team members taking part in an international conference that month, in which they introduced this web page to other participants interested in art. Those conference participants may recommend the web page to the related communities after they returned to their home countries, and thus the UK and US visitors increased greatly during this specific period.

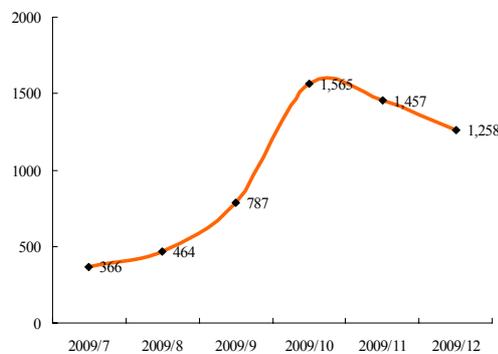


Figure 3. Visits of DT-USUK in 6 months

¹⁵ Mr. Shih-chiao Lee is a well-known Taiwanese local oil painter, one of the important artists involved in the early art movement during the Japanese ruling period (1895-1945). He established a unique and highly-skilled painting style with his sincere, careful attitude and personality strong in thinking and philosophical critique. Shih-chiao Lee has been engaged in creation for over 60 years, and his works are the most completely preserved among the first-generation western painting artists in Taiwan. Besides creation, he also taught several outstanding Taiwanese artists of the second and third generations, contributing hugely to the art education development in Taiwan.

¹⁶ <http://culture.teldap.tw/culture/showcases-mainmenu-186/facets-of-taiwan/154-arts-and-illustrations/159-in-memory-of-an-old-painter-in-taiwan-shih-chiao-lee.html>

4.1.2 Time On Site (By Hours)

Figure 4 displays the number of visits during different time slots in one day. The usage mode of visitors from Taiwan (green and blue curves) is closely related with their daily routines, for the traffic is low during the rest time. The usage mode of those from UK and US (orange and pink curves) is opposite to that of Taiwanese visitors due to the time difference; in other words, the period of time with the lowest number of visits from Taiwan is the one with the highest amount of visitors from UK and US.

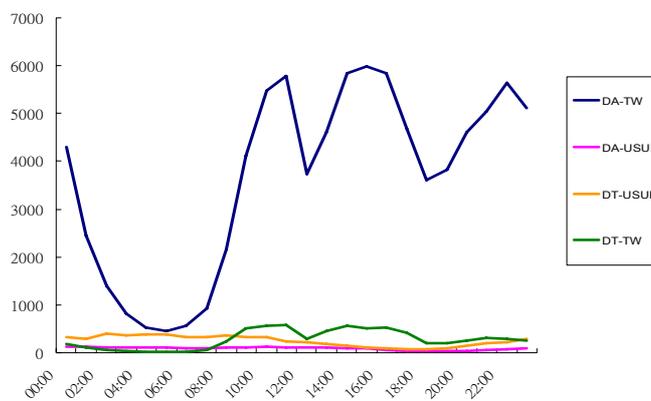


Figure 4. Daily Visits by hours

4.1.3 Length of Visit

As for the length of visit, 70% visitors of the four types stayed for less than one minute, as shown in Figure 5. Among them, 85% of DT-USUK stayed for less than one minute and only 1% spent more than 10 minutes, which manifests the Chinese and English versions of TELDAP portal site still have room for improvement regarding the contents and services offered to attract visitors to probe deeper into the website.

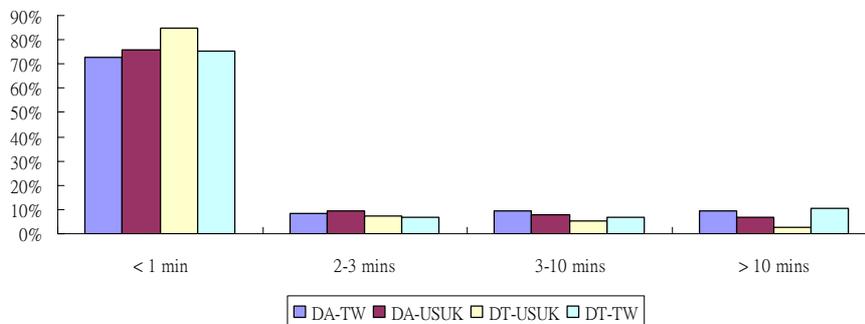


Figure 5. Length of visit

4.1.4 Map Overlay

Figure 6 manifests the users of digitalarchives.tw mainly come from Taiwan, China, Hong Kong and other Chinese-speaking areas. And it should be noted that 65% visitors of Digital Taiwan come from non-Chinese speaking areas, among which visitors from UK and US account for 28%, demonstrating its achievement in promoting Taiwan digital archives to non-Chinese speaking users.

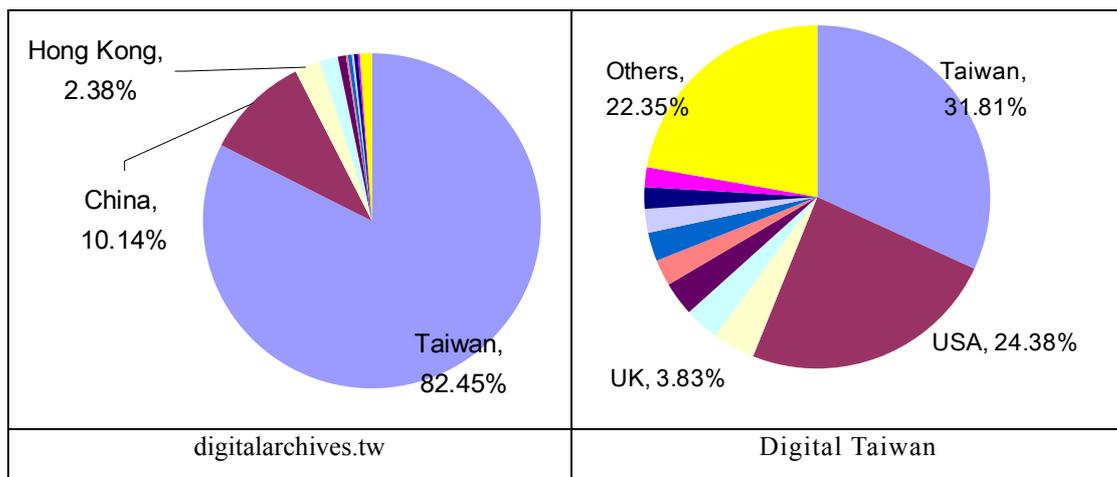
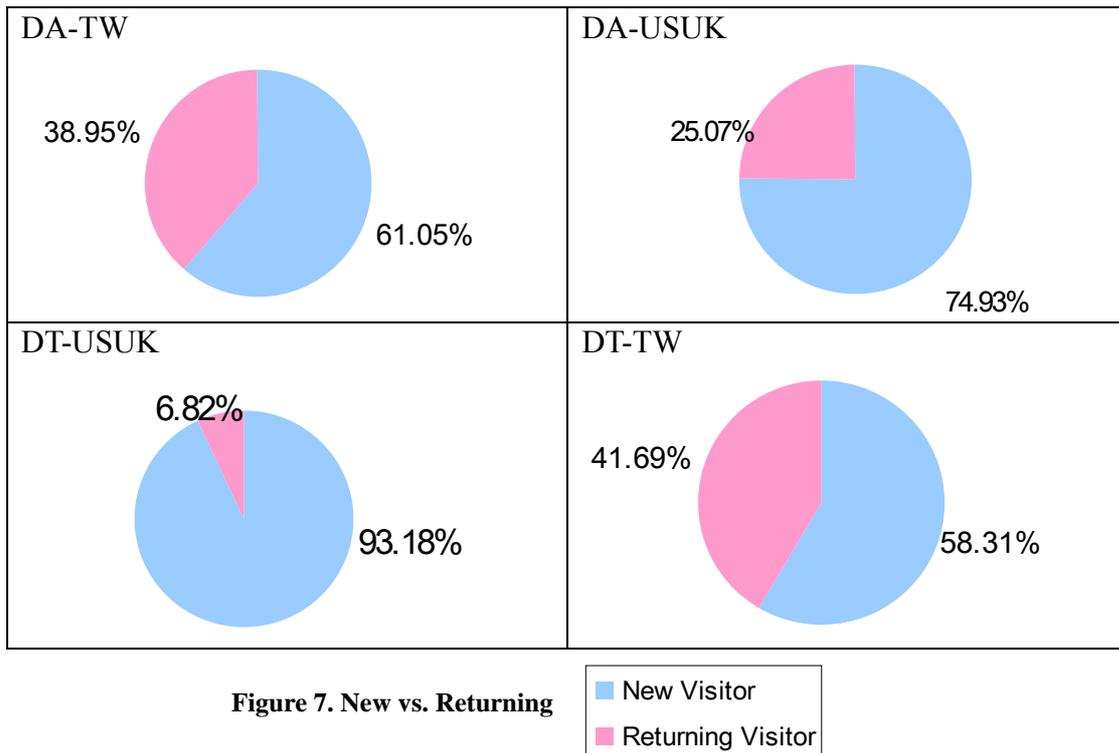


Figure 6 : digitalarchives.tw and Digital Taiwan Users' Geographical Distribution

4.1.5 New vs. Returning

In figure 7 are shown the pie charts of new and returning visitors of the four types, and it is obvious that in both websites, the visitors from Taiwan have higher returning rate. DT-USUK has the lowest returning rate, only 7% visitors coming back to access the website again, which indicates the loyalty of DT-USUK is not so high and their will to return is lower.



4.1.6 Pageviews

Table 3 presents the pageviews of the four types within six months, among which the pageviews of DA-TW are nearly 300,000. That is a huge amount at first glance, but the visits of DA-TW are quite high as well. If the number of pageviews is divided by the number of visits, regardless of the number of visitors, DT-TW has the most pageviews per visit, which are 4.24. As for DT-USUK, the pageviews per visit tend to be lower, which are less than two pages.

Table 3. Pageviews

	DA-TW	DA-USUK	DT-USUK	DT-TW
Page views	291,548	5,298	11754	28,170
Page views per visit	3.34	2.49	1.99	4.24

4.1.7 Average Pageviews by Day

As for the average pageviews by day, DA-TW, DA-USUK and DT-TW exhibit steady curves without any peaks, but DT-USUK reached 224 pages on August 7th, 2009, which is the highest amount within six months. Please see Figure 8.



11,754 Pageviews

Figure 8. Average Pageviews by Day, DT-USUK

The path analysis shows that on the day, visitors from UK and US mostly viewed the Taiwan-related pictures from the “Taiwan Image” website of Government Information Office, Executive Yuan¹⁷, such as Stone Troughs of Laomei¹⁸, Green Island lighthouse¹⁹, Gueishan Island²⁰. Due to the serious damages caused by Typhoon Morakot on Taiwan on August 7th, 2009, Taiwan had attracted international attention, which supposedly led to this enormous increase in the browsing of Taiwan-related pictures by US and UK visitors.



Figure 9.
Stone Troughs of Laomei



Figure 10.
Green Island lighthouse



Figure 11. Gueishan Island

4.2 Traffic Sources

4.2.1 All Traffic Sources

The indicator categorizes the traffic sources into three types: direct traffic, search engines and referring sites. As shown in Figure 12, most visitors access digitalcarhives.tw and Digital Taiwan via referring sites.

¹⁷ <http://taiwanimage.gio.gov.tw/photo/en>

¹⁸ http://culture.teldap.tw/culture/index.php?option=com_content&task=view&id=285&Itemid=188

¹⁹ http://culture.teldap.tw/culture/index.php?option=com_content&task=view&id=284&Itemid=188

²⁰ http://culture.teldap.tw/culture/index.php?option=com_content&task=view&id=286&Itemid=188

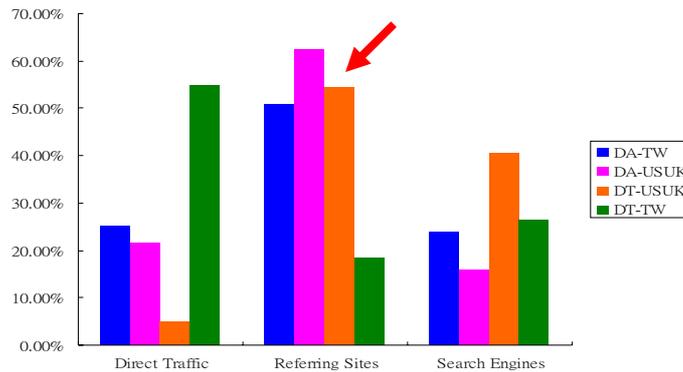


Figure 12. All Traffic Sources

4.2.2 Top 10 Traffic Sources Site

Excluding the factor of direct traffic and ranking the traffic sources sites in terms of the amount of traffic, through this analytical indicator, we could gain a better understanding of which websites are the main traffic sources. From Table 4, it is revealed that among the top 10 of DA-TW, except the two search engines, most visitors connect through referring sites, with TELDAP Union Catalog being the highest proportion, which manifests visitors' high mobility between the two closely associated sites. As for DA-USUK, Table 5 shows its top traffic source site is also TELDAP Union Catalog, and 2.5% visitors are connected via Digital Taiwan, indicating that after browsing the English version website, visitors connect to digitalarchives.tw for more detailed information. In addition, Blog, Plurk and other newly-emerging social media also bring many visitors to digitalcarhives.tw, demonstrating that the influence of Social Network System could not be underestimated in the age of Web 2.0.

Table 4. DA-TW Top 10 Traffic Sources Site

Sources	Percentage
TELDAP Union Catalog / Referring Site	15.56%
Google / Search Engines	13.15%
Yahoo / Search Engines	10.40%
Komica / Referring Site	5.58%
NDAP Program Site / Referring Site	3.54%
Plurk / Referring Site	2.39%
Google Images (Taiwan) / Referring Site ²¹	1.62%
Yam Blog / Referring Site	1.33%
TELDAP Blog / Referring Site	1.00%
Academic and Social Promotions and Applications of Digital Archives and e-Learning Project Site / Referring Site	0.88%

Table 5. DA-USUK Top 10 Traffic Sources Site

Sources	Percentage
TELDAP Union Catalog / Referring Site	30.53%
Google / Search Engines	16.98%
Wikipedia (Traditional Chinese) / Referring Site	5.82%
Google Images / Referring Site	5.70%
Komica / Referring Site	4.50%
Plurk / Referring Site	3.66%
Wikipedia (English) / Referring Site	3.06%
Digital Taiwan - Culture & Nature / Referring Site	2.52%
Yahoo / Search Engines	2.52%
TELDAP Portal / Referring Site	2.34%

²¹ In the categories of Google Analytics, Google Images (<http://images.google.com>) is categorized as “Referring Site.”

For the top 10 source sites of DT-USUK, Google Images occupies more than 50% (Table 6), which indicates most US and UK visitors connect to Digital Taiwan through searching for pictures. The top source site of DT-TW, on the other hand, is Google, occupying 46.81% (Table 7). Besides, the website of Government Information Office, Taiwan also plays an important role in recommending visitors to access Digital Taiwan.

Table 6. DT-USUK Top 10 Traffic Sources Site

Sources	Percentage
Google Images (English) / Referring Site	46.37%
Google / Search Engines	36.83%
Google Images (HK) / Referring Site	6.63%
Yahoo / Search Engines	3.59%
Bing / Search Engines	1.50%
AOL / Search Engines	0.86%
Search / Search Engines	0.66%
Government Information Office, Republic of China / Referring Site	0.50%
ASK / Search Engines	0.36%
Boat design / Referring Site	0.21%

Table 7. DT-TW Top 10 Traffic Sources Site

Sources	Percentage
Google / Search Engines	46.81%
Yahoo / Search Engines	11.66%
Google Images (Taiwan) / Referring Site	6.05%
International Collaboration & Promotion of Taiwan e-Learning & Digital Archives Program Site / Referring Site	6.01%
Joomla! Taiwan / Referring Site	5.75%
Google Images (English) / Referring Site	4.94%
TELDAP Wiki / Referring Site	3.68%
Government Information Office, Republic of China / Referring Site	3.47%
Windows Live webmail / Referring Site	1.10%
DigitalArchives.tw / Referring Site	0.77%

4.2.3 Search Engines

The findings indicate, from Table 8, that whether visitors are from Taiwan, US or UK, the search engine they most often use is Google, which is followed by Yahoo and Bing.

Table 8. Search Engines

DA-TW		DA-USUK		DT-USUK		DT-TW	
Search Engine	%						
Google	54.88%	Google	83.48%	Google	83.28%	Google	79.33%
Yahoo	43.40%	Yahoo	12.39%	Yahoo	8.40%	Yahoo	19.76%
bing	1.09%	bing	2.36%	bing	3.51%	bing	0.57%
yam	0.43%	Aol	0.59%	Aol	2.01%	yam	0.17%
Baidu	0.07%	yam	0.59%	Search	1.55%	Search	0.11%

4.2.4 Top 10 Search Keywords²²

In Table 9, the top 10 search keywords used by DA-TW are listed, with the first two being both 天地宮 (TELDAP Temple²³), while the keywords related with “數位典藏與數位學習” (digital archives and e-learning) occupy four out of ten, with more than 4 page views and over 4 minutes in the duration of visit, which demonstrates the need of the visitors. Overall, Users who are directed to the site using these 10 keywords maintain a decent pageviews and duration of visit, which means the website content addresses their needs.

Table 9. DA-TW Top 10 Search Keywords

Ranking	Keyword	Percentage	Page views	Duration of visit (min)
1	天地宮 (TELDAP temple)	10.79%	2.17	2.66
2	南港天地宮 (Nangang TELDAP temple)	2.70%	3.51	4.25
3	數位典藏 (digital archives)	2.13%	4.71	4.08
4	數位典藏與數位學習 (digital archives and e-learning)	1.24%	10.04	8.38
5	深海魚類 (deep sea fish)	1.18%	1.85	1.60
6	原住民服飾 (aboriginal costumes)	1.14%	3.35	2.75
7	台灣原住民服飾 (Taiwanese aboriginal costumes)	0.68%	3.61	10.23
8	數位典藏與數位學習國家型科技計畫 (TELDAP)	0.63%	4.63	4.97
9	山海經 (Shan Hai Jing/an ancient mythological and geographic book)	0.53%	2.98	2.42
10	數位典藏與數位學習成果入口網 (digitalarchives.tw)	0.52%	9.03	9.50

²² This part analyzes what kinds of keywords are used by visitors to search for the website and how they use the site.

²³ TELDAP Temple is a virtual temple on the Internet made in Flash. Via the interactive games, visitors could gain the knowledge of Taiwanese deities and experience the temple culture.

As shown in Table 10, the keywords used by DA-TW through search engines are mainly Chinese, which could be speculated that these visitors might be of Chinese descent or Chinese-speaking foreigners. Visitors who use “原住民服飾” (aboriginal costumes) as the keyword read 8 web pages on the average, and their duration of visit is also the longest, nearly 15 minutes, thus it is evident that the archive contents about Taiwanese aboriginals in digitalarchives.tw has its charm for the users to adventure deeper into the site.

Table 10. DA-USUK Top 10 Search Keywords

Ranking	Keyword	Percentage	Page views	Duration of visit (min)
1	天地宮 (TELDAP Temple)	10.03%	1.85	2.21
2	digitalarchives.tw	2.06%	5.71	8.76
3	台灣原住民服飾 (Taiwanese aboriginal costumes)	1.77%	2.83	2.44
4	digitalarchives.tw/theme/tdtemple/index.jsp	1.18%	3.00	5.07
5	原住民服飾 (aboriginal costumes)	1.18%	8.25	14.71
6	婉容 (Wan Rong/ the last Empress Consort of the Qing Dynasty in China)	1.18%	1.00	0.02
7	白話字典藏 (POJ archives/ Church Romanization)	1.18%	1.00	0.01
8	人之島 (Pongso no Tao/ Orchid Island)	0.88%	1.33	0.76
9	南港天地宮 (Nangang TELDAP Temple)	0.88%	1.67	0.11
10	數位典藏 (digital archives)	0.88%	1.33	0.11

As shown in Table 11, most keywords used by DT-USUK are related with Taiwanese culture, such as traditional clothing, aboriginal costumes and so on. However, except for the keyword “atayal type of clothing,” the duration of visit for visitors using other keywords is quite short, and the page views are few as well. It should be noted that, visitors who used the top ranking keyword “Taiwan culture background,” tended to leave the website almost immediately after entering it. Through the path analysis, those visitors were directed to the introduction page of the website (About Us)²⁴. Also, from the analysis of keywords, it seems that except for the information about aboriginal costumes, the design of the website does not meet the overseas visitors’ need to know more about Taiwan. The reason might be that this website does not use the concept of Search Engine Optimization, or its content fails to provide sufficient information for users to gain a deeper knowledge of Taiwan.

²⁴ <http://culture.teldap.tw/culture/index.php/about-us-mainmenu-194/digital-taiwan-culture-a-nature->

Table 11. DT-USUK Top 10 Search Keywords

Ranking	Keyword	Percentage	Pageviews	Duration of visit (min)
1	taiwan culture background	1.04%	1.00	0.00
2	taiwan traditional clothing	0.63%	2.13	1.73
3	carlo bergonzi violin	0.54%	3.15	2.19
4	consort chabi	0.46%	1.00	0.00
5	ching k'o	0.42%	1.20	0.14
6	carved ivory ball	0.38%	3.89	1.62
7	travelers among mountains and streams	0.38%	1.00	0.00
8	atayal type of clothing	0.33%	8.00	11.81
9	lo yang class	0.33%	3.25	1.34
10	naked lady	0.33%	1.38	0.17

Table 12 exhibits that DT-TW use more specific terms as the keywords than DT-USUK, for example, Songshan tobacco factory, *Acanthurus dussumieri*, and “台灣總督府檔案” (Files of Taiwan Sotokufu). It could be inferred that DT-TW are more familiar with the content and have a clearer idea about what the site offers. Compared with DT-USUK, DT-TW are more satisfied with the website content, and thus spend more time and have more page views.

Table 12. DT-TW Top 10 Search Keywords

Ranking	Keyword	Percentage	Page views	Duration of visit (min)
1	thou art understood	1.64%	5.03	8.26
2	culture.teldap.tw	1.42%	5.36	11.67
3	songshan tobacco factory	1.25%	1.36	2.01
4	台灣總督府檔案 (Files of Taiwan Sotokufu)	1.25%	1.27	0.12
5	內閣大庫檔案資料庫(the grand secretariat archives)	1.02%	3.67	6.65
6	<i>carex filicina</i> nees subsp. <i>pseudo-filicina</i> (hay.) t.koyama	0.79%	17.79	34.79
7	<i>acanthurus dussumieri</i> 杜氏刺尾鯛	0.45%	2.00	1.45
8	culture portal	0.45%	1.38	2.99
9	pixar taiwan	0.45%	1.00	0.01
10	chinese emperors and empresses	0.40%	19.00	23.48

4.3 Content

4.3.1 Top 10 Pages

Visitors usually enter the website from its homepage, which results in the homepage being ranked as either No. 1 or No. 2 in the four types. Whether DA-TW or DA-USUK, the most browsed webpages all include TELDAP Temple, TELDAP Collections and Creative Comic Collection (CCC)²⁵ (Table 13 and 14). It reveals the initial achievement of TELDAP in promoting digitalarchives.tw through the value-added application of digital archives. Meanwhile, the design of “TELDAP Collections” is more appealing than that of other contents on the site and thus can attract users to access the digital archives.

Table 13. DA-TW Top 10 Pages

Ranking	Webpage	Percentage
1	Homepage	20.10%
2	TELDAP Temple	9.50%
3	Creative Comic Collection	7.23%
4	TELDAP Collections	5.74%
5	Education & learning Website	3.79%
6	Technical Experience Website	2.63%
7	Research Resource Website	2.54%
8	TELDAP Temple Games Homepage	1.76%
9	Creative Resource Website	1.17%
10	TELDAP Temple Games-Burning! Joss paper	1.52%

Table 14. DA-USUK Top 10 Pages

Ranking	Webpage	Percentage
1	Homepage	20.97%
2	TELDAP Temple	9.85%
3	TELDAP Collections	7.72%
4	Creative Comic Collection	4.76%
5	Education & learning Website	3.04%
6	Research Resource Website	2.89%
7	Technical Experience Website	2.08%
8	Collections: The Cat's Meow in Paintings at the National Palace Museum	1.40%
9	Collections: The Royal Tombs of Shang Dynasty	1.36%
10	TELDAP Temple Games Homepage	0.72%

²⁵ CCC is the creative works by the cooperation of gifted story-tellers, illustrators and comic artists, who incorporate various creative ideas into digital archives, reinterpreting these cross-field digital collections in digitalarchives.tw gathered from the archives institutes nationwide through comics, illustrations and short stories, in order to create a whole new image for digital archives and shorten the distance between academic resources and the public; meanwhile, they also exhibit a new way of knowledge transmission.

The comparison between DT-USUK (Table 15) and DT-TW (Table 16) shows a great difference in user behavior. The most viewed webpage of DT-USUK is the one introducing a Taiwanese painter, Shih-chiao Lee, and the second most is the homepage. Moreover, among the top 10 viewed pages, in addition to Photo Gallery and its related pages, pages about the portraits of Chinese emperors and empresses, and the famous violin²⁶ made by Italian violinmaker, Giuseppe Guarneri, are all ranked in top 10. It could be concluded that visitors from US and UK are attracted not only by the oriental elements such as Taiwanese contemporary artists, beautiful scenery in Taiwan and Chinese emperors and empresses, but also by the collections in Taiwan concerning the West.

In DT-TW, after the exclusion of website management pages that constitute half of the top 10, pages with the most views are Homepage, A Slice of Wonder and Facets of Taiwan that have the function of a homepage. The result indicates users from Taiwan do not have specific browsing preferences when accessing Digital Taiwan.

Table 15. DT-USUK Top 10 Pages

Ranking	Webpage	Percentage
1	In Memory of an Old Painter in Taiwan— Shih-Chiao Lee	6.68%
2	Homepage	2.77%
3	The Beauty of TAIWAN (Views from FORMOSAT-2)	2.51%
4	Photo Gallery - The Many Splendors of Taiwan (All photos from GIO)	1.80%
5	Chinese Emperors and Empresses	1.11%
6	Photo Gallery - Enchanting Taiwan (All photos from GIO)	0.96%
7	Photo Gallery - Streets of Old (All photos from GIO)	0.92%
8	Photo Gallery - The New Face of Farming and Fishery (All photos from GIO)	0.83%
9	Violin by Giuseppe Guarneri del Gesù, 1744 ex “Ole Bull”	0.81%
10	Photo Gallery	0.77%

²⁶ This violin is now stored in Chi Mei Museum in Taiwan, which has collaborated with Department of Music and Graduate Institute of Ethnomusicology, National Taiwan Normal University since 2006 in the digitization of 63 famous violins stored in Chi Mei Museum, establishing the website of Digital Violin Archives Project of Chi Mei Museum.

Table 16. DT-TW Top 10 Pages

Ranking	Webpage	Percentage
1	Homepage	18.22%
2	A Slice of Wonder	3.93%
3	Website management page	2.03%
4	Website management page	1.99%
5	Facets of Taiwan	1.84%
6	3D Exhibition of TEES	1.38%
7	Website management page	1.02%
8	Website management login page	0.93%
9	Website management login page	0.91%
10	A Short Tour of the Portal	0.86%

4.3.2 Top 10 Landing Pages

Among the Top 10 Landing Pages of the four types, homepages are ranked as the first two for they are usually the first pages visitors connect to when entering the site. The percentages of DA-TW and DA-USUK accessing the site from the homepage are both more than 30% (Table 17 & Table 18). Besides the homepage, the Top 10 Landing Pages of the two types include TELDAP Temple, Collections and Creative Comic Collection (CCC), same as the Top 10 Pages. Nevertheless, after the top 4, the rest of the rankings of the two types are different from each other; for DA-TW, the pages about Taiwanese aboriginals are included, whereas DA-USUK tends to view contents about traditional Chinese history and culture, such as the famous paintings of National Palace Museum and the tomb culture of Shang Dynasty.

Table 17. DA-TW Top 10 Landing Pages

Ranking	Webpage	Percentage
1	Homepage	32.69%
2	TELDAP Temple	19.09%
3	Creative Comic Collection	14.37%
4	TELDAP Collections	3.33%
5	Education & learning Website	1.29%
6	Technical Experience Website	1.12%
7	Research Resource Website	0.96%
8	TELDAP Collections: The Clothing of Taiwan's Indigenous People	0.80%
9	TELDAP Collections: The Handicraft of Taiwan's Indigenous People	0.55%
10	Project Overview	0.55%

Table 18. DA-USUK Top 10 Landing Pages

Ranking	Webpage	Percentage
1	Homepage	31.41%
2	TELDAP Temple	15.78%
3	Creative Comic Collection	8.08%
4	TELDAP Collections	6.67%
5	Collections: The Cat's Meow in Paintings at the National Palace Museum	2.63%
6	Collections: The Royal Tombs of Shang Dynasty	2.07%
7	Technical Experience Website	1.64%
8	Research Resource Website	1.41%
9	Education & learning Website	1.22%
10	TELDAP Collections: The Clothing of Taiwan's Indigenous People-Men and Women's Clothes	0.85%

As for DT-USUK, each of the Top 10 Landing Pages occupies less than 10% (Table 19). The number one landing page is the one introducing the Taiwanese painter, Shih-chiao Lee, while the other pages in the ranking show a wide range in contents, such as the pictures of Taiwan, Chinese emperors and empresses, famous paintings from National Palace Museum and violins, displaying a wide variety of the landing pages of US and UK visitors. As for DT-TW, nearly 55% visitors enter the site from the homepage (Table 20). Except for 3D Exhibition of TEES that is ranked as the No. 2 landing page, each of the rest in the rankings occupies less than 1%, of which the traffic partly results from website management.

Table 19 DT-USUK Top 10 Landing Pages

Ranking	Webpage	Percentage
1	In Memory of an Old Painter in Taiwan— Shih-Chiao Lee	9.89%
2	Homepage	3.66%
3	The Beauty of TAIWAN (Views from FORMOSAT-2)	3.16%
4	Photo Gallery - The Many Splendors of Taiwan (All photos from GIO)	2.17%
5	Chinese Emperors and Empresses	1.42%
6	Violin by Giuseppe Guarneri del Gesù, 1744 ex “Ole Bull”	1.15%
7	Photo Gallery - Enchanting Taiwan (All photos from GIO)	1.09%
8	Ivory Ball -Concentric ivory spheres carved in openwork with cloud-and-dragon motifs	1.05%
9	The Cat's Meow in Paintings at the National Palace Museum	1.00%
10	The Glorious Violins — The Cremona School	0.93%

Table 20 DT-TW Top 10 Landing Pages

Ranking	Webpage	Percentage
1	Homepage	54.62%
2	3D Exhibition of TEES	3.19%
3	A Slice of Wonder	0.95%
4	Facets of Taiwan	0.95%
5	Night Market	0.95%
6	Website management login page	0.63%
7	Website management page	0.56%
8	Files of the Taiwan Sotokufu (Taiwan Historica)	0.42%
9	A Short Tour of the Portal	0.42%
10	The Beauty of TAIWAN (Views from FORMOSAT-2)	0.42%

4.3.3 Top 10 Exit Pages²⁷

24% visitors of DA-TW exit the site from Homepage (Table 21), and the following two pages are TELDAP Temple and Creative Comic Collection, whose percentages are 17.76% and 13.1% respectively, the same as the rankings in the Top 10 Pages, while each of the rest is less than 4%. In addition, the exit rate is higher for the webpages written in Flash²⁸, for they introduce the achievements of digital archives by means of games, and visitors usually exit the site after playing those games, resulting in a higher exit rate. As for Creative Comic Collection, the exit rate is higher because its content focuses on specific topics of comics and animation, and visitors would exit the site right after viewing the subjects that they are interested in.

²⁷ "Exit Page" is the last page that visitors connect to before leaving the websites.

²⁸ TELDAP Temple, TELDAP Collections: The Handicraft of Taiwan's Indigenous People, TELDAP Temple Games-Burning! Joss paper, and TELDAP Collections: The Clothing of Taiwan's Indigenous People

Table 21. DA-TW Top 10 Exit Pages

Ranking	Webpage	Exits ²⁹	% Exits ³⁰
1	Homepage	24.00%	35.80%
2	TELDAP Temple	17.76%	57.53%
3	Creative Comic Collection	13.01%	54.00%
4	TELDAP Collections	3.65%	19.07%
5	Technical Experience Website	1.76%	20.08%
6	Education & learning Website	1.19%	9.44%
7	Research Resource Website	1.13%	13.40%
8	TELDAP Collections: The Handicraft of Taiwan's Indigenous People	0.78%	32.21%
9	TELDAP Temple Games-Burning! Joss paper	0.78%	26.09%
10	TELDAP Collections: The Clothing of Taiwan's Indigenous People	0.71%	36.21%

In DA-USUK, the Top 3 Landing Pages are the same as those in DA-TW, which are the Homepage, TELDAP Temple and Creative Comic Collection (Table 22), but with higher exit rates. It should be noted that the exit rates of more than half of the pages exceed 50%, for which the reason may be that US and UK visitors access the site with interests in particular topics³¹, so after viewing the information offered on the pages, they have reached their aims of visit; besides, there are no related links for visitors to gain further information, which leads to their exits as well.

²⁹ Exits: The percentage of all visitors exiting the site from this page

³⁰ %Exit: The percentage of site exits that occurred from this page, which means the proportion of visitors exiting the site from this page among all that have viewed this page. The higher the rate is, the more possible that visitors would exit the site directly after viewing this page. The reason might be they have already achieved the aim of visit, or the web page information does not meet their needs.

³¹ For example, the famous paintings in National Palace Museum, the tomb culture in Shang Dynasty and the stories about Dutch and Spanish colonization of Taiwan

Table 22. DA-USUK Top 10 Exit Pages

Ranking	Webpage	Exits	% Exits
1	Homepage	25.45%	48.78%
2	TELDAP Temple	14.88%	62.84%
3	Creative Comic Collection	7.37%	62.30%
4	TELDAP Collections	6.06%	53.72%
5	Collections: The Cat's Meow in Paintings at the National Palace Museum	2.68%	77.03%
6	Collections: The Royal Tombs of Shang Dynasty	1.97%	58.33%
7	Technical Experience Website	1.83%	35.45%
8	Education & learning Website	1.36%	18.01%
9	Research Resource Website	1.08%	15.03%
10	Zeelandia 1661 ³²	0.89%	70.37%

As for DA-USUK, the percentages of the Top 10 Exit Pages are all less than 10% (Table 23), which shows that US and UK visitors have a variety of ways to exit the website, not just concentrated on a single page. But the exit rates of the Top 10 are all above 50%, which might be because there are no related links between these pages and other pages in the website, and visitors would leave the site after viewing the information offered on the pages.

Table 23. DT-USUK Top 10 Exit Pages

Ranking	Webpage	Exits	% Exits
1	In Memory of an Old Painter in Taiwan— Shih-Chiao Lee	9.89%	73.97%
2	The Beauty of TAIWAN (Views from FORMOSAT-2)	3.15%	61.78%
3	Homepage	2.95%	53.54%
4	Photo Gallery - The Many Splendors of Taiwan (All photos from GIO)	2.17%	60.38%
5	Chinese Emperors and Empresses	1.36%	61.07%
6	Photo Gallery - Enchanting Taiwan (All photos from GIO)	1.14%	59.29%
7	Violin by Giuseppe Guarneri del Gesù, 1744 ex “Ole Bull”	1.07%	66.32%
8	The Cat's Meow in Paintings at the National Palace Museum	0.98%	65.17%
9	Ivory Ball -Concentric ivory spheres carved in openwork with cloud-and-dragon motifs	0.93%	62.50%
10	The Glorious Violins — The Cremona School	0.92%	72.00%

³²“Zeelandia 1661” presents in Flash animation the stories about Dutch colonization of Taiwan by combining elements of historical stories, creative scripts and digital archives.

Among the DT-TW Top 10 Exit Pages listed in Table 24, Homepage is ranked as the highest for nearly 40% visitors exit the site from this page, while the percentages of other pages in the rankings are all lower than 3.5%. There are three pages with exit rates higher than 50%, of which “3D Exhibition of TEES” are Flash pages introducing stories about the collections planned by four archives institutes³³ in cooperation. Visitors would leave the site to look for more information after watching the Flash, resulting in the higher exit rate. As for the pages of “TELDAP Collections: National Taiwan University” and “Night Market,” both of them provide external links, so visitors might be directed to other pages through these links after reading the introduction, leading to a higher exit rate.

Table 24. DT-TW Top 10 Exit Pages

Ranking	Webpage	Exits	% Exits
1	Homepage	39.19%	54.51%
2	3D Exhibition of TEES	3.40%	58.25%
3	A Short Tour of the Portal	1.20%	33.20%
4	A Slice of Wonder	1.14%	6.86%
5	Facets of Taiwan	1.08%	13.87%
6	Website management page	0.77%	9.11%
7	TELDAP Collections: National Taiwan University	0.53%	50.00%
8	Night Market	0.50%	66.00%
9	Exhibition	0.45%	12.77%
10	LATEST NEWS	0.44%	16.67%

4.4 Preliminary Findings

From the above data, we find that the target audience of digitalarchives.tw are those from Taiwan or Chinese-speaking visitors from other areas, for the website content is mainly displayed in Chinese with its aiming to be an exhibition platform of digitized achievements for the public access. Though DA-TW has the highest traffic amount among the four types, which means digitalarchives.tw successfully attracts its target audience, the average duration of visit is less than one minute. Therefore, how to keep the target audience and lengthen their visiting time on the site, even turning them into loyal users who return repeatedly, would be one of the problems faced by digitalarchives.tw

³³ The four institutes are The Institute of History and Philology (IHP) of Academia Sinica, The Biodiversity Research Center of Academia Sinica, National Taiwan University and National Museum of Natural Science. Their contents include The Tatara Boat, The Earthenware, The Earthquake Fish and The Shovel Bug.

concerning its development strategy. Moreover, although TELDAP Temple and CCC are highly ranked in the Top 10 Pages of digitalarchives.tw, the exit rates of these two pages focusing on games, comics and animation, are also high in Top 10 Exit Pages. More than half of the visitors leave digitalarchives.tw right after browsing the pages. Therefore, while new ways such as Flash games, value-added applications and multimedia are added to the traditional text-based form in presenting the webpages to attract more visitors, it is also significant to provide internal links on the pages to increase the depth and width of the content, in order to prevent visitors from leaving the site after finishing the games.

Mainly displayed in English, Digital Taiwan aims to be “the window of information circulation for international users to retrieve and inquire the results of digital archives in Taiwan.” As a result, non-Chinese speaking visitors outside of Taiwan are its target audience. However, with respect to the amount of visits, length of visit or the number of page views, DT-USUK still has room for improvement. Its returning rate is not high, and one-time visits constitute the majority, with 93% visitors being newcomers; also, the traffic of direct connection is very low. All the above phenomena demonstrate that Digital Taiwan fails to turn its target audience into loyal users, for most of them connect to the page only for the purpose of picture searching. They leave the site soon after viewing the pictures and captions, and are not likely to visit again. Accordingly, it is the primary task to design the contents that would appeal to US and UK visitors and increase their returning rate.

5. Suggestion

5.1 Traffic Strategies

Observing the two portal websites of TELDAP, digitalarchives.tw and Digital Taiwan via the indicators of the “Visitors” category, the indicator of “Map Overlay” shows the effectiveness in the internationalization strategy of TEDLAP. As for Digital Taiwan, though it indeed attracts overseas visitors more than twice of Taiwanese visitors to access the site (Figure 6), it still fails to draw a great number of overseas visitors. DA-TW is more than fifteen times as many as DT-USUK in the number of visits (Table 2). With “traffic strategies,” digitalarchives.tw successfully appeals to more visitors; from its “TELDAP Temple” being highly ranked among the Top 3 in the rankings such as Top 10 Search Keywords and Top 10 Pages, the effectiveness of these strategies is manifested

and could act as a model for the promotion of Digital Taiwan.

The main concept of “traffic strategies” is to make the website more accessible, in order to increase its traffic. The methods digitalarchives.tw adopts are as follows:

(1) Search Engine Optimization

The data of traffic sources in DT-USUK demonstrates that most US and UK visitors connect to Digital Taiwan through search engines for the purpose of picture searching. Consequently, we could make more detailed descriptions about the ALT attributes of photos when editing the web pages, or add some keywords when naming image files to increase the possibilities for the pictures to be found. For example, the original file name of the image of Gueishan Island³⁴, hp-0120270072-i.jpg, could be changed into “Gueishan-Island.jpg”; or the popular keywords (such as TELDAP Temple and carlo bergonzi violin) could be put into the HEAD of web pages, so that the visitors are more likely to find the website.

(2) Website Recommendations

The data of DA-TW shows (Table 4) that many users connect to the portal site via the recommendation links on other sites or blogs. For instance, the archived result of this program is transformed into “Creative Comic Collection” and advertised on the ACG website, Komica³⁵, and the visitor sources are thus expanded. Another way to increase the website traffic is to make use of Social Network System (SNS). Most US and UK visitors connect to Digital Taiwan via Referring Site links. Therefore, we could introduce the rich website content by using some popular SNS at present, such as Plurk for Taiwanese visitors, Twitter and Facebook for US and UK visitors. Meanwhile, with the highly interactive feature of SNS, we could also respond to visitors’ feedback or suggestions promptly.

(3) Media Exposure

Digitalarchives.tw increases its visibility and website traffic by participating in large-scale exhibitions, publication promotion, demonstration speeches and other

³⁴ http://culture.teldap.tw/culture/index.php?option=com_content&task=view&id=286&Itemid=188

³⁵ <http://www.komica.org>

methods of media exposure. The analysis of Visits (Figure 3) and Average Page Views by Day (Figure 8) of DT-USUK indicates that through the promotion in international conferences and the effect of news events, the website traffic could increase greatly, which shows the promotion of activities could indeed help amplify the traffic of the virtual Internet world.

5.2 Content

Although the traffic strategies are helpful in enhancing website usability, “content” is the real inducer that prompts users to access the site. Both the Duration of Visit (Figure 5) and the Returning Rate (Figure 7) indicate the content of digitalarchives.tw and Digital Taiwan could not attract visitors to use the two sites thoroughly and repeatedly. We have the following suggestions for the future planning of both sites based on the searching behavior of users shown by some indicators in Section Four:

(1) To increase the content that target users are interested in

Analyses of DA-USUK Top 10 Pages, DT-USUK Top 10 Viewed Pages and DT-USUK Top 10 Search Keywords manifest visitors’ need to know more about Taiwanese culture, but the information provided by the sites is unable to satisfy them. Here we list out three kinds of contents US and UK visitors show more interest in: 1) images of Taiwan; 2) Oriental elements, such as Chinese emperors and ancient Chinese history; 3) Western items they are familiar with, such as violins. Consequently, in the future strategy of website development, we could adjust and add these contents favored by US and UK visitors, which will not only increase the visiting rate, but also lengthen the duration of visit on the site, making the number of page views grow, in order to achieve the goal of raising the international visibility of Taiwanese digital archives. Moreover, US and UK visitors show great interest in the images about the beauty of Taiwan provided by Government Information Office. Therefore, when choosing the results of digital archives and devising the strategy of multilingualization, we could consider the website “Exhibition of Cyber Island, Taiwan,”³⁶ which has plenty of images about Taiwan, as our source of materials in enriching the content of Digital Taiwan, and introduce to overseas

³⁶ The “Exhibition of Cyber Island, Taiwan” (ECIT) is an interactive platform for private individuals or workshops that wish to share their collections or artistic work online. The content of the platform comprises impressions of the Taiwan local cultural and natural landscape, records of social events, memories of the past, depictions of everyday life, and creative art pieces. (<http://cyberisland.teldap.tw/en-us/index.htm>)

visitors about the beauty of Taiwan from a more local perspective.

(2) To design the interactive web pages

For digitalarchives.tw, visitors from Taiwan prefer the interactive web pages made in Flash, such as TELDAP Temple. With regard to the future strategy of developing digitalarchives.tw, we could design more web pages of this type, presenting the rich achievement of digital archives in Taiwan in an interesting, interactive way.

(3) To improve web page structure

According to the exit rate (Table 21), half visitors would exit digitalarchives.tw after viewing “TELDAP Temple” and “Creative Comic Collection.” The main reason may be that the planning of internal and external links of these two web pages fails to effectively direct visitors to continue browsing the site. Therefore, we suggest improving the website structure by adding more internal links on the pages of higher exit rates in order to keep visitors staying in the site; or, we could add more external links, directing visitors to other websites related to digital archives for more information.

6. Conclusion

When facing users with different languages and cultures, we have to adjust website management strategies of digital libraries. The multilingualization of digital libraries is not simply equal to translating the content of local language into foreign language; instead, the users’ reading habits and preferences should be taken into account to meet the needs of different language users, and the selection of contents as well as web page designs should be modified accordingly. Table 25 is the strategic suggestions for different types of sites and visitors, proposed by this research based on all the data collection and analyses.

Table 25. Strategic suggestions about digitalarchives.tw and Digital Taiwan

	digitalarchives.tw	Digital Taiwan
Visitors from Taiwan	<ul style="list-style-type: none"> ● <u>Traffic Strategies</u> <input checked="" type="checkbox"/> use keywords to carry out search engine optimization <input checked="" type="checkbox"/> increase the website recommendation links, such as the promotion via SNS (Plurk, Facebook) ● <u>Content</u> <input checked="" type="checkbox"/> design the interactive web pages, such as those made in Flash <input checked="" type="checkbox"/> increase the content that target users are interested in, such as content related with Taiwanese aboriginals 	<ul style="list-style-type: none"> ● <u>Traffic Strategies</u> <input checked="" type="checkbox"/> use keywords to carry out search engine optimization ● <u>Content</u> <input checked="" type="checkbox"/> design the interactive web pages, such as those made in Flash
Visitors from US and UK	<ul style="list-style-type: none"> ● <u>Traffic Strategies</u> <input checked="" type="checkbox"/> use keywords to carry out search engine optimization <input checked="" type="checkbox"/> increase the website recommendations links, such as collaborating with Government Information Office to promote websites to overseas users. ● <u>Content</u> <input checked="" type="checkbox"/> increase the content that target users are interested in, such as Taiwanese aboriginals, emperors, ancient Chinese history and so on. 	<ul style="list-style-type: none"> ● <u>Traffic Strategies</u> <input checked="" type="checkbox"/> use keywords to carry out search engine optimization, such as increasing the possibilities for images to be found by changing their file names and ALT attributes <input checked="" type="checkbox"/> increase the website recommendation links, such as the promotion via SNS (Twitter, Facebook) ● <u>Content</u> <input checked="" type="checkbox"/> increase the content that target users are interested in, such as images of Taiwan, Oriental elements, Western items and so on. <input checked="" type="checkbox"/> improve the web page structure by adding both the internal and external links

By using Log Analysis to observe and analyze website users of different languages, we could understand not only how users access website information but also the sources of website traffic. Besides being helpful in improving the website structure and organization, Log Analysis is also beneficial when devising the strategies of website marketing and promotion. It is indeed a good helper in discussions on website management strategies and structure planning.

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Appendix A
The indicators that Google Analytics provides

Visitors	Traffic Sources	Content	Goals
Benchmarking	All Traffic Sources	Top Content Pages	Total Conversions
Map Overlay	Direct Traffic	Content by Title	Goal Conversion Rate
New vs. Returning	Referring Sites	Content Drilldown	Goal Verification
Languages	Search Engines	Top Landing Pages	Reverse Goal path
Visits	AdWords Campaigns	Top Exit Pages	Goal Value
Absolute Unique Visitors	Keyword Positions	Site Overlay	Goal Abandoned Funnels
Pageviews	TV Campaigns	Site Search	Goal Funnel Visualization
Average Pageviews	Keywords	Event Tracking	
Time on Site	Campaigns		
Bounce Rate	Ad Versions		
Visitor Loyalty			
Visitor Recency			
Length of Visit			
Depth of Visit			
Browsers			
Operating Systems			
Browser and OS			
Screen Colors			
Screen Resolutions			
Flash Versions			
Java Support			
Network Service Providers			
Hostnames			
Connection Speeds			
Mobile Devices			
Mobile Carriers			
Custom Variables			

* The indicators used for this paper marked with the sign.