Bringing Geoscience Australia's Antarctic heroes in from the cold: creating an interactive story map

Abstract

Digital humanities mapping tools can be effectively used to collate and present library collections and links to related content via an interactive map. Taking a geohumanities approach to telling the story of Geoscience Australia and its predecessor organisations' involvement in the geographical place names of Antarctica, an interactive web map was created to complement a written article. The map showcased related digital items from the library's collection, Geoscience Australia's image database, as well as links to the Australian Antarctic place names Gazetteer.

Over 110 Antarctic geographical features were identified as being named for former employees of Geoscience Australia and its predecessor organisations. Using the free online mapping tool ESRI Story Maps, pins were placed on an Antarctic map to show the location of each geographical feature. Pop up boxes were then created containing basic information such as latitude and longitude, a brief biography of the former employee and a link to the full Antarctic Gazetteer entry. Where possible, links to the digitised full text copies of the scientist's Antarctic Reports, Records and Bulletins from the library's collection, as well as photographs from Geoscience Australia's image database were included.

The written article "*Geoscience Australia's Antarctic heroes"* was published in Geoscience Australia's online newsletter *insights* with a link to the accompanying Story Map. The map has been viewed over 600 times and has successfully linked related

information which was previously unconnected. Anecdotal feedback from users indicated that they found the map to be an easy access point to discover the Antarctic collection without having to interact with a text based catalogue search screen.

The interactive Antarctic map allowed connections to be made in an easily accessible and visual manner between items in the library's collection as well as to other collections within Geoscience Australia and the broader Antarctic community. This map has led to a digitisation and crowdsourcing transcription project of Geoscience Australia's Antarctic field notebooks to enable the future linking of related library resources and to increase online access to our Antarctic collection.

Introduction

Geoscience Australia is a government entity within the portfolio of the Department of Industry, Innovation and Science and is located in Canberra. Within Geoscience Australia's purpose-built facility lies the Doc Fisher Geoscience Library which boasts a desert garden complete with dinosaurs. Our Library is regarded as one of the most extensive collections of geoscientific literature in the Southern Hemisphere, with items dating from 1742 to the present day.

Our collection consists of a wide range of items including e-journals, databases, e-books, rare books, maps, atlases, print journals, aerial photographs, field notebooks, pamphlets, manuscripts, photographs and even a radioactive rock (safely stored outside the library!). As would be expected of the national geological and geospatial advisor, our collection provides extensive coverage of Australia and its territories including Antarctica.

Our Library has the privilege of not only providing assistance to Geoscience Australia's scientists, but also being open to the public. We are visited online and in person by university staff and students, private industry providers, interested members of the public, and retired geologists who never lose their enthusiasm for the earth sciences. In the past few years we have seen an increase in the number of family historians and arts and humanities-based researchers who are turning to our collection to answer their diverse enquiries.

A fundamental principle of science communication is to engage with your audience in a manner which makes the science accessible. We took this approach in working with Geoscience Australia's Antarctic Geoscience team to tell the story of our institution's involvement over the years in the creation of geographical place names in Antarctica . A simple interactive online map provides an accessible entry point to the public to engage with the story and items relating to geoscientific exploration in Antarctica.

This paper will present the case study of how we used a digital humanities tool to take a geohumanities approach to telling the story of our organisation's contribution to the exploration and mapping of Antarctica and raise awareness of our Library's collection of Antarctic resources.

Case study

Geoscience Australia and its predecessor organisations, the Bureau of Mineral Resources (BMR), the Department of National Mapping and Australian Geological Survey Organisation (AGSO) have all made significant contributions to scientific exploration in Antarctica. Since the first Australian National Antarctic Research

Expedition (ANARE) voyage in 1947, geologists and surveyors have been an integral part of mapping and describing the surface of Antarctica. The contributions made by these scientists are often reflected in the naming of the geographical features of the Antarctic regions in which they worked.

Our current Antarctic geoscientists were aware of the important contributions made by our predecessors and wanted to highlight the history of Geoscience Australia's sustained contribution to Antarctic geoscience through writing an article for our online newsletter *insights*. The focus of the article was the more than 110 Antarctic geographical features which bear the names of former staff members who made contributions to Antarctica either on the ground or in office-based support roles. It became apparent that our Library contained an extensive collection of resources which were created by these scientists arising from their time in Antarctica, which would be of interest to and enrich the telling of the story. The challenge was how to integrate our Library's resources, which primarily were text based catalogue records, into a visual and interactive representation which would complement the written article and engage the audience. Digital humanities provided the solution to our dilemma.

Digital Humanities

Originally known as Humanities Computing from its emergence in the 1950s, the term Digital Humanities came into mainstream use in 2004 to describe the work being undertaken across the humanities and computing fields (Vanhouette, 2013). Consensus on a definition of digital humanities has been the source of much debate with multiple views being presented including 817 definitions submitted by participants from the Day of DH (Heppler, 2015). Despite a multitude of definitions, a common theme of the intersection between computing and the humanities emerges as a central

component of most definitions. In his discussion on the definition of digital humanities, Vanhouette (2013) presents the broader perspective on what digital humanities do when he states that “Digital Humanities tries to model the world around us through success and failure in order to arrive at a better understanding of what we know and don’t know about humankind, their activities, artefacts, and record”. This definition reflected the aim of our project which was concerned with trying to better understand and communicate our scientists’ endeavours in Antarctica in a visual manner using our Library’s collection and related artefacts.

Within the broad field of Digital Humanities there exists a number of special interest groups (SIG) which focus on smaller subsets of research interests. In 2013, the Alliance of Digital Humanities Organisations (ADHO), established a GeoHumanities SIG with the aim to focus “on spatial, spatial-temporal and "placial" perspectives in the digital humanities” (Alliance of Digital Humanities Organisations: GeoHumanities Special Interest Group, 2016). It is worth noting that one of the inaugural co-chairs was a librarian, Kathy Weimer, from Rice University who along with geographer Karl Grossner of Stanford University recognised the need to form a community to support the demands of geographical based research. A recent report published by Gale Cengage and *American Libraries* highlighted the intersection between libraries and Digital Humanities in the American setting and the ways in which libraries are supporting Digital Humanities projects (Varner and Hswe, 2016).

The geographical nature of our story was a key factor in selecting an interactive map to visualise it. As time and resources were limited, we sought a solution which was cost effective and required little setup infrastructure. The ADHO GeoHumanities SIG has compiled an ever-growing list of digital mapping tools within the Digital Research Tools

(DiRT) resource. The list of mapping tools provided on DiRT (http://dirtdirectory.org/categories/mapping) presented us with a number of options to choose from. We selected ESRI with their free online ArcGIS Story Map product as the most suitable solution to visualise our story.

ESRI Story Maps

ESRI is a GIS (Geographic Information Systems) company that provide a range of spatial services to clients, including the free online platform, Story Maps. Story Maps is a cloud based platform which allows users without access to, or technical knowledge of, specialist GIS software to utilise the capabilities of GIS to create an online map which communicates a story to a broader audience.

Users can access this free service by registering on the ESRI Story Maps website (https://storymaps.arcgis.com) to create a user profile. There are ten different standard Story Map templates to choose from with new features and interfaces being regularly added to the suite. Regardless of the template used, the underlying principle remains the same, which is using a map to communicate a story and populating the map with resources which enhance the telling of it. Story Maps was a logical choice for complementing the written Antarctic article and showcasing the relevant items from our Library's collection, as it presented the opportunity to locate the place names in context on a map, and present items related to the person after whom the location was named. Geoscience Australia also had the desktop version of ArcGIS deployed across our organisation which enabled us greater flexibility in customising features such as the base map, as both products were compatible with each other.

Construction

The first step in constructing the Story Map was to decide upon the narrative which we wanted to convey through the map. As we were aiming to complement the written story about the history of our geologists and surveyors in Antarctica, we had a clear narrative to share through our map. By focusing on depicting the location of the geographical place names which were often assigned the names of those who first visited them, we were able to demonstrate the scope of the work which had been undertaken and the breadth of the overall scientific work program in Antarctica.

Once we had decided on our narrative, we focused on discovering and collating the relevant resources from both within the Library's collection and from the internet which would help enrich our story. Our Library has a wide range of unique Antarctic resources produced by our organisation and its predecessors including the published reports of the trips to Antarctica outlining analysed observations and considered geological findings; field notebooks (including one of Kerguelen Island in the Sub Antarctic which was written on the first ANARE voyage); aerial photographs which were used in pre-GPS days to determine locations and record the sites where rock samples were collected. Outside of the Library's collection, Geoscience Australia has an extensive collection of photographs taken by personnel during their trips to Antarctica as well as the rock samples which they collected during their time in the field and the subsequent thin section slides.

From sources external to our organization we were able to locate other highly relevant information to be included in our map. The Australian Antarctic Division manages the Australian Antarctic Data Centre that houses the Australian Antarctic Gazetteer. The Gazetteer is the official record of the name and location of recognised geographical

place names in Antarctica. Gazetteer entries will also often contain brief biographical information about the person after whom the feature was named. By combining the above mentioned relevant resources together on the map, viewers were presented with a more comprehensive understanding of the context in which the work was undertaken by the scientists and of the scientist themselves.

A limitation when deciding what resources to include in the map was the lack of availability in digital formats of all of the relevant resources being in a digital format. Due to this reason, the resources from Geoscience Australia which were presented in the map were limited to the published reports and general photographs which were already digitised, as well as the links to entries in the online Australian Antarctic Gazetteer.

There is a wide and ever increasing range of Story Map templates to choose from when deciding on a design to use for your map. As the main focus of our article was on the place names and the story of the people behind them, we chose to use the basic Story Map template which provided a clear and minimal interface so that the place names became the focus of the map. By clicking on a pin placed at a geographical location, a pop-up box was displayed containing additional information about the person the place was named for including a brief biography, a link to the Gazetteer entry, links to full text copies of any reports published by the person, and where available, a photograph of either the person or the place.

Once the template had been chosen, we created a base map layer. Story Maps has a number of existing base maps covering different views such as topographic, open street map and satellite imagery which can be used. However, the platform also allows users to upload alternative base maps. We created our own base map layer for our Story Map

as we were keen to highlight geographical features of Antarctica. In particular, we wished to draw attention to the fact that although the vast majority of the continent of Antarctica is covered by a thick ice sheet, exposed rock outcrops account for approximately 1-2% of the landmass. Using shapefiles of the Antarctic continent from the Antarctic Digital Database acquired via the Scientific Committee on Antarctic Research, we manipulated these using ArcGIS desktop and overlaid the Australian Antarctic Territory (AAT) boundaries on the map to highlight the areas in which the scientists in question had primarily worked. This extra detail also served as a visual marker to show why the place names were concentrated in their locations. The completed map layer was then saved to one of our servers and the layer was added to our map.

With the base map layer in place, it was time to populate the map with pins corresponding to the locations of the identified list of place names. Pins could be automatically placed in locations by uploading text files containing fields with the location names and corresponding latitude and longitude coordinates, or by manually finding and placing a pin on the map. The pin icon could be customised to suit the user's preferences. Once a pin was placed, the pop-up box could be populated with the desired information. This was a straightforward process of typing in information and adding hyperlinks to online resources such as the digitised reports, photographs, and Gazetteer entries. Photographs and any videos need to be hosted outside the Story Map platform, with the links inserted into the pop-up box. Although we didn't use this feature, Story Maps also offers the ability to import media from Flickr, Google+/Picasa and YouTube and if this content is geotagged it will automatically be placed at the correct location on the map. The completed map was then saved and released through

the Geoscience Australia account. To ensure the maximum exposure for the map, the open access viewing option was selected so that any member of the public could view it.

The Story Maps website has numerous tutorials covering the steps required to construct the different maps. The tutorials are easy to understand and have screen captures demonstrating key points in the construction process. A gallery of examples of completed projects also provides inspiration and guidance to new users when beginning their map.

As with any new venture, a number of lessons were learned from the process of constructing the map. In particular, the selection of the Story Map template would be different if this map was to be constructed again. The initial aim of the map was to complement the written article *'Geoscience Australia's Antarctic heroes'* which provided in-depth context for the map. This worked well for us, but the impact and usefulness of the map as a stand-alone product was reduced when the map was accessed directly, rather than through the link in the article where the background and explicit linkages to the library resources were stated. To rectify this and maximise the outreach benefits of the map, a different template such as Story Map Journal could be selected. A Journal template would allow for the narrative contained in the article to be included on a side panel of the map, ensuring that viewers were always presented with the context of the story. Consequently, viewers' awareness that the Library was the source of most of the items in the map would be increased.

Results

Using the Story Map to complement the written article has had a number of positive results. Since it was released in June 2015, the map has been viewed over 600 times. It has proven to be a useful outreach tool for showcasing our Library's collection of Antarctic resources to the general public in an easily accessible format. This invites users to browse and explore the collection. The map allows the public to interact with items from the collection without having to know what they are looking for, and without having to enter text based search terms as is required when using the library catalogue. This removes a barrier to accessing the collection and makes it more user friendly.

The linking of related resources from within our Library, the wider Geoscience Australia community and externally is another factor in the success of the map. The flexibility of the map enables resources from multiple sources to be curated and presented to users in a manner which makes it easy for them to explore. Items related to a person or location are displayed without having to conduct searches across the various sources.

Visualising part of our Antarctic collection raises potential questions which could lead to further research. Seeing the place names located on the interactive map provides viewers with greater context than seeing a text based list of the place names. Looking at the distribution of place names across the map shows that a few of the named geographical features fall outside the AAT. This could lead to further research exploring such issues as scientific collaboration between nations in Antarctica.

The Story Map demonstrated that a scientific library collection can be used outside of the field of scientific research. The majority of our patrons use our collection for scientific research, however the map shows that the same items hold value for

humanities researchers. By demonstrating through the Story Map how our collections can be used outside of the field of applied science and highlighting the human element that the items contain, we hope to make more researchers aware of our collection and encourage them to use it in their research.

An unexpected, but pleasant, outcome of the project has been the offer of additional related material from members of the public. A retired geophysicist who previously worked for the BMR saw the map and contacted the library with the offer of additional photographs and an article that he had written about his time working in Antarctica. This information enhances the map and also helps to raise awareness of the Library's resources with the wider community.

The interest shown by the public in the Antarctic Story Map led to a related citizen science crowd sourcing transcription project being undertaken with our Antarctic field notebooks. Geoscience Australia's Library holds 84 field notebooks written by geologists during their visits to Antarctica. The notebooks contain the handwritten observations and accounts of life in the field and include details of the rock samples collected, geographic coordinates and air photographs used. These notebooks were unable to be included in the Story Map as they were not digitised.

With the support of our Antarctic Geoscience Team, the notebooks have been scanned and uploaded into the Australian Museum's DigiVol online transcription platform. A team of dedicated and enthusiastic volunteers from around Australia transcribed the handwritten notebooks in an impressive 6 months! The initial transcriptions are currently being validated and will be uploaded to the Biodiversity Heritage Library enabling access to them from anywhere in the world. The transcriptions also include a number of

Text Encoding Initiative (TEI) tags which will make it easier for Digital Humanities researchers to work with the content. The field notebooks digitisation and transcription is the first step in a larger project to digitise and link a range of related items from the library's wider collection as well as collections such as the rock samples and thin sections held by other areas of our organisation.

Conclusion

Digital Humanities tools provide libraries with an opportunity to present their collections to the public in new and engaging ways. The creation of an interactive Story Map containing digitised items from our Library, images from the Geoscience Australia photographic collection and links to the Australian Antarctic Gazetteer was well received by the public. The map provides a platform through which the public can engage with items from our Library's collection in a visual manner woven around the narrative of a story. This interaction has led to members of the public visiting the Library to view Antarctic items and even contributing related items for inclusion in the map.

The success of the map has led to a digitisation and crowd sourcing transcription project of the Library's collection of Antarctic field notebooks with TEI tags. The transcriptions and tags help to open up our scientific collection to a wider variety of researchers, including Digital Humanities researchers, to access and reuse in new and unprecedented ways, adding value to our resources. Increased digitisation of library items for use with digital humanities tools will further facilitate access and discovery of collections, and extend the reach and impact of libraries to inspire, provoke curiosity, educate and encourage further exploration of our collections.

References

Alliance of Digital Humanities Organizations: GeoHumanities Special Interest Group. (2016) *Home*. Retrieved from http://geohumanities.org/

Heppler, J. (2015). *What is Digital Humanities?* Retrieved from http://whatisdigitalhumanities.com/

Vanhoutte, E. (2013). The Gates of Hell: History and Definition of Digital| Humanities| Computing. In M. Terras, J. Nyhan & E. Vanhoutte (Eds.), *Defining Digital Humanities: A Reader* (pp. 119-156). Available from https://blogs.ucl.ac.uk/definingdh/reader-contents/

Varner, S. & Hswe, P. (2016) Special Report: Digital Humanities in Libraries. *American Libraries*, January/February, 36-41. Retrieved from https://americanlibrariesmagazine.org/2016/01/04/special-report-digital-humanities-libraries/

Additional Resources

Black, J. (2015). Geoscience Australia's Antarctic Heroes – Web Map. Retrieved from http://geoscience-au.maps.arcgis.com/apps/OnePane/storytelling_basic/index.html?appid=bb956e835f44421da9160b7557ba64a6

Carson, C. & Black, J. (2015). Geoscience Australia's Antarctic heroes. *Insights*. June. Retrieved from http://www.ga.gov.au/news-events/news/latest-news/geoscience-australias-antarctic-heroes