

stages to follow and reflection in what went on before. Still one event follows another in a sequence even though recursion and planning may be evident within each of the stages. The naïve observation of linearity overlooks the depth of the holistic experience captured in the model. The model rings true for many people who are in the process of constructing meaning from a variety of sources of information because it is able to capture the sequential holistic experience of the process.

Recent developments in brain science have confirmed

the close relation between emotion and cognition. The future holds interesting prospects for research into the user's experience in information seeking and use. The work on the ISP has opened paths to understanding learning and creativity in rich information environments, but it is only the beginning of our research journey into the challenging field of library and information science in the 21st century. I have found these approaches to be important for developing the ISP and I recommend them to others in the pursuit of a fruitful sustained research agenda.

Desa Informasi: The Role of Digital Libraries in the Preservation and Dissemination of Indigenous Knowledge*

by Liauw Toong Tjiek (Aditya Nugraha)

Indigenous knowledge (IK) has for quite some time been forgotten in the globalization of modern science and technology. However, the paradox of globalization – which increases the value of local information resources as the world becomes more global – has created renewed interest in IK. The interest has so far mostly been generated in the Western world toward the IK of developing countries. Although the above statements remain open for debate, it is commonly known that IK is often still poorly documented let alone disseminated by most developing countries.

Indonesia as a developing country suffers the same condition of poor documentation and dissemination of its IK. Some IK is already documented, although not very well. Most is undocumented. Dissemination is even worse. This condition is exacerbated by the fact that Indonesia is an archipelagic country and situated on one of the most volcanic- and tectonic-active regions in the world. Any volcanic or tectonic activity can cause tremendous damage in local communities, including putting their IK heritage at risk. The December 2004

Liauw Toong Tjiek (Aditya Nugraha) is head of library at Petra Christian University, Surabaya, Indonesia. He can be reached by email at anugraha@at.petra.ac.id.

tsunami in Aceh and Nias was a shocking example of such forces of nature. Undocumented IK would surely vanish, while documented IK would still vanish if not disseminated or replicated elsewhere. In this case preservation of IK entails documentation and dissemination efforts.

The root cause of the poor condition above is believed to be the fact that Indonesian culture – as with most Asian culture – does not really have written tradition. Another factor is the “inferiority syndrome” of the Indonesian people, including its librarians and other information workers, which holds that knowledge generated by the West is superior to their IK. These conditions have contributed to the low appreciation of local information resources, which in the end impedes the development of such resources. Most people do not think that IK is valuable and that anyone would want to know and learn from it. Intensive effort is needed to change this denigrating perception, to encourage local communities to start documenting and disseminating their IK.

The rapid development of information technology, especially in the area of digitization and digital libraries, could be the answer to improve the condition in Indonesia and other developing countries. The author has observed that digitizing documented IK and putting it on a digital >

library has helped tremendously in adding “appeal” to the resources, which have previously been viewed as mediocre in quality due to the inferiority syndrome mentioned above. The digitized resources suddenly have higher value than before – when they were still un-digitized – and interest in preserving and disseminating similar (IK) resources significantly increases. The digital library has also broadened access to the digitized resources. It responds to the needs for the dissemination of IK, which in the end helps preserve the IK itself since preservation of IK entails dissemination efforts. Thus, digitization and digital library hold great potential to contribute to the preservation and dissemination of IK.

What is Desa Informasi?

Desa Informasi (translated into Information Village) is an umbrella name for a university-wide effort/project conducted by Petra Christian University Library to identify, collect, digitize, catalog and disseminate IK. It is an initiative to increase the visibility of IK – for which in this project the term *local content* (local information resources) is usually used – and it advocates the use of IK as a learning resource.

The project was started as a small-scale digitization project to convert students’ theses collections to CD-ROM storage, since the library was running out of space for storing hardcopy documents. However, the project evolved into a full-scale local content documentation effort.

Simply and narrowly put, Desa Informasi is an institutional repository (IR), which is a form of digital library (DL). In his article, “Institutional Repositories: Essential Infrastructure for Scholarship in the Digital Age,” Clifford Lynch says the following:

A mature and fully realized institutional repository will contain the intellectual works of faculty and students – both research and teaching materials – and also documentation of the activities of the institution itself in the form of records of events and performance and of the ongoing intellectual life of the institution. –

[ARL Bimonthly Report, 226, p. 2](#)
(www.arl.org/resources/pubs/br/br226/br226ir.shtml).

Desa Informasi adopts Lynch’s definition of IRs, which makes the terms *IR* and *DL* interchangeable, at least in this discussion. Lynch’s description of the possible content of IRs is also adopted. Based on the adopted definition, [Desa Informasi](#) (www.petra.ac.id/desa-informasi) currently contains the following digital collections:



FIGURE 1. Indonesian batik sarong in the traditional Maduran style created by Marissa Suwandi. Image from the Desa Informasi collection courtesy of Petra Christian University.

- Digital Theses: Petra Christian University students’ theses collection in digital format, mostly as PDF documents. An increasing number of multimedia resources generated by the students of Faculty of Art and Design is also included.
- eDIMENSI: Digital version of articles of *DIMENSI*, scientific journals published by various academic departments of Petra Christian University.
- Petra@rt Gallery: Works of art by campus communities (mostly students’ works) or works of art that are exhibited/displayed at Petra Christian University campus; mostly photographs and digitized images. The collection contains wonderful visual resources, capturing and immortalizing the intrinsic knowledge and values of art in the works documented. Some of the wonderful themes are the Visual Poetry, Café Décor, Chairs of Indonesia, Destination Branded, Nusantara and Bersatu (United Archipelago).
- Petra iPoster: Posters of events or issues related to Petra Christian University.
- Petra Chronicle: Historical documents related to Petra Christian University (in planning stage).

Figure 1 is representative of some of the images cataloged by the project. Additional images are shown at http://www.asis.org/Bulletin/Jun-07/desa_gallery.html.

As apparent from the characteristics of the collections above, Lynch’s definition of content can be summarized as locally produced content/information resources. Desa Informasi expands the content definition to also include information resources containing features of local entities. It significantly affects the type of content that can be hosted in Desa Informasi. Due to this expansion, another >

collection has been developed, namely Surabaya Memory, which contains documentation of Surabaya city's historical and cultural heritage, mostly old documents, photographs and maps. Several sub-collection additions of cultural heritage resources are being planned.

While not every single resource in *Desa Informasi* is a documentation of IK, it is fair to say that the majority of them do hold certain level of IK, and quite a number of them are indeed documentation of IK.

Content Development in *Desa Informasi*

Certain approaches are employed by Petra Christian University Library in the development of the (digital) local content of *Desa Informasi*:

1. Be proactive and lead the way.
2. Develop thematically.
3. "Piggyback" the university formal administrative system.
4. Make it the interests of the academic departments, faculty members, students, administrative units, etc., not merely the library's.
5. Go beyond digital content and digital library development.

The first approach requires the library to assume a leadership role in identifying and collecting the local content from the campus and local communities. The library should take an active role in helping the campus communities (the academic departments, faculty members, students, administrative units and others) identify information resources in their possession that have the potential to be developed into digital collections in *Desa Informasi*. It is surprising to learn that most of them do not even realize that they have abundant information resources, which mostly contain IK and are too valuable not to be disseminated. The campus communities also need assistance in collecting the resources. They usually do not have the expertise or experience in developing and managing information resources as librarians do.

Developing thematic digital collections is central in creating added value for the collected resources. Having several smaller thematic collections of interest to the communities is far better than having one big collection consisting of just about anything people can throw into the collection without any defining character that binds them together. Choosing an exotic name for the collection, which also defines the character of it, is also imperative. Short and exotic names are easy to remember and make the collections personal to the communities. It further adds appeal to the

digital collections. It is a strategy to attract interests, which in the end will translate into attracting resources. This second approach also stipulates that librarians conduct the collection process, rather than providing the tools and expect the communities to do it themselves.

While the latter is a perfect approach, I believe that most of the time it does not work, at least not in the early stages of the initiative, since it takes time to build interest. It is a strategy to absorb proactively as many resources as possible from the communities. I would be tempted to name this second approach as "attract and absorb."

In order to be able to absorb or capture as much IK of the communities as possible and to guarantee sustainable flow of resources into the IR, it is essential that the library formulate a collection process that piggybacks or, at least, connects to the formal administrative system of the university or the local communities it serves. Otherwise the collection process will be too massive to manage sporadically, and the sustainability of the flow of resources from the communities into the IR will depend largely on fluctuating individual interests. This approach goes both ways. The collection process, which includes the cataloging and management of digital resources/content, also has to be integrated into the library's daily operational tasks. Otherwise it will be a project-based activity that might stop after the funding is terminated.

In working together with campus communities, especially the academic departments and administrative units, it is critical to emphasize and remind them that it is in their best interests – as well as the library's – to develop the content in the IR. First, the IR will be a powerful documentation system to register (all) the works and intellectual output of the academic departments or, in this case, the documents and records produced by administrative units. This is where the boundaries between libraries and archives are starting to blur, a topic that I will not explore any further in this discussion. Second, having more content in the IR will increase visibility of the academic department and/or administrative unit to the campus communities as well as to the society. It could prove to be an elegant and powerful marketing campaign for academic departments to attract prospective students and build a good image in the society.

Although I believe that all the above approaches are adequate to ensure a successful IR implementation, I would encourage libraries to do more with IR beyond digital content and digital library development. However for the sake of the flow of discussion, I will elaborate this topic >

the section about expanding the libraries' influence in the society. Let us continue the discussion by talking about content management in Desa Informasi.

Content Management in Desa Informasi

A locally developed system is used to provide content management functionalities. New SPEKTRA is a Windows-based application utilizing Microsoft Access as the database. The Digital Collection Processing (Cataloging) Module implements expanded Dublin Core as the metadata set to catalog digitized or born-digital documents. The module is in fact only one of several modules available. Others, which are not discussed in this article, are the (Traditional) Collection Processing Module, which is used to catalog physical resources (books and audio visual materials); the Circulation Module, which manages the check-in and check-out of library materials and other circulation functions; the OPAC Module which can search the traditional and digital collections using the same user interface; and the Operator Management Module.

The Dublin Core has been expanded to accommodate the need to manage digital content for use as a learning resource, as well as for the documentation (digital preservation). It has also been adapted to accommodate local needs. For example, because of low Internet bandwidth in Indonesia, PDF file size of each student thesis is reduced by making each thesis chapter a separate PDF file. Each record could hold one or more digital objects/resources in various file formats. Detailed discussion of the Dublin Core metadata set implementation in New SPEKTRA is beyond the scope of this paper.

Digital objects/resources in Desa Informasi are categorized into various themes and sub-themes, which have also been accommodated by the expanded Dublin Core metadata set. The categorization enables us to build thematic (digital) collections. This feature enables us to select an exotic name that defines the character of each collection. This categorization will also be very useful for the (future) browsing feature of the OPAC, which will provide users with more alternative methods in their information seeking endeavors.

Desa Informasi currently holds a total of 19,874,883,478 bytes (almost 20 gigabytes) of digital objects. Table 1 provides the breakdown of the total number.

TABLE 1. Breakdown of Desa Informasi by contributing units

Collection name/theme	Number of records	Number of digital objects	Total size (bytes)
Digital Theses	1,910	17,715	19,229,623,871
eDIMENSI	256	256	67,410,066
Petra iPoster	46	46	138,663,215
Petra @rt Gallery	39	200	250,574,891
Surabaya Memory	65	195	188,611,435
Petra Chronicle	0	0	0
Total	2,316	18,412	19,874,883,478

TABLE 2. Breakdown of Desa Informasi by type of document

Collection name/theme	Text	Image	Moving Image (Video)	Animation	Misc.
Digital Theses	17,769,768,775	947,700,560	352,845,128	20,966,952	138,342,456
eDIMENSI	67,410,066	0	0	0	0
Petra iPoster	0	138,663,215	0	0	0
Petra @rt Gallery	6574	258,568,317	0	0	0
Surabaya Memory	0	188,611,435	0	0	0
Petra Chronicle	0	0	0	0	0
Total	17,837,185,415	1,533,543,527	352,845,128	20,966,952	138,342,456

The 2004/2005 Petra Christian University Library Annual Report recorded more than half a million pages accessed between September 1, 2004 and August 31, 2005.

Table 2 reflects the results of a further breakdown based on types of documents.

Users can access the digital collections using iSPEKTRA – the web-based OPAC – that is available in two flavors: the universal search interface and the specialized search interface. The universal search interface enables us to search (and in the future browse) all the digital collections available in Desa Informasi.

The OPAC has a basket (cart) function that allow users to drop resources in while they are shopping for more resources. The stored search results can then be saved, emailed or printed. Users can view the digital object(s) contained in each record by clicking on a “Detail” button, which opens up a “Resource’s Detail” window.

The specialized search interface provides a targeted search that limits the search results in a specific digital collection. Besides serving as an added service to users, a specialized search interface is also very functional when we build a website surrounding a particular digital collection as part of our effort in reaching out to the society. This topic will be explored further in the discussion of expanding the libraries' influence in the society. >

Impacts of Desa Informasi to Campus Communities

The fact that Desa Informasi documents the works of the campus communities has had positive impacts, especially to academic departments (students and faculties alike):

- Motivation to produce better works, since the works will be immortalized digitally and accessible by global audience through the Internet.
- More awareness of academic integrity and copyright issues. Since everyone can virtually read or view the works, any violation of academic integrity or copyright infringement will be much more easily detected by the global audience.
- Stronger relationship between the library, on the one side, and academic departments and administrative units on the other, since the library provides a solution for documenting their works.
- Increased visibility of each academic department, the library and even the university as a whole.

All these positive impacts should provide enough incentive for libraries to build IRs. However, I would encourage libraries to go beyond building digital content and DLs/IRs. They could and should reach out further to the society. Besides as services to the society, the libraries should make use of this opportunity to expand their spheres of influence and strengthen their roles in the society.

Expanding the Spheres of Influence of Libraries through Institutional Repositories

An IR/DL with rich (digital) content that forms the body of IK of local communities can serve as a powerful tool to expand the libraries' spheres of influence. Through various campaigns and advocacy programs that focus on or highlight the IR content, libraries can reach out to audiences that might otherwise fall outside their traditional users. Libraries can build a website on top of a particular (thematic) digital collection. The website can contain educational information that is relevant to the theme of the featured digital collection.

For example, a website has been developed for Surabaya Memory collection. The site features various information on the history of Surabaya city, lists of historical/cultural sites, lists of historical events of the city and other educational information. The availability of this information encourages the society's appreciation of its own historical and cultural heritage and encourages the society to help preserve IK.

Another website has been created for the collection of

digital theses. It is still in its early stage with only a specialized search interface available. Eventually, the website will be populated with information that educates the society on the importance of academic integrity, copyright issues, resources to help students with their theses writing and other relevant information.

Libraries, especially in developing countries where Internet access is still considered a luxury, can further reach out to the society by conducting offline/onsite (or even coupled with online) exhibitions and other community outreach programs and activities. For example, Petra@rt Gallery holds regular exhibitions in or outside the library throughout the year, featuring works of art with local themes (promoting IK of local communities). Surabaya Memory holds regular photo exhibitions every May (the anniversary of Surabaya city) featuring its collection of old photos of Surabaya. It also holds regular Heritage Walks throughout the year, offering the society a chance to experience the history and culture of the old sections of the city.

The possibilities are endless when we go beyond digital content and DLs/IRs. One might notice here that the community outreach programs and activities mentioned above are starting to mimic what a museum would do, but that is a topic for another discussion.

The campaigns and advocacy programs will raise the awareness of local communities to appreciate their IK and heritage. This will encourage documentation and preservation of their IK and heritage, which in the end will help libraries develop the content of their IRs/DLs. This will lead to the availability of digitized IK in IRs/DLs – accessible through the Internet – that will attract global users to exploit them for the advancement of art, science and technology. This process will form channels for the dissemination of IK.

Besides playing an important role in the preservation and dissemination of IK, DLs/IRs hold promises of exciting future since DLs/IRs provide new and exciting avenue for libraries to engage the society in a much broader roles and scope.

Conclusion

The issues raised in this discussion and the experience in developing Desa Informasi lead to the following conclusions:

- Digitization, digital libraries and thematically developed digital collections add appeal to indigenous knowledge, increasing interest in initiatives for the documentation and preservation of indigenous knowledge. >

- Digital content/resources development of a digital library provides digital preservation of IK, including historical and cultural heritage, of local communities, thus preserving their collective memories.
- Digital libraries provide channels for the dissemination of IK of local communities to a global audience, thus preserving IK as well as transforming local communities from consumer of information/knowledge into producer of information/knowledge.
- Digital content/resources development of a digital library yields positive impacts to local campus communities.
- Digital libraries can serve as powerful tools for libraries to reach out to, expand their sphere of influence and strengthen their roles in the society.

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