“Adapt or die”: Energizing library staff & academics through the development of digital repositories

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Introduction

This paper will address knowledge management principles as applied by us during the implementation of our digital repository at the University of Pretoria, South Africa. Although the paper is titled *“Adapt or die” : Energizing library staff and academics through the development of digital repositories*, it could just as well have been titled *“Skydiving through virtual space”*.

The reason for the alternative title is that we are all part of a team, in which we need the involvement of each and every individual at the library as well as at our institution as a whole to make a success of the institutional repository. Working in an open access and open source environment, we often also rely on help and support from experts all over the world. Since each and everyone has a unique role to play in an institutional repository, an omission of an individual or a defect in a specific role or workflow can easily result in breaking up the team, or, when applied to this example, breaking up the formation. In the end the expected result won’t be achieved, and objectives won’t be met, be they institutional, team or individual objectives.

In this paper we specifically take a look at digital repositories and how knowledge management practices or principles tie in with digital repository objectives. Organizational strategies and objectives are addressed, after which we give a brief overview of how we learned to “skydive” in five simple steps. We also take a look at the roles of the various positions in the team or formation, challenges facing the leader of such a team, and examples of teams within our repository that made perfect landings.

About skydiving

But what connection is there between skydiving and knowledge management principles?

- In skydiving you need to be able to *trust* others. Often you’ll dive as part of a team and you’ll need to be able to rely on your team members, especially when you skydive for the first time. Your skydiving gear must be in perfect condition, and you must be prepared if something goes wrong.

- Skydiving is also a sport for adrenalin junkies, for people who are not afraid to take *risks* and who are prepared to sometimes fail. You will not always make the perfect landing, but at least you can learn from your mistakes.

- As mentioned earlier, *teamwork* in the form of communities of practice, is an essential component, since you have to rely on working with others.

- *Strategies* must be in place. You must know where you are headed for, how to go about to have a perfect jump or to form a specific formation.

- Up in the air you *share* a lot of things – if you are a more experienced skydiver you can share your expertise, or you can help out if one of the team members is in trouble. This is also true of a digital repository. Helping each other out – whether it is a colleague from your own institution or another institution – is all part of the game.

- Not all of us are natural skydivers, but a lot of perseverance and practice make perfect in the end … And one day – after a lot of practice dives - you'll get more confident and maybe jump from higher and higher heights.

The elements listed above also apply when implementing a digital repository, and are fundamental when managing knowledge within an organization and during a specific project.

The University of Pretoria

It is important to know exactly what your organization's objectives are, since knowledge management processes are directly linked to these objectives and are designed to achieve specific outcomes.

The University of Pretoria is one of the leading four South African universities listed among the top 500 in the world (Shanghai list) and has the highest research output in the country. One of the objectives of the university management is to improve this position in time to come. We at the library feel that we can contribute to this goal, by means of the research support we provide to our clients.

According to the most recent strategic plan the key drivers for the innovation generation are research and postgraduate education. The primary goal is to become an internationally

recognised South African teaching and research university. From this it is clear that our main business is research.

There are various ways in which we would like to achieve the goal of becoming an internationally recognised South African teaching and research university, and we would like to share some strategies and objectives with you.

Organizational strategies and objectives

According to our university's strategic plan for 2007 to 2011, titled "Innovation Generation: Creating the future" the library has an important role to play.

The role played by the library is clearly defined and acknowledged in this plan – amongst others it says that "The **sound management of information** through our library system is **cardinal** to our vision of being an **internationally recognised research university".** This is exactly what we want to achieve through the implementation of an institutional repository.

Our library strategy and objectives are strongly aligned with those of the university. Our main focus is to provide an integrated seamless electronic service to our clients through whom we strive to support education innovation and research excellence. We also aim to provide optimal e-information or portal services and participate in and contribute to national and international e-phenomena. The implementation of our digital institutional repository is just one of the ways in which we try to attain the objectives of both the University of Pretoria and the library.

But how did we go about implementing our digital repository, keeping in mind the strategies and objectives of our organization?

Implementing a digital repository

We started off by conducting a lot of research on repositories, trying to establish what's going on out there and what's available. We knew that we wanted to focus on research only, since there was at that time no formal way in which full text research output by researchers were archived or preserved at our institution. Only bibliographic references were kept electronically by our Research Office, which were not always complete.

We identified important role players such as the head of the Department of Information Science who from the start was involved as a consultant. Subject librarians who were comfortable with

new innovative tools were approached to get involved, and a metadata specialist, a digitization specialist and IT staff who we felt would be able to make valuable contributions, were identified.

Resource issues were addressed. We conducted a survey of what we had e.g. we had a suitable server, we had a bunch of enthusiastic people who believed in the project, and we had support from the library management and specifically the Assistant Director: eInformation Strategy & Knowledge Management. We also had a bit of money, and we were ready to continue towards a way to achieve our objective.

It's no use implementing a repository if there is no need for it. In our case we knew we needed one, but we were not sure what needs should be addressed. We conducted a needs analysis, and from there we conducted an evaluation of available institutional repository software. Due to the fact that we didn't have the necessary human resources, we had to rely heavily on the literature to form an opinion on which software would address our needs best. We investigated *ARNO*, *CDSware*, *DSpace*, *ePrints*, *Fedora*, and *MyCoRe*. The whole project was documented on a web page (http://www.dspace.up.ac.za) – the reason being that we wanted to be transparent, and we were hoping that others would also be able to benefit from what we learned once they were ready to start an institutional repository, which they did.

A proposal was put together and approved by the library management team, a project plan was put together, and the project was on track. Luckily *DSpace* software is very user-friendly, there's a lot of support available from the open source community, and we only had to add a few changes which were required by our Department of Information Technology. The software was first deployed on the developmental server, then on the quality assurance server, and finally we were ready to have it deployed on the production server beginning 2006. Evaluation instruments were designed, and the various deployments were regularly evaluated by our institutional repository team.

We are quite a big university, with 9 faculties, 130 departments and many more units and centres. We realised from the start that it would not be realistic to deploy our institutional repository across all faculties and departments at once, since we didn't have the human resources and we weren't sure how it would be received in the beginning. We first had to find our own feet so that we were convinced it would work well, and that we wouldn't run into unexpected problems etc. Four "champions" or "zones" were identified, based on progress they made with regard to digitization and strategic objectives. The collections were the Pretoriana (Department of Architecture), Scholarly Publications, Arnold Theiler (Faculty of Veterinary Sciences) and Jonathan Jansen Collections (Faculty of Education). Not only did we want to preserve and provide access to all

formal research output of researchers and staff, but we also wanted to preserve tacit knowledge which only existed in people's heads by making them part of the electronic workflow process.

It was also decided that where items were not available in electronic format, they would be digitized according to international digitization standards. A *Digibook RGB* scanner was purchased to digitize very old and fragile material.

The next step was to set a date for deployment and "jump", which was January 2006. We are now in our second year and are very proud of the "jumps" we've made so far. All were not involved from the start, and initially we were only approximately 12 people who worked on the institutional repository. Today we have 800 e-persons who already signed in, 18 subject librarians and 12 cataloguers who do the quality control and add *Library of Congress Subject Headings* to items in our repository.

The last step was to get licensed. It is no use having a repository if the rest of the world doesn't know about it and if it is of inferior quality. One of the main reasons for having an institutional repository is to help increase the visibility of researchers at our institution and the impact they can make in the world out there. The final step therefore was to register with the *Registry of Open Access Repositories*, *openDOAR*, *Google* and as a publisher at *GoogleScholar*, the *DSpace* community, and we hope to have our repository harvested by OAISTER soon once our OAI-PMH compatibility problem has been sorted out. We also plan to add an entry to *Wikipedia* - not only for our repository as a whole, but also for prominent collections within our repository.

"Skydiving" as part of a team

Organizational objectives can only be met if one works as part of a team, and if team members work towards the same goal.

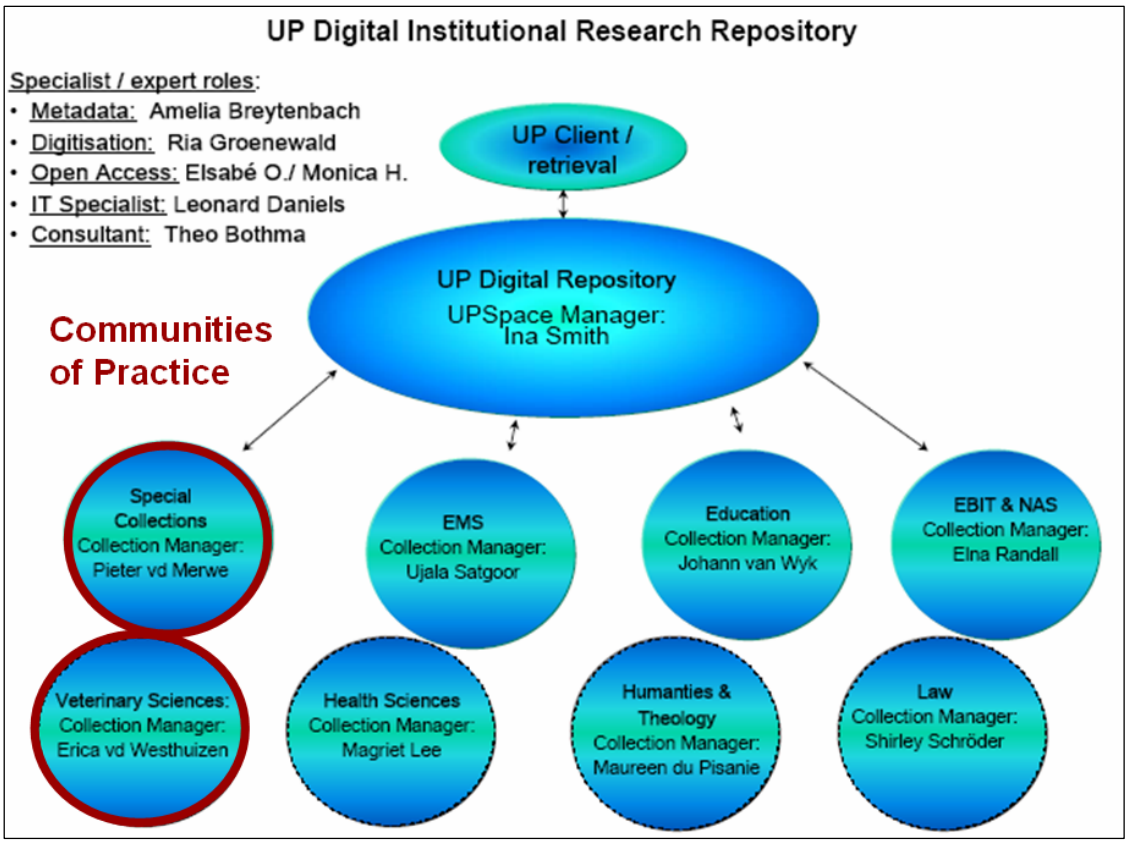
Prior to the implementation of our repository, our library went through a complete restructuring process. An e-information service was established with the mandate to implement an institutional research repository, and also to investigate and implement other e-solutions to address the needs of our clients and to support the university's strategies and objectives. The e-information service is coordinated by the Assistant Director: eInformation Strategy & Knowledge Management.

With regard to our repository - new roles and responsibilities were generated during the implementation of this digital repository.

So far we have approximately 18 subject librarians who are involved as collection administrators, 12 cataloguers who are involved as metadata editors and 9 faculty library leaders who fulfil the roles of collection managers. Involvement in repository activities are also from this year onwards part of the official role description of our cataloguers and subject librarians, and their performance in this regard will also be monitored on the performance management system.

To remove any possible uncertainty amongst role players, each and every role was clearly defined and communicated, and certain responsibilities were assigned to these roles so that all were familiar with exactly what was expected of them. The following diagram *(Figure 1)* illustrates the roles across faculty libraries. Specialist or expert roles are also listed, and these were not restricted to specific faculties.

Figure 1. Roles across faculty libraries

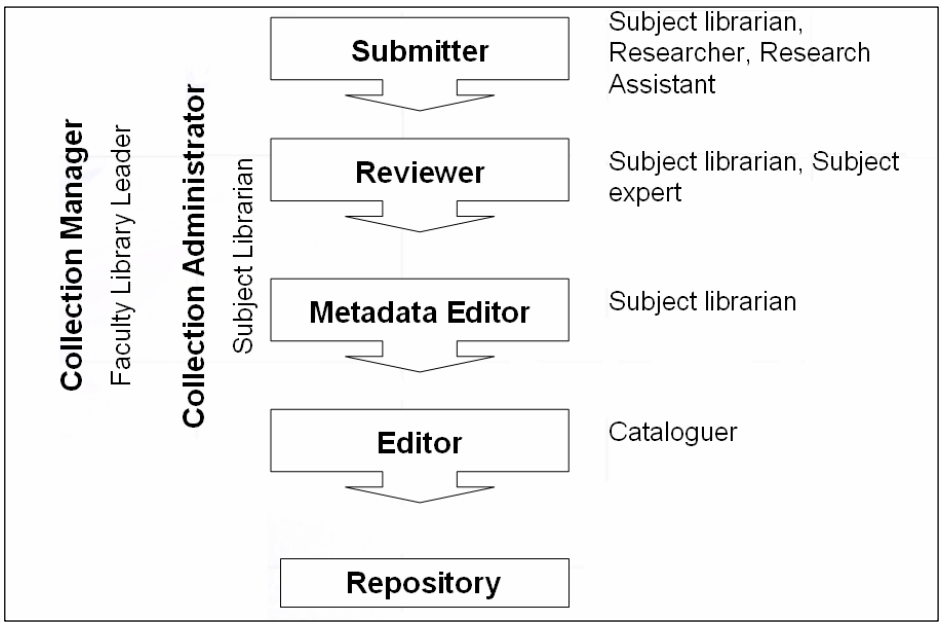


The oval at the top *(Figure 1)* represents the clients we serve, and just below it is the Digital Repository Manager who's responsibility it is to manage the repository in such a way that the needs of clients are addressed and organizational objectives are met by the sub-teams, which are the faculty libraries. Each and every faculty at our university is now represented on our

repository, which we regard as a major breakthrough. We've also assigned certain responsibilities for the roles listed at the top left-hand corner, which are the metadata specialist, digitization specialist, open access specialist and the IT specialist. These persons are experts in their field, and monitor all activity as it relates to their expertise throughout the repository. Two faculty libraries that succeeded very well in forming communities of practice, as will be demonstrated later on, are the Special Collections Division in collaboration with the Department of Architecture, and the Faculty library for Veterinary Sciences.

One of the major advantages of *DSpace* is that it makes provision for an electronic workflow. *Figure 2* is a visual demonstration of the various roles within the electronic workflow of each collection on our repository. We encourage departments to appoint research assistants to assist with the submission process, or the researchers can do the submission themselves. Often library staff assists with the submission of items, depending on their own capacity. The role of the reviewer is fulfilled by a subject expert, which could be a subject librarian or a researcher. This person simply decides whether a newly submitted item is suitable for a specific collection or not. The roles of metadata editor and editor are very important for us, since these persons verify the quality of items and metadata attached to these items. Once the metadata editors have checked an item, it is approved and available in the repository for all to access. The collection administrator in collaboration with the collection manager identifies possible collections and promotes the use of the repository amongst clients within the departments they are responsible for.

Figure 2. DSpace electronic workflow



Leading the team

Managing or leading a digital repository project has challenges of its own. You need a strong leader, somebody with a lot of perseverance and patience.

Such a person should have a clear understanding of organizational strategies and objectives. In our case using *DSpace* was a first as it relates to the use of open source software. We were used to proprietary software, and with proprietary software it is easy to just pick up the phone and contact the vendor to fix problems, because we pay for that kind of service. Although the *DSpace* community offers excellent support, you often need to solve problems yourself, and learn as you go along. We are now more or less at a point where staff within the library has accepted the use of open source software, although our institution does not have a formal policy on the use of open source software as a whole.

People's mindsets had to be influenced, for example cataloguers had to be convinced that they had a major role to play in this project. A separate session was held with the cataloguers, motivating from the literature what role they could play, which was quite a successful session. Something else we experienced was that some people were not always willing to share expertise and knowledge – they wanted to keep their knowledge for themselves, since knowledge is power. We had to take the lead and set an example, and although we are not there yet, people have already started to change and share with the rest. We've also initiated a series of "60 minute workshops", and one of the topics is on how to submit items to the repository and manage a collection within the repository, trying to take away the threat experienced by some. Often staff just need a bit of encouragement or praise to get them going, which is also one of the repository manager's responsibilities, or even other team members can do so.

Frequent communication is very important. We have a list serve, and an official newsletter is sent out at least once a month.

The role of the repository manager is also to identify or spot opportunities – opportunities for new ways in which the repository can be utilised, to make it more visible, or ways to get others on board.

Although much more can be said about the role of the manager, that person is often a mentor for others, providing advice or supporting and reflecting together with the team players. If you are a repository manager or aim to become one, always remember …

- "**Uncertainty** will always be part of the taking charge process" – Harold Geneen
- "Leadership is practiced not so much in words as in **attitude** and in **actions**" - Harold Geneen
- "The task of the leader is to get his people from **where they are** to where they have not been" – Henry Kissinger
- **"No man will make a great leader who wants to do it all himself, or to get all the credit for doing it"** – Andrew Carnegie

And the credit for what's happening at our institution and the success of our repository most definitely goes to a wonderful team of people, some of whom have already made perfect landings…

Communities of practice – the perfect "landing"

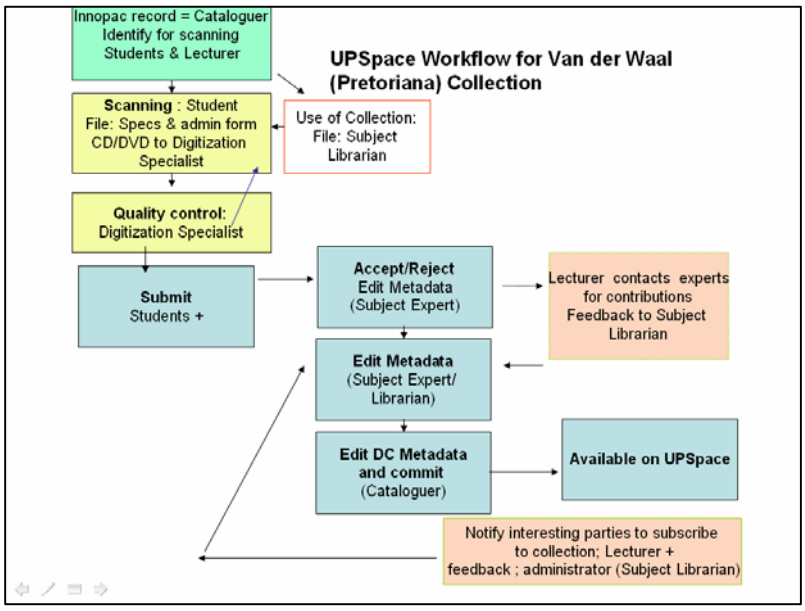
The success of the examples to follow can mainly be attributed to the fact that the people concerned formed communities of practice to get the job done. A community of practice can be described as a spontaneously formed network of people who share a lot of common knowledge, expertise and tools. They are held together by informal relationships, learn from one another, and are committed, active and adaptive. A lot of social learning takes place between these people in their search to find solutions, share ideas, stimulate innovations, share tacit knowledge etc.

This is especially true for a community of practice which spontaneously emerged between the Special Collections Division in the library, the subject librarian for Architecture, and the Department of Architecture. This group meets on a weekly basis, and students who have been appointed to submit items join the meetings and make contributions. The following photo *(Figure 3)* was taken in the *Pretoriana Room* in the library building. The room has been fully furnished with furniture, a computer, scanner etc. by the Department of Architecture. Archival collections were moved from the Department of Architecture to the Pretoria Room, which is a good example of the trust they've put in us with regard to the repository project. Contributions from all over the university are also welcome.

Figure 3. Community of practice formed between the Special Collections Division, subject librarian for Architecture, and the Department of Architecture

The workflow for each collection within the repository is unique according to the needs of that specific collection. *Figure 4* is a diagram of the workflow for the community of practice which was formed between the Special Collections Division in the library, the subject librarian for Architecture, and the Department of Architecture. Non-digitally born items are first digitized, after which they are submitted by students of the Department of Architecture. The subject expert accepts the item, the cataloguer edits the metadata and add LCSH subject headings, after which the item is committed to the archive. The item is assigned a persistent URL and made available on *UPSpace*, our repository.

Figure 4. Workflow for the Pretoriana collection



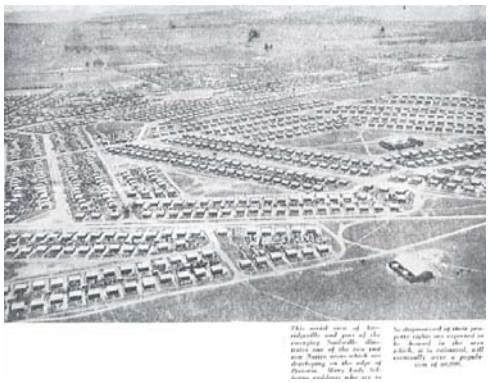
Following are examples from the Pretoriana collection in the repository.

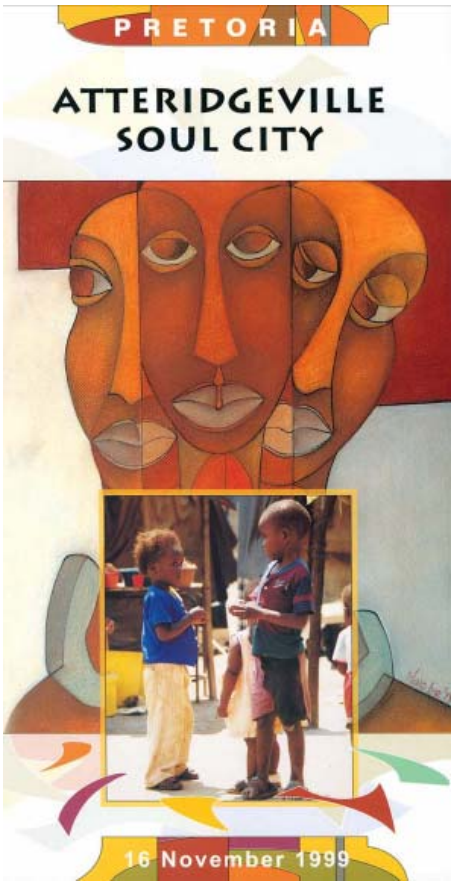
Figure 5. Digtized from the original: photograph taken on 19 April 1984 of the Barclays Bank Building designed by Gordon Leith in 1939 that was digitized from the original

Figure 6. A digitized photo of the Pretoria Station building, designed by Sir Herbert Baker and opened in 1912, after being digitized

The Pretoriana collection contains not only very old and fragile material, but also material published more recently. To the left *(Figure 7)* is a map and an aerial photograph of Atteridgeville which forms part of Pretoria, and to the right a pamphlet promoting Atteridgeville as a vibrant neighbourhood with the potential of leading the African Renaissance at a local level. A brief history of the township is also included in this pamphlet.

Figure 7. Items from the Pretoriana collection





Another excellent example of work which resulted from the formation of a community of practice, is that of the Faculty of Veterinary Sciences and the faculty library for Veterinary Sciences. This specific article *(Figure 8)* appeared in the faculty newsletter, as a result of items digitized and submitted to the Christine Seegers collection on *UPSpace*, and is a good example of involvement and collaboration between the faculty and the faculty library. Christene Seegers is one of the few biomedical artists in South Africa. She made a large collection of biomedical illustrations of wild and domestic animals while she was employed in the Department of Anatomy of the Faculty of Veterinary Science, Onderstepoort.

Figure 8. Article by collection manager in faculty newsletter

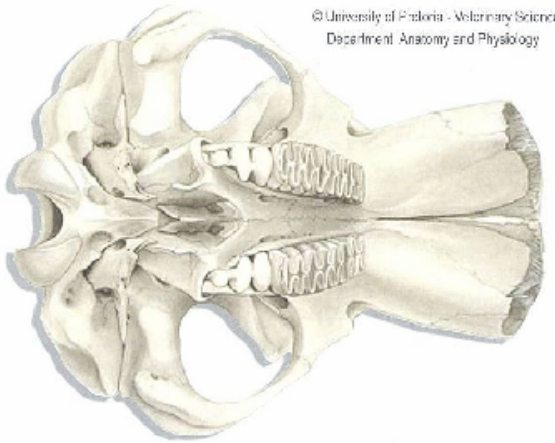
Elephants in UPSpace

by Erica van der Westhuizen

The Onderstepoort library is excited about its latest digital project. Fifty-one of Christine Seegers's elephant sketches have been placed on the UPSpace at https://www.up.ac.za/dspace/handle/2263/1971. In this way this unique collection can be safeguarded, while showing it to the rest of the world. Each plate has the UP logo, marking it as UP property, the copyright-holder being the Department of Anatomy and Physiology of the Faculty of Veterinary Science.

Special mention must be made of the important role of two staff members in creating this digital collection: Ria Groenewald, Digitisation Coordinator of UP, whose expertise in creating the digital images ensured that the artist's work is shown to its best advantage, and Amelia Breytenbach of the Onderstepoort library, who heads the metadata applications for UP, enabling optimal retrieval of information on the website.

We would like to thank Prof Herman Groenewald, Head of the Department of Anatomy and Physiology, for his input in describing each illustration.



An example of Christine Seegers's illustration of the African elephant (the adult skull), which can be seen at https://www.up.ac.za/dspace/handle/2263/2213.

Conclusion

We feel that we are well on track, and are satisfied that we have successfully applied knowledge management principles to implement a high quality, reliable, trusted repository. To summarise:

- Knowledge transfer took place. Not only between our own staff, but also between institutions, e.g. when we hosted a collection from the CSIR (South Africa) on our repository.
- New roles and responsibilities were generated, and new opportunities were created for people to expand on their existing skills.
- Communities of practice emerged spontaneously.
- Organizational learning took place, and people were empowered and encouraged to achieve success.
- A number of mind-sets were changed during the course of the project.

And what does the future hold for us? We would like to "jump" from even higher heights by starting to archive/preserve data sets for re-use between researchers. We would like to establish a model for a trusted African institutional repository, and we would like to see that self-archiving of all research output by the various departments become compulsory in order to qualify for funding or in order to qualify for promotion or awards at our institution.

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