**Data Repository Deposit**

**Project Title:** Beyond the Digital Divide: Sharing Research Data across Developing and Developed Countries

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**Award Holders:** Brian Rappert, Sabina Leonelli, Ann Kelly

**Objectives:** Data sharing within scientific research raises many ethical, legal, and social issues. The rise of data-intensive science has precipitated the need to examine these issues in detail in order to cultivate comprehensive and inclusive data sharing policies. Within these discussions, however, data sharing practices in developing countries are under-represented - indeed outside clinical research they are largely absent. This project aimed to contribute towards a better understanding of *how, why,* and *to what end* scientists in developing countries share data, and whether these data sharing practices differ from the priorities, practices, and policies associated with research in developed countries. We sought to address the questions:

* Do low-resourced research settings influence scientists’ perceptions of data?
* Do the resource constraints influence the concerns that scientists have regarding sharing data?
* Do the conditions in low-resourced laboratories influence scientists’ perceptions of personal gains from data sharing activities?

**Research Design**

The primary data collection element of this project related to observational based fieldwork at four universities in Kenya and South Africa undertaken by Louise Bezuidenhout (hereafter ‘LB’) as the award researcher. The award team selected fieldsites through a series of strategic decisions. First, it was decided that all fieldsites would be in Africa, as this continent is largely missing from discussions about Open Science. Second, two countries were selected – one in southern (South Africa) and one in eastern Africa (Kenya) – based on the existence of the robust national research programs in these countries compared to elsewhere on the continent. As country background, Kenya has 22 public universities, many of whom conduct research. It also has a robust history of international research collaboration – a prime example being the long-standing KEMRI-Wellcome Trust partnership. While the government encourages research, financial support for it remains limited and the focus of national universities is primarily on undergraduate teaching. South Africa has 25 public universities, all of whom conduct research. As a country, South Africa has a long history of academic research, one which continues to be actively supported by the government.

Third, in order to speak to conditions of research in Africa, we sought examples of vibrant, “homegrown” research. While some of the researchers at the sites visited collaborated with others in Europe and North America, by design none of the fieldsites were formally affiliated to large internationally funded research consortia or networks. Fourth, within these two countries four departments or research groups in academic institutions were selected for inclusion based on their common discipline (chemistry/biochemistry) and research interests (medicinal chemistry). These decisions were to ensure that the differences in data sharing practices and perceptions between disciplines noted in previous studies would be minimized.

Within Kenya, site 1 (KY1) and Site 2 (KY2) were both chemistry departments of well-established universities. Both departments had over 15 full time faculty members, however faculty to student ratios were high and the teaching loads considerable. KY1 had a large number of MSc and PhD candidates, the majority of whom were full-time and a number of whom had financial assistance. In contrast, KY2 had a very high number of MSc students, the majority of whom were self-funded and part-time (and thus conducted their laboratory work during holidays). In both departments space in laboratories was at a premium and students shared space and equipment. Neither department had any postdoctoral researchers.

Within South Africa, site 1 (SA1) was a research group within the large chemistry department of a well-established and comparatively well-resourced university with a tradition of research. Site 2 (SA2) was the chemistry/biochemistry department of a university that had previously been designated a university for marginalized population groups under the Apartheid system. Both sites were the recipients of numerous national and international grants. SA2 had one postdoctoral researcher at the time, while SA1 had none.

Empirical data was gathered using a combination of qualitative methods including embedded laboratory observations and semi-structured interviews. Each site visit took between three and six weeks, during which time LB participated in departmental activities, interviewed faculty and postgraduate students, and observed social and physical working environments in the departments and laboratories. Data collection was undertaken over a period of five months between November 2014 and March 2015, with 56 semi-structured interviews in total conducted with faculty and graduate students. Follow-on visits to each site were made in late 2015 by LB and Brian Rappert to solicit feedback on our analysis.

**Deposited Data**

Segments of interviews related to recurring themes were transcribed by LB and are included in the table below (arranged by theme and sub-themes). The interviewee designator takes an ‘A/B’ former wherein ‘A’ denotes university affiliation (i.e., SA1, SA2, KY1, KY2) and ‘B’ provides a numeric identification of the interviewee (in the case of KY1/6 a further identification number is given for the two interviewees spoken with at the same time). Where transcribed segments include a blue designator they relate to postgraduate students, otherwise they relate to interviews with faculty members. The symbol ‘\*\*\*\*\*’ is used at times to anonymize named individuals.

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| **Theme** | **Sub-theme** | **Quote** |
| **Open Access** |  |  |
| Misconception about OA | Lack of understanding - OA as pay-to-publish | **SA1/1:** I’ve never really understood what OA means or entails. People talk about it is more expensive to publish in OA, so I’ve never been sort of quite sure what it involves  **SA1/2**: So bottom line was that it was very, very difficult to access some of these papers, regardless of whether it was in Nature or Science – it was just difficult to get them. Then PLoS came – anyone can publish anything in PLoS and they’re not particularly keen on what themes or what have you. So you can publish on maternal health just as much as someone else can publish on anti-bacterial resistance, and someone can publish on epidemiology. So there’s a lot of flooding of information there that has no filter.  **LB:** what do you both understand by the idea of OA? Is a term that you’ve used commonly?  KY1/6/1: in fact, we’ve heard it talked about, but exactly we didn’t get the meaning exactly about OA. But sometimes if you get a paper it’s OA, but when someone asks me what does it mean the only thing that I know about it is that you can get scientific paper for free.  **KY2/14:** Yes [the author fees are expensive] but I thought, I have this and I want a publication from this. I want to publish my findings so that it can be helpful. So I just paid it. No one thought I existed, they only knew who I was when it came to exam time, and when I’m reprimanded. Not when I do anything meaningful.  **SA2/6:** And then you never know really how you know whether you dealing with predatory or although I have a good idea, but the fees to me look predator.  **SA2/7:** So I’m now open access, are we talking about the journals that are now. I think they are good but obviously I don’t think people, I could be wrong, I don’t think people go out there to publish their best research. I don’t think so, I think people, they will just, look if something came along as they were doing some research they could go and put it there but I don’t think it’s their top.  **SA2/7:** Definitely impact factor would be key but like I say if I come across, you know if you are an established researcher and then I guess then you can pick and choose what is it that you want to publish but for someone like myself whose not established I would want to now establish myself so I wouldn’t just go and publish it in open access journals I would try now to go into high impact factor journals, see that the journals are respected journals. |
|  | OA and quality | **KY2/3:** Well, some grants may support publication. Where not then you have to seek for one that’s OA that doesn’t need pay. Because not all OA require you to pay. So most of the journals, most of the articles, will be sent to the OA that don’t require any payment. This raises a question in terms of the power of the article. So when I say that I have 3 publications and they are all in OA and I didn’t pay, and another person has one publication in a peer-reviewed journal that’s not OA and I paid, someone tends to think – the panel believes that – if you are producing 3 very fast in a year and someone only managed one because they had to pay enough dollars to get that published, then that is considered “more important, more powerful” than the others that are. So that is something that discourages the OS, cos then OA is viewed as if it’s not very important info. No wonder it is just let out there.  LB: so there is an assumption that OA journals are not as critically peer-reviewed?  KY2/03: Yes, they’re underrated. They’re underrated in comparison. |
| Theoretical importance of OA | Importance of openness | **SA1/4**: Once a paper is published I don’t see why it needs to be closed.  **KY1/2**: We use quite a lot of research that has been done before as reference. Publications and online. Online has become very important to access information.  **KY1/6/2**: to me it [OA] would be a good idea, but it should have been free to both the reader and the author. Because if the reader is going to use that information then the author has already done his scientific work and he has contributed the scientific knowledge to the world for other scholars to read. Maybe to pay for his paper to be published is not fair. |
|  | Importance for authors | **SA1/02:** I’d like to consider myself as a researcher so in a way that would mean that I would want my work to get as much attention as can be, so I’d favour OA so that as many people as able are able to read it – they don’t have to cite it – to get to know what’s going on – in malaria, in TB, HIV. So I’m more likely to want the OA mode than the closed access mode. |
| OA in reality |  | **SA1/10:** There was a seminar yesterday at the HSRC as part of the OA week and the Uni Pretoria made a presentation saying that the APCs are not going to be sustainable for African universities. We’re just doing a pilot at the moment and we’re coming to the same conclusion. It’s a new revenue stream for the publishers, and there’s no reason for them to ever do away with it or more away from hybrid journals – we’re just going to be paying twice, which was our original concern and why we wanted to manage it ourselves. We did not want to let the research office manage APCs because we would never be able to balance subscription versus hybrid models. We have to monitor what’s going on and it doesn’t look good. So how the rest of Africa is going to cope I don’t know.  **SA1/11:** I’m not too worried about publishing in OA journals as the people in my field will have access to the journals that I publish in.  **KY1/2**: I would publish in them [OA journals], but the problem is that if it is accounts to my promotion or it is recognized that the work that I have done is, you know if the university recognizes that then I would participate, because at the moment most people tend to publish where they would most benefit from. If it is in such a journal this is acceptable in terms of promotion it will be considered. But I think that the idea of OA is still not very familiar with a number of us around.  **SA2/7:** Of course, I mean that’s why I saying probably people who are established who will do [publish in OA journals] for there because now myself if I’m here I must get the chemicals, I must get funding, |
|  | Personal funding | **KY1/1:** Um, no, the problem with open access is that you have to chip in as an author. All the charges are borne by the author so that everything will be open access. What else do we do? You have to pay. You just have to sacrifice a good chunk of your salary towards that.  **KY1/2:** At the moment I think there is, a number of journals whenever I open up I see this impact journal but I don’t know what but then you have to pay. You know that concept of paying it was not there before, some years back. We’re used to the journals where, even if it takes long, proof reading and so forth, and then it is published. But nowadays I have seen some demanding up to $500. At the moment we don’t have a source for that. So what happens that either if you have money for research you would use that, or if three or four of us we are publishing we will come together and contribute.  LB: from your personal money?  KY1/2: Yes. That is now what is happening. Because it is much easier to publish in these ones than in the other ones that are of course peer reviewed but takes long time. It is now much easier to publish in the ones where you pay, because they are many and almost some of them come after three months or a year there are two journals requesting. But the problem is the fee which is not easy to raise.  **KY2/01:** if we want to publish we must pay out of our own pocket. It is important to publish, but it is also expensive. |
| **Open Data** |  |  |
| Importance | Utility | **SA1/6**: the issue is not whether I would want to share raw data. To me it’s about the utility of sharing the data. Because if someone had to give me raw data I wouldn’t know what to do with it.  **SA1/8:** Who has the time to sit and go through someone else’s raw data?  **SA1/8:** And I mean also, people are so busy and it takes so much time to analyse the data. Even as a supervisor you rely on your student to do it and you’ll just take their data and double check that they’ve analysed it correctly. But to even then go and take some student’s data and they might be, like, having 10 thumbs and drop everything, and to still want to spend time analyzing it when you don’t actually know the ins and outs of how they conducted the experiment or how good they are in the lab, you know. I don’t know, I’d find it strange. But then maybe it’s specific kinds of data. Maybe it’s data which is somewhat more finalized that you could actually use.  **SA1/11**: Sharing raw data is useless as it is largely unusable.  **LB:** Would you reuse someone else’s data online?  SA2/11: No |
|  | Getting feedback on data | **SA1/2:** It’s about can I put my data out there on a platform where other students and researchers can have a look at it and draft whatever they want to draft in terms of guidelines for their own work. I think that I would, and I’d appreciate it if others would share their data.  **KY1/3:** you could be working with the same plant, we could be 10 students working on the same with different objectives, different approaches. So at the end of the day my work may not be replicated by other students. So even if I will be viewing the work online it will only help to strengthen mine, but not to actually directly copy.  **KY1/5:** Yes, I’m very comfortable with that because that is the way you’ll get some of the key challenges and know how to handle. |
|  | Enhances reproducibility and comparability | **SA1/06:** Anyone can share data, but whether it is good data or bad data depends on how good your methodology is. So I think the process of getting to data sharing is more where I fit in, and the actual data sharing part, I mean, yeah, I don’t have a problem with it.  **KY1/2:** If I have access I just look at it. You know the goodness with that open data is that you can compare the work. If you are doing work in a certain area, if somebody did some work and that data is available you can compare and you could comment that so and so found this but now under certain conditions you found certain results.  **KY1/3:** you see, when I want to compare what I’m doing with whatever’s on the internet, when I want to access something that will help me in achieving my goal in terms of my PhD work I have to download some articles here and there. This are how other researchers work. So if I am able to use theirs to do what I’m doing, then why should I not do the same. So it’s more important.  **KY1/4**: I think it’s good to share information online. Because if someone wants to do your research again to check that what you’ve got is ok. Then they can still do it, they can still pick up. |
|  | Not really “our thing” | **SA2/3:** Personally it depends which organisation one works for and what output they expect. If one works for a research centre or institute where the research is geared at targeting a solution, then the person works at solving that problem and coming up with a product that can be used. But if you are in the universities it’s more of just research and what. So the focus and the approach would be different. Those in the centres and institutes would push more to get the thing done quickly so a solution can be found but at the university probably just want to understand the mechanism. So I think it would depend on the expectation of a particular group.  **SA2/3:** No I wouldn’t consider making my data available – we’re doing basic research. I mean I know we’re working on some things may are applicable, but in most things its basic research which could maybe be converted into a product after 20 years. But if I would be working for a science innovation centre and the funders want a product, then in that case it would be good to share with colleagues and it would also be contributing some ideas and the process would be moving.  **SA2/7:** Again I’m going to say my view will be it will be established researchers who would do that [share data] now its people who let me say they don’t have to prove themselves to anyone so they know that okay it’s there but they can always have something on the side. Whereas for someone like myself you always like now we don’t have enough post graduate students so whatever results that will come we always want to make something big out of them but maybe also there’s benefits I suppose |
| Practical concerns with data sharing | Bias in perceptions of data | **LB**: does it matter who produced the data?  SA1/02: To be honest, I’d be biased towards Kings College over Kathmandu. … if you’re a reviewer you’re going to be harsher on the Tibetan guys and a little lenient on the others [from Kings] - you’re going to be like, from the onset, these guys seem to know what they’re on about, I’ll score them well. |
|  | Being scooped | **SA1/4:** For publication issues that’s the only issue. Because then obviously other people can do what you’re doing – replicate it – and publish it before you. Yeah, I really wouldn’t like that. … The thing is that you spend so much time on your lab work and then a week before you’re going to publish someone else publishes your work and then you can’t publish – which is literally a waste of your time then.  LB: And what would you feel if you were able to get some sort of credit for the data – a DOI – to get recognition. Would that change your opinion?  SA1/4: It might, possibly, depends on the credit. Because they’re obviously going to do the work themselves as well so I don’t really see how they’re going to give us credit for our work because then you’ll have to compare exactly – you’ll have to do the experiments exactly the same way and everything.  **SA1/06:** Oh, ok. I think it is very dangerous. Because a lot of people are not very honest in what they write. Would people go actually point by point and say this is actually what I’ve done, you can trust that source. But a lot of people tend to – especially if things have worked and they’re going to publish – sometimes they leave out crucial things. Especially in papers – whether there is a lab book or not. And then you’re spending a year repeating that and it just doesn’t work. So I don’t think, as much as it is important to share what you know, I don’t think going down to a point or raw data sharing and things that you’re physically doing should be put out there so strongly just yet. Because everyone’s on their own path, like, getting there. And you need to go through that grindstone to get there. So you know your process through it. And I think people need to be more kind and open minded in communicating and helping someone else – not holding back your information or your experience – but physically seeing everything out in the open, online, is not going to make anyone go and take that extra step and do anything better. You know, because it is going to be taken for granted – but that’s just my opinion.  **SA1/7**: Methodology sharing is much more useful but in the field that I’m working in it would just mean that half of the stuff that we do would be taken over by people with much more resources and they’d do it much quicker than us.  LB: What’s your opinion on contributing data? Is that something you’d consider.  **SA1/7:** Hmm, it depends on where. The problem – especially with the crystallography stuff – once one person has done it. So if you haven’t finished your project and you contribute there’s other people with a lot more resources in terms of physical actual lab resources that can do what we do in a year in a couple of months. So if you were to share what you were doing without having finished they will finish the work for you and basically your work is rendered obsolete  **SA1/8:** And the funny thing is that I don’t mind sharing data, I’m just worried about the publication part because that is so important.  **SA1/11:** I feel an obligation to share, but I don’t think I’d share data as I don’t like the idea of people trawling the raw results to write papers and take credit.  **KY1/1:** I won’t release data unless I first of all publish. Because the results, you know, they can be taken away. You’re dealing with colleagues and there are some – that which has taken you like 2 months, they can come and do it overnight with a whole research lab.  **KY1/2:** I think there is still some fear that if I put this data before I publish then possibly somebody will publish the data. There is a fear on that still.  **KY1/2**: Well, see the problem there again is that this data, when it is in the open access, if somebody use it and claim the data to be his or hers that is the question. So I don’t really know what happens to the data or what policy is there that will control the data that is available in the open access.  LB: so that would influence your enthusiasm for contributing?  KY1/2: Yeah.  **KY1/4:** But no in the fact that maybe I’m here in the lab doing something and someone is out there in Europe and they do the same research as me and published before me so my work will be null and void.  LB: so you’re concerned that by making your research available other people might beat you to the post.  KY1/4: Yes. Because it may be null and void but you’ve been in the lab for almost a year.  LB: do you think it is influenced by the resource difference between the North and the South?  KY1/4: We’re in Africa, right. That is the West – they definitely have more advanced stuff than us. So if I’m doing this research for one year, someone in Europe of the US they can do it in 3 or 4 months. So that is where now the issue.  **KY1/9:** funding constrains what you talk about. We have to think about IP and patenting, and only discuss things with collaborators otherwise we have the risk of being scooped. The commercial applications of our research influence who we will share with.  **KY1/10:** because it takes us so long to complete our research, other people have a lot of opportunity to steal our data. We must keep it secure until we publish.  **LB**: is that because you’re worried about other people using the data beforehand?  KY2/3: It is a possibility. Yes, and it happens. Even when you’re hiding your data. Anyone can run away with it.  LB: it is a familiar response – that it takes longer to do research because of resources, and if you put the data online …  KY2/3: It will go, it will definitely go. You know, it’s the discipline in academia that is still lacking. I need to respect that I’ve seen your data, and I can comment on it, but not to sell it with my name as my idea. It happens, and it’s something we have not been able to find the mechanism of killing it, but I think it’s just discipline.  **SA2/7:** to me it’s too much of a risk, it’s too much of a risk and I’m not at that stage to take such risks, I don’t think so […]We want to be trusting each other but sometimes it’s not that easy.  **SA2/11:** in the world of science people like stealing ideas and data  **SA2//11:** Yes there are people whose job is just there to steal and even when you go to conferences you put your poster on the wall you don’t know how many people are taking pictures of your data and one day you sitting and there is an article similar to yours in the paper so it’s a sword. A double edged sword so it’s great for the exposure but to what extent. |
|  | No protection | **SA2/11:** For example with the size of the [SA2] we don’t have the same legal power like a university in Australia or America. If someone steal their idea they will go for them. But we are small and who is going to believe me when I say “this was my idea”. So there is that fear. |
|  | Lack of industry engagement | **KY2/4:** Maybe that information is about a traditional medicine that’s refined for thousands of years then you publish it and who is likely to make a move on that kind of work? It’s not an industry in Kenya, as I’ve stated, it will be an industry elsewhere. We have had some research done here some time back by a local scientist and by and by at that time, as I said about patenting, it ended up being used to make these jeans and so, to make colours and stuff. So the issue is that the only way that we should be communicating our research? why would I go write an academic journal and I know the local director, for example I have done research that is directly supposed to benefit the vegetable oil industry, and that vegetable oil industry is of course Kenyans based then I do the research, then I publish it and the local industry will never read it because they don’t read, so for whose benefit is the publication? It’s just for me because I will get promoted. But the people who are supposed to get that knowledge they don’t get it. |
| **Open Science** |  |  |
| Importance | Theoretical | **SA1/3:** I think it leads to better science – if people can always – multi-group, multi-faculty collaboration where everyone with an opinion can venture one. Then you can choose to take that opinion into account, but everyone has something positive to contribute. So in a way that pushes the science forward. So you’re not bogged down and not getting it because you’ve missed one small thing. But if you publish it online and someone can tell you that you’ve missed that small thing then- you’ll avoid wasting 6 months and numerous literature searches and chatting to your supervisor and going back to the theory. Often things are overlooked.  **SA1/6:** I think it is a good thing but it can also be misused. So I think that OS is very important, communicating science is important, and also being intellectually honest about what you do. That’s what is going to put this thing on a higher level. As much as we say we want to have access to data and this and that, it is important but if you’re going to have people involved – I’m sorry, I’m very... cautious when it comes to trusting people and data and things, from personal experience as well |
| Practical considerations | No recognition for sharing | **SA1/3:** I think it’s [OS] great, but in terms of funding and output recognized grant proposals and things like that I don’t think it’s working right here in [South Africa]. So we’re judged by how much output we get out there and first time publications and first authors and things like that. So if you share your work Open Source and even though you get a DOI it’s not the same as getting a paper, and I think you’re at a disadvantage for funding in [South Africa]. Not only students but supervisors as well, and I think it’s not encouraged here.  **SA1/03:** There are a number of reasons they don’t encourage that [open science initiatives] here – for funding, for research recognition, for promotion. I assume I’d face similar problems. So in an ideal word, yeah. |
|  | Cultural differences | **SA1/9:** The insights from that [value study] were very interesting in that not everybody wants to share and often there were quite strict protocol and cultural reasons around that. So this was a hot topic of conversation in our focus groups in Botswana. People spoke to us about Basotho culture, and similarly in \*\*\*\*\* who was our research coordinator there very seriously explained to us one evening how Hindu culture works and that there was a mode of supplicance involved in that. So your integrity is bound with a kind of humility. So to \*\*\*\*\*, and he was talking about himself, but he inferred that it was true for a lot of his colleagues, you kept your head down and you did good work. And if you did good work someone would notice. But you didn’t showboat and you didn’t self-promote. And they conflated an aspect of openness with self-promotion. So those were very sobering. |
|  | Structures for sharing data | **SA1/9:** it was so tragic – it broke my heart – because these guys came and they were so dispirited because things were just falling over left, right and centre because the funding that had come in with the initiative had been withdrawn, or the champion had left. So again, it enraged me, as we had seen the same thing happening in the repositories environment. So these big initiatives go and sweep in and erect something and build some form of infrastructure, but it is like planting a rose bush in arid soil. Unless you address the soil that this thing is supposed to be growing in you’re not only throwing good money after bad, you’re having this cumulative impact of reinforcing the idea that shit doesn’t work here. And that is what is so dangerous. Eventually people will say: “oh, this open data thing, we tried it and it doesn’t work. This repository thing, someone came here and built us a repository – this is what happened in Namibia. They’d been part of a big donor-funded programme and someone came and build a repository in the library and then left. It wasn’t embedded institutionally – do you know what I mean? It was built with the best intentions, but … I think it is part of the growth-curve towards maturity – you try some things and they fall over, you try again and maybe more things stay standing. That’s the root to sustainability …  **SA1/9:** The other confounding thing in this picture is that it’s not at all the case that all these institutions exist in a culture of deficit – or that they don’t have money, to be blunt. So the University of Botswana had a brand spanking new version of Converus (?) – they’d just invested millions in a new research management system that wasn’t being used because nobody knew how to use it. In the time that we were there – ok, it’s not true to say that there isn’t deficit – what there seems to be is intense disparity. Incredible spending of resources in one area and then complete poverty right next to it. So we spend a lot of time in library environments. University of Botswana library, relatively well resourced – perhaps compared to some other spaces – but struggling. While we were there - we travelled with a libraries expert and metadata consultant who did part of it – so she was in the library space, and while she was there a library colleague of hers who was in the library took \*\*\*\*\* down into the library and said I want to show you something. And \*\*\*\*\* came back with her jaw on the ground. They’d just invested in a scanner that had cost R1 million and they’d had it for 6 months already, but they couldn’t use it because you have to go to Germany for training to use the scanner. So they first had to come up with the money. In fact, \*\*\*\*\* couldn’t really get a sense of the scanner because it wasn’t plugged in, and it’s all driven through a computer interface – it doesn’t even have an on and off switch. It’s like a sophisticated high-end piece of equipment. So those kind of situations, again, speak to this window dressing that happens. A senior manager goes to a conference where everyone is saying: “you must have Converus - you must have this research management system” and he’s like: “oh, I want one of those, let me get one of those”. And this is the thing on paper – you will hear this one has Converus, this one has this infrastructure, but it’s sitting there gathering dust. That was very prevalent.  **SA1/9:** You know, there’s so much hierarchy and politics and outright strife around resources that there is incredible political maneuvering whenever resources come into play. Territory setting and .. yeah .. that was definitely a feature of – I wouldn’t say at [SA1] – but particularly at Mauritius and Botswana, and as soon as we were bringing some resources in – we were working at the level of academics – but the senior people started fluttering. Oh, what’s this, why do you have it?  **SA1/9**: There’s something I think in the power dynamics that really has a bearing on openness.  LB: another issue that came up in my work in Kenya was the power dynamics when it came to promotion. A lot of the people were saying that with regards to winning grants and self-promotion that they wouldn’t do that because the head of department was very controlling and he didn’t want anyone to come up and challenge his position. He was very comfortable being the go-to guy for the Western agencies. So he was kind of actively suppressing independent activities of his staff because he didn’t want anyone coming up and thinking they could “topple him from his power”. And I think that’s very sad as well – how many levels power dynamics operate on.  SA1/9: And heavily authoritarian. Heavily. Yeah.  **SA1/10:** the Dept Sci Tech has realized that they need to put in a coordinated infrastructure to enable basically the SKA, but other big data initiatives. So it was structured around the NRENS, the High Performance Computing Centre and DIRISA. Previously the HPCC was mandated to create a “very large database”, they called it. So we did a report you can find online on national cyber infrastructure. So we’re just waiting to see what the department will do with it – because we think that’s quite critical. And I’m saying that the universities have actually been excluded from this – it’s what we call tier 1 – department-funded research - SKA projects. The universities are being seen as the training layer, the whole kind of skill set issues. And that has been quite critical because we’re battling to find the skills. It’s coming out of the Belmont Forum research as well – that the skill sets are critical. And it’s not just about data curation which is probably the easiest part – I can do that. What I can’t do is produce data scientists who can actually interpret this data centre and enable it to be shared across disciplinary boundaries. So how do I make this climate change research available to the hydrology guys. And that’s where the standards start becoming quite critical. So we can only do that part, but how they visualize the data and reuse the data, you know  **SA2/10:** Basically internet has improved tremendously – I think in the last two years - but initially it was huge problem. We had that project that we spoke about earlier with the data sets and we needed to exchange data between the sites for comparison using analytical protocols, but we couldn’t move the data sets. At times we had to wait until the weekends when the usage goes down before we can transmit data because of the very small bandwidth. But it has improved a lot, although we have down times where there are issues with cables these issues aren’t resolved quickly. For example, last week for almost 3 days I didn’t have access to Internet so I would work till 12 and then go home and access from home and continue working at home. |
| **Personal experiences with data** |  |  |
| Patenting | Lack of support by institutions | **KY1/1:** But I think I’d prefer for the university to go in the way of – I don’t know if Exeter has spin-off companies – there was talk about having a science park, but I don’t know what happened – politics took over. Because sometimes you have ideas which may have commercial values, but for you to do it through your own way and to look for someone who may help you with R&D, but even to patent it you have to do it through your own pocket. The university does not assist you. What they do is that they have a lawyer, but everything else you have to do on your own. Nothing, there is no … ask the others and see if they’ve ever patented. If they’ve ever had university support.  **KY1/1:** Oh, I wish, I wish, I wish [we had more support for patenting]. So, there is totally no support. I don’t think there has been any effort to encourage that innovation of, if there is patenting you will have to do it on your own. But the university will not, and probably the government will not support you in that. There are some universities like Kenyatta University they have a an innovation centre in that they had an investor – an industrialist – he was able to put up an innovation centre there, so for students and staff who’ve got their ideas it’s like an incubation centre. KY1 which you’d expect to have an incubation centre doesn’t have. So any ideas that you have it’s for you to do it alone. And I’ve got a lot of ideas, not only in chemistry, but also things which are relevant to the industry – I cannot speak about them, but – I want to see how I can develop them, but they have commercial interest. But it is the financial resources that are required to do that without any government or institutional support. But what I’d prefer, and what I wish you’d include, I wish the university had an R&D centre and an innovation centre – somewhere whereby students and staff can develop their ideas, and their ideas can be incubated. Like in Cambridge they have a science park and I would wish the KY1 would have that. Though the university has got some land and the rest whereby they may have some things that may be bringing finances – a detergent unit and the rest – but a science park should be mandatory and I wish you would include it in your report.  **KY1/8:** There is a patenting office in the university?  LB: do they also provide funds?  KY1/8: No they don’t provide funds – they only give you advice. So there’s very little incentive for patenting for the sake of patenting – just for the sake of it. It’s a hassle for nothing.  LB: so you would have to find the money yourself?  KY1/8: You’d have to find the money yourself to patent. The university will not help you patent.  **KY1/8:** It’s generally a sensibility of raw materials – we as Kenyans, Kenya is not a primary raw material producer. Especially chemical raw materials – it’s not produced here. We are a packaging industry. Raw materials are brought here and mixed up into medicines or some other formula like washing detergents, soaps. But there’s nothing that is made locally from small compounds or from extracts of things. So people are not sensitive towards, people don’t care about patenting and it is transmitted to the universities, that the universities don’t support patent production because whatever you try to patent may never be useful – may never be commercialized. So that’s the situation here.  **KY1/9:** overseas governments prioritize R&D. Here in Kenya we don’t have that support. You must use your own money to support your research and to patent any findings. This is poor prioritization, and we need an innovation and patenting office.  **KY2/2:** And the university does assist. I actually happen to be the chairman of the intellectual property committee board. But we have a full-time IP director who handles the day to day things.  LB: and do they provide money to assist?  KY2/2: Oh yeah, the university provides funding for filing and so forth.  **KY2/2:** But also we need a science and technology park. We’re dealing with a relatively under-developed economy. It’s not like South Africa you know. you can find companies there. But in this part we’ve got a long way to go. So I think a science and technology park is critical. To scale up.  **KY24:** I am a past director of university industry relations to try and bridge that gap and so we go to a level where we say even our own syllabuses they are too theoretical orientated. We fall in the classic British high society sort of approved where an academic is meant to be in an ivory tower somewhere. In this high society party and governing we can give you the opportunity to tell us that this is the new thing that you are trying. In the process of doing that we decided that we should also try to promote innovation amongst students to see whether they can also start serving their ideas and start by patenting their ideas - because our history was such of a British high society and patenting was not supposed to be for academia  **KY24:** I think it’s important because I have found in my research so far that scientist in Africa as you say still have a traditional approach to academia and they are not promoting themselves in any particular way so not through patenting their work or innovation but also not profiling themselves online.  **KY2/4:** So that is the way it is - by the time I got my patent it was never recognized, and I know a few others who had the same problem. But in [KY2] it’s changing – now we have a director who deals with patents and there is a direct encouragement that if you doing research then please come and we will help. When I did it then it was my own money, my own effort, my own everything and by the way I never got any money even to do my research. |
|  | Sitting on data | **KY2/4:** I think something that is disturbing is that if there is no support for patenting and scientist recognises that they have information of commercial value they will sit on it if they can’t patent it because they are worried about it being used by other people.  **SA2/7:** people are just locking it [data] away in their computer.  **SA2/7:** But also with the students you know we have a very high turnover of students and then those students leave and they haven’t stored their data properly or they leave with their hard drive. |
|  | Too much institutional involvement? | **SA1/8:** And as soon as we submit an MSc and PhD thesis, actually, before when the student fills in the intention to submit it first goes to the patent office so that they can quickly have a look at it to see if there’s anything patent-able and should we be quiet about this before it goes in to the library. Because once it goes into the library I think it’s in the public domain. So actually it’s the policy here at [SA1] that as soon as a student fills in an intention to submit it first goes down to the patent office. And because they know we’ve patented in the past we always get these emails, like, “we’re supposed to be patenting something here”.  **SA1/8**: And if you’re a young researcher like myself you actually need to publish papers and they stop you from publishing and, I mean that’s what I actually need to do. I don’t need 100 patents to my name I need a paper. So they will stop you from doing that. |
| Creative Commons |  | *No one had heard of it before* |
| Sharing | Sharing without allowing re-use | **KY1/2:** if you look at [KY1] right now most of our publications – even the students’ theses – are now online. Whereby nobody can copy them but the information is available.  **KY1/2:** I know people tend to handle the data in a way that they do not share before publishing. That was due to this idea of plagiarism. But with this data now being shared online once it is published and people make sure that you cannot download it, you cannot copy it. You can read through but you can’t just download it. I think that is encouraging people to see the work that others have done, but only after publication. |
| Personal gains |  |  |
|  | Promotion | **SA1/8:** Well, you know, like you get people who .. I try to keep quite a low profile in a way because I find I have so much I have to do here with .. that’s not directly related to publishing papers or whatever – like other stuff like student supervision and lecturing and then you get asked to, like, review all these papers or review masters theses from this university and that university and none of this goes on to your CV and none of it is going to earn you big points and it’s sort of, this is all stuff that kind of has to happen on the side but you’re main focus is your own profile and it’s like publishing papers.  **KY1/2:** You know the idea with our university is “publish or perish”.  LB: so it is linked to your promotion criteria?  KY1/2: It is, it is linked to the promotion criteria. It is given that to move from this grade you need to have supervised this number of students or publish this number of papers.  **KY1/3:** The criteria for promotion comes with the publications. And that’s the reason why after PhD you’ll find someone staying so long as a lecturer before he or she is promoted to senior lecturer. Because until you publish nobody, you’ll not even have an option to apply for promotion. Because you’ll not have the qualifications.  **KY1/4:** So when you are in the lab you just hear that people are publishing so you get into the system. |
| Ownership of data | Putting in all the time and effort | **SA1/01:** On the one hand I feel, yes, I should be sharing all this information and putting it all online and it’s important as I would have been so grateful myself as a starting-off student a few years ago, but on the other hand, dammit, I’ve put in all the time and effort myself – months of time and purgatory – to figure it all out. Let me at least wrap up these experiments and perhaps once I’ve written up a thesis or perhaps got a nice publication then share everything. So I’m in two minds. |
|  | Paying for research | **KY1/1:** for most things I have used a lot of my own money on the research because I don’t think you get government whatever. Though occasionally there are some committees called Dean’s committees where you can apply for funds, but the funds are limited and they are mostly limited to students who are doing research - PhD students. But for staff, what do you do?  **KY1/9:** here you often find that people pay for their own research. They wait to patent their findings, but this means they can sit for 5 or 10 years on the data without a patent or publication. |
|  | Being territorial | **KY2/02:** people get very territorial about what they think is their discipline. I’ve seen people are very sectarian and that’s a problem. We need to break the barriers. |
| When generated with old equipment |  | **SA1/02:** If you’re a reviewer you’re going to be harsher on the Indian guys and a little lenient on the others [from Harvard] – you’re going to be like, from the onset, these guys seem to know what they’re on about, I’ll score them well.  **KY2/13:** how much can we do to develop our own data? What processes do we need to convince people that the data are good? |
| **Actions of data engagement** |  |  |
| Data generation |  |  |
| Graduate students | Predominantly grad students generating data | **LB:** so apart from the limitations of equipment, do you feel that your working environment supports your research?  KY1/3: Yes, it does. This university is unique in Kenya as it is the only place you find PhD work you’ll find 3 to 4 students – maybe 5. But in these others rarely will you get even one PhD student.  **KY2/3:** The students when they get that grant it’s basically for the lab. For chemicals and write ups and material – looking for information. That can be supported in the budget. But what it won’t support per say is upkeep or stipend. At least the ones I have don’t have that.  LB: That must be quite difficult for them – it must take them quite a long time to complete.  KY2/3: It’s very difficult. Those who get partial support – actually we call it partial support because again if you don’t have support for living it’s really partial support – but those who don’t get it at all are a strained lot. And that means that for an expected 3 years completion of a masters some take it up to 10 years.  LB: That must be quite frustrating for you as well – if you’re relying on the data to come out.  KY2/3: Yes. And not just relying on the data to come because you want to disseminate to the scientific community, but also derails the growth of the student as a person. And there’s something very interesting – and I think this is world-wide over – that for me to move from one level to another – for me to get promoted from a lecturer to senior lecturer, or from a tutorial fellow to a lecturer – I need to achieve one or two detailed items on the criteria for promotion. So if I need to move to the position of senior – which I just did – I need to supervise a student to completion. They must have graduated. So now look at this – if I have just these three students and I need to graduate three students and they all have no grant they take a long time. So it derails not just me, the student themselves, but also the scientific world in gathering this information that is otherwise useful at the beginning.  **KY2/13:** it is difficult to build up a body of data when the research is all short-term and ends with the student.  **SA2/2:** So my research is undertaken by honours, masters and PhD students.  **SA2/2:** Yes, you have to work closely with them You know, working with students you must make sure that sometimes you need to check that they are really doing the right thing. Maybe they’re just doing their own thing. When you are trying to synthesis some compound and they don’t get anything they’ll tell you that they can’t isolate the compound. Sometime you need to go and start the experiment with them, monitor, and take them through the process. |
|  | Part-time grad students | **KY2/12**: we are part-time masters students, right. It is difficult to work like this because you must come for a short period of time, take a little data and then go away. When we are away it is difficult to do work, and also to get hold of our supervisors.  **KY2/12:** we don’t have training in the lab. We must just survive.  **KY2/13:** we need long-term research projects that will transcend individual students and allow for stable and rich networks of collaboration. |
|  | Postdocs | **LB:** what about postdocs? Do you have any people who fill that function – who focus only on research and starting own research projects?  KY1/3: Most of them do automatically become lecturers.  LB: does that come with a teaching requirement, or is there a chunk of time that you have specifically to spend on your research after your PhD.  KY1/3: You go straight into teaching. What happens is that I intend to start it this month. I will collect the samples this month and then I’ll settle down to business next month. So maybe after one year or so I’ll become a tutorial fellow doing some teaching, so that will continue until I graduate so by the time you graduate you are already in the teaching profession. Hardly are you given time to go for postdoc [11:24].  LB: would you be interested in a postdoc?  I would, I would. Actually, it helps you come up with your research. |
| Samples | Sending samples away for analysis and time spent | **KY1/4:** The assays that are done for anti-cancer here in Kenya they are not up to date as I heard, so it was easier to send them to Germany.  **LB:** so you just completed your masters. How long were you working on it for?  KY1/5: Like, for the research only like one year. I isolated the compounds within 6 months and then they were sent to Mississippi for analysis and that took quite a long time.  LB: so waiting for the analysis was the main time?  KY1/5: Yes, it took a lot of time.  LB: why did you send the samples to Mississippi?  KY1/5: Because the project was, one of the collaborators works with my supervisor. There is a collaboration between his lab and ours.  LB: did you have a chance to go?  KY1/5: No I didn’t. The samples were sent for NMR data.  **LB:** do you do the NMR here?  KY1/6/2: currently we don’t have. So we send out to Germany or Sweden where we’re collaborating.  **KY1/9:** when we send these samples overseas, what stops people from taking the structure?  **LB:** I can imagine it’s frustrating having to wait for a sample and it gets to South Africa and you are waiting for 6 months to get it back.  KY2/15: Even if it takes 2 weeks then you are still sitting doing nothing because you have to know if you are preparing something for application and you have to know this is what I have to prepared that I can apply or proceed to the next step of preparation. Before this one has been done there is very little you can do. |
| Collaborations | For equipment and services | **LB:** so are these collaborations a preference or also a necessity? Do you have the facilities to do all the work here?  KY1/8: They’re mostly a necessity. It’s not a preference. A preference in a way because now we are used to them and they are working with us well so we prefer them. But otherwise if you don’t have them it would be very difficult to get any good data. That we can publish, you know, in good journals.  **LB:** with the foreign money coming in, do you have specific data agreements on sharing data and releasing data? Or does it work on a more ad hoc basis between you and each collaborator?  KY1/8: no, it’s, uh, they don’t expect us to share data with them. What they do is they expect us to acknowledge them.  **KY2/13:** it is challenging to analyze compounds after isolation. We must rely on foreign collaborations which slows down research.  **LB:** Do you have a lot of local collaborations with Uni Limpopo  **SA2/2:** Not really but we are starting. It’s only now we are starting collaboration in terms with sharing equipment because previously they didn’t have any equipment so they were using ours but now ours is broken down and we are going back to them.  **SA2/11:** access to collaboration institutions like UJ or Pretoria University is difficult because if I want to analyse my data and using a flow cytometer then I need to drive to Pretoria and it’s a long drive.  LB: So do you transport it yourself or do you use a courier?  SA2/11: We use our own because I don’t trust the transport condition. |
|  | Preferences | **LB:** So with your research do you collaborate a lot with people in Kenya or internationally?  KY2/15: [pause] We do it with the resources that are available. Because for somebody to collaborate with you maybe outside Kenya or outside this place he must really be interested in the line that you are working in. I mean is it priority? You may not buy a car if you have not had enough to eat. So people busy doing their own things and they are not giving attention to what we are doing. |
|  | With colleagues | **SA2/6:** the other thing is also I that I think that there is not enough trust also. You know you can tell a colleague you have had 15 honour students in the last 10 years there must be results let’s look at them and try to publish them they don’t want to share that they rather don’t publish and to share it with someone else.  **SA2/6:** mentoring is something else and you know people do not really like to be mentored they prefer to do their own thing because I don’t know maybe they are scared that they will be forced to do certain things they don’t want or they don’t like. |
| Equipment and facilities |  | **SA1/1:** I have to thank my supervisors because they give me a very stable environment. I can go to them with my wish-list, my requirements and they’re usually very accommodating – sure we can get those chemicals, sure we can invest in that piece of equipment. We can pay for you to spend many hours at the microscope – where you pay an hourly rate. Just kind of “knock yourself out and do what you need to do”. That kind of trust they’ve placed in me has been very empowering – terrifying at first. You think, oh, all this time and money is – sort of might not come to anything. So, yeah, both of them [\*\*\*\*\*], in particular as my primary supervisor has been very helpful and encouraging and helpful in an intellectual level as well as making the research possible. I think at [SA1] we’re quite lucky – it’s a pretty organized, well-run institution.  **SA1/1:** You know, the nice thing about science is that often there are so many different ways of answering a question – even someone with less resources can still make a very powerful case – almost as powerful as someone with state of the art resources. Because there are hundreds of techniques at your disposal to back up your hypothesis and obviously sometimes it sucks to have to do 5 experiments to show something rather than if you have a state of the art machine that can do everything at once. But I don’t think that resources are so much the question. It’s also like, wanting to see it through. If you’ve generated the data you sort of want to be the one who interprets it. Because then if there are any errors, or things that haven’t been done properly then it is also on your head.  **SA1/3:** I think [SA1] fosters that [collegiality], and especially the chemistry department, we foster that. Talk about your research, talk about your work with everyone. There are some equipment we don’t have here but I’ve found that even in other [South African] universities as soon as I say that I’m from \*\*\*\*\* group and I’m interested in this and what can you tell me, they’ve always wanted to be very helpful.  **SA1/7:** I’ve been lucky in the sense that my other supervisor got quite a nice grant at the beginning of the year so she was able to buy quite a lot of the chemicals that I needed – which unfortunately are quite expensive and quite specialized. It took a lot of time to actually get them. And they’re not available from our usual supplier. … It was terrible. I was doing nothing for ages and you’re twiddling your thumbs trying to find out what you’re supposed to do for a couple of months while you’re waiting for chemicals.  **SA1/9:** even people internationally who are interested and who have a sense that things are different don’t have an understanding of the challenges that are here. … And it’s difficult to have the challenges conversation without the “oh, Africa’s a basket case” slippery slope. And people get – I can see in those international conversations at one or two presentations that I’ve made – a kind of impatience. “Oh, Africa, just sort it out. Just sort it out and get over it. If there’s a problem just address it and fix it.”  LB: I agree, it is frustrating at conferences – especially as African scientists don’t draw attention to these issues during the sessions.  SA1/9: But, you know there is a weird and interesting blockage to having this conversation internationally. We have an inferiority complex.  **LB:** do you still have a lot of contacts and collaborations with the UK?  KY1/1: Contacts, yes. Collaborations as such, ah, not much. What I’ve seen is that the kind of research which is taking place here is a bit different from what I was doing – like in the UK I was doing synthetic organic chemistry. And the kind of equipment and the rest, it was purely on silicone chemistry and the reagents and the rest I couldn’t get them here. So what I had to do was to look for things which are relevant for this institution.  **KY1/3**: Our labs are not even there for synthesis – synthetic work – the environment is not there. So when it comes to that I either have to skip it or I have to go to a lab that has such facilities.  **KY1/6/2:** the solvents and reagents we have all, but the equipment – some equipments are missing. But we do the best we can.  LB: and with so many in the lab there must be high competition to use the equipment.  KY1/6/1: yeah! For example this evaporator, we all use it. so we have to use it at a certain time and you when you leave it the other person wants to use it and so on and so on.  LB: so there is a schedule.  KY1/6/1: so for us to work very well, so everyone should have at least an evaporator like this so that you can use it at any time. In that case it can become very easier, instead of sharing – it’s not easy.  **KY1/9:** we have limited lab facilities. Our equipment is not running or idle. We have an AS that is not operating, because we have no fume hood and now no acetylene gas. Because of this it has been idle for 6 years.  **KY2/1:** it’s not like the US here - where everyone has their own lab and space. We are constrained by equipment.  **LB:** I’ve been impressed by how enthusiastic the staff are about research  KY2/2: Oh yeah, but we don’t have that capacity and capability.  LB: and the sheer teaching loads that everyone seems to be coping with  KY2/2: Oh, yes  LB: I’m surprised that anyone has time for research  KY2/2: No they don’t. But also the facilities are very poor.  **KY2/2:** And we need to invest. I mean, … I don’t like to see, for example, a tower being built. That’s a waste of resource. If you look at the administration block – there’s nothing wrong with that, by the way – we don’t need a huge administration block, and graduate school. Why a graduate school? It’s just offices facilitating and testing. Come on!  LB: I must admit I was struck by the contrast between the administration block and your labs.  **KY2/2:** I was worried about applying for international funding because the facilities are poor and we have to deliver. So I’m selective about what I apply for from outside.  **KY2/3:** Yes. The availability of equipment kind of directs research. Kind of directs the research you do. So, we have a chromatograph, for example, so we want to do a lot of work related to chromatography, SA2. But, we also look at how much money we have, and whether we can do the sample analysis away elsewhere. In a neighbouring university or out of the region, but it is also expensive. You can keep those costs into your budget, and if you are lucky to get the whole amount well and good. But the lack of equipment limits the extent to which you can do research – and even the type of research that you want to do. And you ask yourself, ok, so I want to do this kind of research but do I have the machinery? Where else is it? So how much will it cost me, and can I get this grant? Because every grant has a limit.  **KY2/13:** Organic research is limited by the equipment we have. Synthesis is impossible with the equipment we have, and reagents are very expensive.  **KY2/15:** There is a constraint. Even the conditions aren’t right, so you cannot work as fast. One of the limitations is of facilities. I mean facilities that can’t be considered credible for some publication. If the instruments that are there are really elementary so you have to search for instruments that aren’t here and that takes some time. Number 2 is budget and budget means money. The university budget maybe has its own priorities so research material may not be available as fast as one would need. So that is another limitation. … The research output is curtailed by such factors.  **KY2/15:** Because a student can never be fully satisfied with what we have. It’s easier to go to another university – KEMRI, KY1, South Africa, America, and there is such like things. The facilities will never be the same.  LB: Did the government sponsor the NMR machine?  **SA2/2:** Yes, it was sponsored by the government. But now it’s not working and we are squeezed. You must remember that we are far from the city here and sometimes there are challenges with filling of the liquid helium and the liquid nitrogen, but plans are underway to move the equipment to the new building now.  **SA2/2:** Yes the one challenge is that doing chemistry research is very expensive exercise because beside equipment you need chemicals and most which we use are very expensive - the reagents, the solvents are all very expensive.  **SA2/6:** Yes but it has been very challenging [having the NMR machine] - it’s a baby that you have to nurse all the time. Also for the liquid nitrogen that we need at first we couldn’t get a source of liquid nitrogen north of Pretoria.  **SA2/6:** We installed liquid nitrogen plant and that has been quite challenging also but it has been working, then when it broke down we had to depend first on Limpopo University then they were not active anymore we had to send the person on a weekly basis to Germany to fetch liquid nitrogen.  LB: my goodness.  SA2/6: Unfortunately the liquid nitrogen plant was swamped during a storm at the end of last year…. It was in the basement. It should have been here in the new building but they promised us space after phase 2 we are only now busy with phase 2 so we don’t know when we can get that. So only after this we would be able to move the plant here. Meanwhile it has been swamped with about 40 cm of water so that has been written off. The insurance claim took a year so now we are getting the money, but the Rand is dropping so quickly. So that is a challenge and in the mean time in the beginning of this year, the end of last year, another cryogen - liquid helium - also needs to be supplied twice a year and this is done by outsiders because it’s a very complicated process, it is a very specialised process. What happened is for some reason the instrument quenched. What this means is that when you add the liquid helium at minus 200 it hits maybe a hotspot and then it just boils out like when you add water to boiling oil, which means the instrument now had to be left standing for quite a number of months and we have to check whether it is still usable and then it has to be cooled down again and restarted. So that is quite a lengthy process. |
|  | Ordering and deliveries | **SA2/2:** Yes because processing of the orders takes a lot time. You see we don’t get the orders processed on time.  LB: how long does it take to process an order?  SA2/2: You see, what happens here is that you need to get quotations. You need at least 3 quotations and it depends on the time that the supplier takes to get back to you. Often they will respond within a week, and from there you must process it and it must go through the procurement division. We don’t put the final order. The final order is placed by procurement. We have to then follow up, to see that they’ve placed the order. Because many times you find that the order is still on their desk. That is a big challenge.  LB: so it can take...?  SA2/2: We know of orders that have taken up to 6 months. But there are some orders that you cannot do otherwise, because they are single agents. You have no choice and you need to be good in planning your research. Otherwise your student will just be lingering around without having anything to do. In that case we just advise them to continue with their literature.  **SA2/3:** It’s really bad - the bureaucracy of it. It’s how the money is transferred, technical services, procurement, all those … but those are like “grand problems” that you can’t solve.  **SA2/10:** In general in terms of technical support I need to procure reagents and biologicals for research and it takes time to get it here. So perhaps I may put in a requisition and I may have those things after 3 weeks, I month, 6 weeks. The policy as well I think it’s not fashioned so as to support research, because you need so many quotations for a small item. The policy is based on the amount of money spent on an item. So, for example, if an item costs over R5000 then you need 3 quotes but that for me R5000 is to get a small tube of enzyme and I need about 10 in a month. And also, perhaps what you have identified as appropriate to use, there’s only one supplier in SA and they’re agents that have contracts with the manufacturers – sole agents – and at times you need to get a letter to show that they are sole agents and there is a process. So in that period everything waits and then you place the order and then it takes time to come here. And those things are not made in SA, they’re imported. And the process of importing takes time. So that is the aspect of the procurement issue. So it was set up to buy stationary, to buy furniture and not for research, and that policy has to be radically reformed. There were a few changes, but it is taking a while and the administration is slow. So we are facing those challenges. |
| Funding for research | Foreign funding | SA1 held an NIH grant that supported the research and some of the students. KY1 had money from Sweden and Germany, and KY2 one lecturer had money from TWAS. All labs had very little local funding. |
|  | Local funding | **LB:** does the majority of your money come from the government?  KY1/1: Ah, no, I don’t think the government has ever funded our research.  **KY1/8**: We get no funding from the government. We get paid from the government, we get bills of power and water by the government but otherwise, other than that, the materials that we need for research we have to source from funding agencies. |
|  | Not just about money | **SA2/1:** Our challenges are unique and very different and so you should come with a purse of money and hand it out you may address some of the issues but you will not address all. In fact I don’t think you could address even 50% of them, so again you know they call us to meetings and they say we have funding for this and that. And I think great stuff, butI wish they would ask me what the real issues are. I’ll probably tell you 100 other things outside than money.  **SA2/1:** Yes and maybe at SA1 or WITS this may be the issue. So maybe you should give them a big grant and they can set up some fancy place - I don’t know - but here it’s a different culture. I think we have to learn to crawl before we walk or compete. So we must do some things right and perhaps we don’t need money for that - even though money is useful. I mean from my experience I always found good researchers can attract funding - that is the rule. It’s different in Europe because you could be good and still battle for funding as the competition is stiff but here if you have a story to put together I am sure you get funding. So here funding is not the biggest problem we have. In fact I think government in principal is willing. They put money into research and we are also at the centre of government sympathy, because they are aware that we are previously disadvantaged - but then is money the only factor? |
| Interest in research |  | **KY2/13:** A lot of the staff have foreign PhDs, and have been exposed to that research culture, but here in Kenya it is difficult and they get frustrated. If they do any research it is just a little for promotion. It is tough with no research culture and funding.  **KY2/2:** Lack of multidisciplinarity is a problem at [KY2]. When I came to this university I was shocked.  LB: is there a lot of support from the university governance?  KY2/02: I think they’d like to do, but it will take time. I don’t want to sound too critical, but … |
| Collaboration stimulating sharing |  | SA1/3: so what we wanted to do is to start an online lab book so that anyone can access your lab book.  LB: would that be closed within your group?  SA1/3: yes, closed within the NIH project, because we’re on that combined project. Just so everyone can see what you’re doing and how you’re doing it - if they need to repeat any experiments. |
| Action of Disseminating |  |  |
| Papers | Digital vs print | **KY1/2:** Like I just have seen somebody requesting about four papers that I published. But now the problem is that I could having that paper but it is not in pdf form, or it is not digital. The titles I have put there, the titles and abstract I have put online but it is now the full text that they want. And sometimes it is not easy for me to send that because I may not have full text in digital.  **KY2/02:** I move from paper culture to electronic culture, but it’s not easy. I’ve still got lots of papers going way back. |
| Personal connections | Prefer to know the person you’re sharing with | **LB:** would it make a difference if someone asked you personally?  SA1/3: To give them something? I have done that, but then I do specify that this is unpublished work. There is an element of trust there - my supervisor would have to have worked with their supervisor before or something like that. Or constant correspondence. Because we collaborate with an international group and we worked on a paper together there was lots of data sharing, even unprocessed, but that’s with your collaborators.  **SA1/5**: well, we share a lot of data internally, so if there are a whole lot of people who do work on a specific grant - for example the NIH grant, we have specific meetings once a quarter and we share a lot of data at the meetings both orally and visually, but then we also have dropbox folders that we share internally where we put all our presentations and relevant new data and that sort of thing.  LB: what about people who are not involved in the grant?  KY1/5: If people approached me, for sure. We do have quite a lot of collaborators with other universities, but that’s more like them specifically sending us compounds and then we test them and send them the data back and publish some sort of collaborative paper. But certainly, if someone approached me for data I would definitely be willing to share it - depending on what the overall goal was.  **SA1/5:** a lot of people have different opinions physically about the way things work, and sometimes you want to share something and they go and interpret it in the wrong way, or like kind of go against what you’re actually trying to do with the data or they have some form of misconception. So, yea, you want to share with people that you trust essentially - the internal sharing.    **KY1/4:** someone I knew or someone I knew about  **KY1/6/2:** I think for that I would be more comfortable. If you were in personal contact with someone then you would know that your information is safe. In case of everything you get to know the person you’ve been dealing with. But if it is online everybody can access and you cannot know who is accessing your information.  LB: so the personal connection is important?  KY1/6/1: yes.  **KY2/3:** Because ultimately you end up doing your communication online thanks to technology, but traditional we believe in “can I meet you”, “can we talk”.  **KY215:** If you share the data you have, well unless someone has contracted you do to such, if it’s the students to graduate and get a degree then you have just given the information to the world and everyone can just nick it and so what he wants with it. So there is some data that can be released but there is some that needs to be classified. |
| Benefits accrued | Benefits of sharing data | **SA1/5:** It would actually be cool if you were rewarded with funding if you’d shared more - as opposed to if you published more. But I suppose that publishing is a form of sharing anyway, but it’s much more formal and time consuming of sharing.  **LB:** if you were going to share data does it matter who you share it with?  KY1/5: Provided he’s a chemist. Someone who is going to add value to my data or my research.  **KY1/8:** If you want to develop the Kenyan scientists so that the number goes up and gets more visible the society must learn to recognize the Kenyan scientists which at the moment there is no capacity to do. So, it’s going to happen but we don’t have a system of recognition of people working in science. We don’t have that system. And it would be nice if we developed a way of recognizing young scientists, productive scientists. That culture is not there. And the rate of productivity of papers from science is actually going down, I think, compared to previously. The assistance that [KY1] is now innovating. That from a thesis research a certain number of papers is expected. That one is going to increase the number of papers, but it’s not going to increase the quality of the papers. Because it’s almost like being forced to write papers. So it’s not natural. You’re not doing it as a scientist who wants to express themselves very well, but you have to produce a paper so that your thesis is accepted by the university. So the university’s visibility goes up. So there’s no proper advantage of forcing people to produce papers from assuredly done research. I think the best papers which can bring you visibility come out of commitment that you are working on an idea and you want it to be known that you’ve cleaned the idea. And you have some information that you want to share. But if you’re forced then the quality of the papers is second rate and you can’t access high impact journals.  **KY2/15:** I think profiling the your work is an important thing. The government needs to reward and stimulate scientists even if it’s not financial something - even if its recognition of I have done something. |
| Where to share | Databases vs publications | **LB:** would you consider uploading things to a database?  KY1/4: I think publications are better.  LB: why?  KY1/4: It has more weight.  **KY2/03:** We are still a little bit, I would say, not so strong when it comes to dissemination of data. Because you have the information and it just lies down there in your drawer. Wherever it makes it difficult to get it out – time, ability and skill – writing is a skill and some of the people don’t have this skill. Due to trainings a few are beginning to catch up and say, “oh, I didn’t know I can write a two page paper”. When it is written then we source for the right avenue to disseminate. Most of this is just online check-up – which journal is relevant to my work. And then you disseminate it.  **KY2/15:** Yes publications are the wealth of the researcher. |
|  | Publications and promotion | **KY2/4:** So basically most of the research that we do here is purely journal, I mean publication and it helps the academic in that they are promoted really it’s not having a benefit in society with the hope that we can apply that research. So basically what I did is I thought that wasn’t a good way of existence of having known what research means in the other world  **LB:** if your promotion is linked to your research then you would expect there would be more support from the institution to do research.  KY2/15:Well they expect magic from us because there is no input from their side. |
|  | Stopping to publish | **KY1/8:** there is no incentive for professors to publish - they have been promoted as far as they can go and there are no financial rewards.  **LB:** does the university encourage you to share information outside of publications, or is it mainly focused on producing publications? If, say, you were to contribute to a database, would you get recognition and support from the university?  KY1/8: our university doesn’t have those systems you have in South Africa that when you are publishing the university can give you some money to help you publish or even to help your research because you published a paper. That does not exist. We are not assisted to publish papers – we don’t get any support. We don’t get any kind of support which I know my colleagues in South Africa get when they publish a paper. There is no such formal recognition. The only thing they tell you is that when you publish they will promote you. But some of us, when you are at the top of our promotions, then there’s nothing, you see? There’s nothing even if you publish.  SA2.6: I think still people have more … well, by the time they come here they have more or less arrived and especially after promotion - once they have a doctorate - they usually fall back. |
| More data makes you more aware of sharing? |  | **LB:** so you’d like to be involved, or would you consider uploading to some sort of data website?  SA1/5: yeah, I wouldn’t have a problem with it. Obviously it would depend on the situation. In some cases you’re specifically preparing data for publication and you wouldn’t want to publish it somewhere before you’d actually written your paper on it. But after that, yeah sure. I think particularly when you’re doing high throughput screening it’s important to publish the results because there’s so much that you can’t work with it all yourself anyway, so you kind of have to share it otherwise what was the point. You’ve just screened all these compounds and now you know what all the activities are, but if you’re not going to let anyone else know what the activities are that makes no sense. So, definitely, but I’m don’t sure exactly what medium I’d use to share the data, but there are some good websites that are dedicated to sharing high throughput screening data and that sort of thing. But, I’m not really involved in that because I wasn’t the primary person working on the high throughput screening. |
| Timing | When to share | **SA1/5:** so I guess the whole publishing thing is a bit of a … it kind of blocks your overall path because you need to publish in order to get funding, so you kind of have to prioritise publishing.  **KY1/4:** Yeah, that is no problem once it’s published.  **KY1/6/2:** to me, if it is part of the thesis, it’s better to report at once when you have finished and you’re writing the thesis. Not after you’re done you report and put online. It is better to do it at once after you have finished. It is easier to do it that way.  **KY1/6/1:** if it is the same lab then it is a good idea – very good. Because anyone in the lab can get access into your data although it is not yet finished. But if it is widely open, because most of the chemists we are working on plants and you have not yet published your data. If someone who is not into the lab gets access he will see what you are doing and he can take it very easily and publish before you. So you may have data you didn’t yet publish but someone has published something that is not far from what you are doing. So you cannot publish and you have to do another thing. So this is a challenge also. |
| Disillusionment |  | **KY2/4:** When you’re in Exeter, that could be a very good dictum, because you have got people who are reading it. Anyone who is research and development will be looking forward to your paper. But not so here. Here I will publish and unfortunately when I do that here even that person in research and development in industry will not read my paper unless someone has said something. So the tragedy is I do all the work, I publish it, the audience that I am looking for already has a prejudiced view, if I may put it so, about my ability to do the research so they won’t value it or read it, right, unless they know me – unless they know me as a person. If they know me as a person then they know so and so is a friend of mine. But they don’t read it or make use of it, and here back at home they don’t read it. They don’t even know I exist. So it’s quite a depressing situation.  **KY2/4:** It is quite a depressing situation and that is why it would have to be addressed other ways that it’s not just publishing in the third world that would make you known as advanced in the development of society there would need to be another way. |
| Action of Receiving |  |  |
| Access to papers | Requesting authors | **SA1/2:** so if there was an article that I needed but that I can’t get it either through the library or through PubMed or whichever port that I’d usually go through I’d try to write to the author. It could work both ways. Sometimes they respond fast because there are a lot of authors that like it when someone shows interest. So that is something that happens a lot. Sometimes you get professors who either just don’t read that email and they don’t respond, or someone’s on holiday and don’t respond. By the time they get back to you - say a month or two later - you’re probably not as interested in that information anymore or you found that paper through other means or something else has happened - but you can’t say I don’t need this, just take it back.  **KY1/6/1:** it’s also very important, but sometimes when it is online you can even send a request asking him his paper, for example. And he maybe can pass maybe one month, two months without acting on it. you have now to look for another alternative to get that paper. But if he’s personally involved in the communication maybe he knows the person you can discuss with him, call him, discuss it personally with him. And he can explain why he didn’t yet reply.  LB: so it is easier to have a personal relationship?  KY1/6/1: absolutely.  **LB:** and if you cannot get hold of a paper, would you try any alternative means of getting access?  KY1/6/2: for me, when I find that I’m required to pay, I just leave that paper, because there are other journals that I can access for free.  **KY1/2:** I actually contact and request for that paper, so that the author can send me that paper.  **SA2/2:** I suppose you could write to the authors but I haven’t done that myself. I don’t know how effective that would be. |
|  | Access provision | **LB:** do you feel there are any barriers to accessing data online?  SA1/2: none come to mind straight away.  **LB:** and when this comes to accessing journals or databases, do you have any problems at SA1?  SA1/4: most of the access is alright. Except sometimes they don’t have certain articles you’re looking for. And then we have this great library service that they will contact other universities around the area - inter-library loans.  **LB:** do you find that the amount of access you have to journals is usually sufficient?  KY1/1: No, of course it will never be sufficient. It will never be sufficient because there are some journals that you really want because especially for organic chemistry and the rest there are very few journals which are, ah, especially with these prestigious journals. For other journals I think you’d just get access, but not for the journals that you really want.  **KY1/2:** the university has subscribed to a number of things that we can try. When you go online it detects that you are working here and you can access that, but there are others which you cannot access. It’s like we have to subscribe and it’s expensive.  **KY1/3:** some of them, but when it comes to those ones that are not on Science Direct, maybe they are on Science Finder, we are not able to access. Like those American journals we are not able to. So we only access those which are on there, which are ones that are free on the internet and those ones that are on Science Direct.  **SA2/2:** You can get a lot of information through the internet, Google or Science direct but you find that some of the articles you are interested in you are unable to open. That is one of the greatest challenges we face here. |
|  | Getting resources | **KY2/15:** Plus, if you want to get a journal from this library and they can buy it for you it can take a year. So it is not worth it.  **SA2/11:** There is someone who is there for school of science - maths and natural science - and she is dedicated to us and so we go there and talk to her and she says okay give me 2 weeks and you get your paper and sometimes in a week she comes back with your paper. |
| Pay to view |  | **KY1/3**: Only a few we’re told to buy. But you can’t buy because it’s expensive. They talk of, like $80. That is times 80, like KSh 6400. That’s a lot of money  **KY1/5:** What stops me from getting data is that some journals you’re supposed to buy.  LB: so it is the pay-to-view thing that is the problem? And the library doesn’t help you?  KY1/5: You see, anything in the library, they hold books. So I don’t think there is anything in those books.  LB: so you can’t write to them and ask them to get an article for you?  No.  **KY1/6/2:** in fact there are some articles that you can find online, and then when you try to get it then you have to buy. In that case we cannot access them. Because our financial situation is not good. But there are some which we are able to access and they are free.  **KY2/15:** No this university doesn’t subscribe to journals. So at times we buy if it is very seriously that you want it.  LB: Will the university buy it or from your own pocket?  KY2/15: From your own pocket. Depending on how serious you are about it. I mean you can maybe pay 10 pound for that, you just pay and it is sent to you. Or alternatively you can use colleagues from outside this university – you ask if they can access this journal and if they can send a soft copy of the same. So that is maybe how we survive here. |
|  | Asking a colleague | **SA2/2:** This is something that I was advised by a friend very recently, friends but I haven’t tried. But what we’ve been doing is that maybe if you have friends - a colleague in a better-off institution then maybe they can try and download the article for you. The library also has not been very, very helpful because the interlibrary system hasn’t been working well for us. That is a greater challenge. We get good articles related to what we want to do but when I want to read the article you can’t - it’s just the abstract.  **SA2/2:** Very frustrating. Some of my research I had to abandon because I could not go further – I couldn’t get access. I mean, even if you rely on a friend you cannot do it every a week because they have their own work – their own responsibility and time. It’s difficult and maybe I should try consulting the authors.  **SA2/3:** I haven’t contacted any of the authors myself. But what I have done is, for instance, there are staff members who are registered for courses at SA1 or Rhodes, so because they are students have access to those libraries online. So that is something that helps. |
|  | Move on | **SA2/7:** Normally I don’t make a follow up. I just keep on searching up until I find some work I can find more or less the information that is related to what I was looking for or the same. Normally I find that in some cases it can be very frustrating I am telling you because something is exactly what we are looking for. |
| Storage and curation |  |  |
| Storage |  | **SA1/1**: But handling data must be becoming a huge concern because what happens when students leave. Their lab books, I understand you keep those, but now you generate all these data from experiments, images – do they go onto a hard drive somewhere, does the department have something on the network. So if students don’t make the effort of sort of properly writing up these data before they leave it’s kind of lost otherwise. It’s so easy to generate data these days.  LB: I agree, and I think that students all over the world are not taught data management particularly well.  SA1/1: Absolutely! I learnt the hard way – the number of experiments that I had to repeat because I didn’t write down everything, or I lost this or that [29:40] and I had to go and do it all again because I couldn’t trust what I had.  **SA1/1:** That should almost be part of a crash course – or an undergrad course – on data management. And I think it’s something that supervisors don’t necessarily take on board as part of their supervision.  **SA1/7:** LB: what about data storage? Did you ever get any instruction on that?  No, that’s a thing I learnt very much by trial and effort. And that’s where the honours mini-projects were quite good cos it forced you to figure out how to deal with this data.  **SA1/7:** Yes, the undergraduate teaching didn’t teach us at all anything about data. We never – even working with large data sets we never had to do.  **LB**: with your own research, do you use things like Dropbox to store your data? Do you use any online storage or mainly a flashdrive or computer/  KY1/6/1: for me I’m using flash, US. I use Dropbox sometimes if I want to send document sometimes to my friend. I think sometimes I can send them using Dropbox, but for saving my data I use US. |
| “Dead” data |  | **KY1/9:** students publish information in theses and publications and that’s where they end up - on a shelf.  *This is an issue that was alluded to by a number of the supervisors - particularly when the students did not publish from their research (due to time or financial reasons). The repositories were not widely believed to alleviate this problem.* |
| Learning curation | Lab books | **KY2/3:** Lab book, on the other side, is more of a new invention here. Ok, we know the lab book per se, we can formulate one and just write something there, but the official lab book that is recognized is not so old with our students. We even don’t train them much on how to use it, so it depends on you and your mentor. And if your mentor didn’t use one it becomes difficult. We are at the start of this lab book as an official document of the university …  **KY2/3:** We don’t have a system that works within a department. That I’m seated here, and “hello, just check on this result” from the next desk. Cos finding people really at their desks in the lab is next to impossible. So that’s about the lab book. |
| Data processing |  | **SA1/5:** LB: you’re obviously working with huge amounts of data – how did you learn to manage that data?  I kind of taught myself to be honest because no one in this group had done that before – I was the first to go and do high throughput screening and came back and no one in the group had worked with that much data. Even [\*\*\*\*\*] didn’t really know.  **SA1/5:** Yeah, it’s not something they teach you in undergrad. It’s often not something even your supervisor has worked with a lot because I guess it’s a kind of a very modern way of doing research because never before has there been this much data available. So, that’s the other thing. The student is almost, usually, the first one in the group to have the experience, so it’s hard.  **SA1/6:** No, I have no training. And I think that would be very helpful. Definitely, because if someone had told me that this is how you handle large amounts of data, or some kind of guidance long-term, you know, it would help me think differently. Definitely.  **SA1/6**: Because I think, right now, that’s my biggest problem. Because I have large amounts of data but now to process it is so ridiculous. Because no one – even senior scientists – no one has gone through that process of learning how to do it strategically. We all just, sort of, feeling your way around. And it takes a lot of time and you tend to overlook important things.  **SA1/6:** Not necessarily the experiments don’t work … but processing of data is so important and that is where we wash out.  **SA1/10:** It’s even more basic than that – the researchers are not willing to clean up the data to make it available. I mean, who has the time to go back after a research project and tidy it all up so that someone else can look at it? It’s not going to happen. So I’m assuming it will come to us [at the library that hosts the repository]. So we’ve had a really tough discussion with ICTS that they do the storage and we do the curation. So we’re now advertising for data curation officers in the library. So that’s what I’m saying – we do scholarly support. We don’t just do publishing. We do all of these other things as well. We’re appointing scholarly communication officers, digital curation officers, web editors, social media assistants. Those are the kind of skills we’re looking for in the library. The actual data scientist is something that is going to have to come out of the disciplines. And in the national project we’re looking for perhaps a group of universities to build perhaps a interdisciplinary masters, so that people coming through physics, or chemistry or whatever, can spend a year working on data science. |
| Promoting visibility |  |  |
| Visibility | Limits of visibility | **KY1/1:** somebody can take up your idea and they can do the research with much better equipment. But what the university likes is to give a general view of the research, so that you don’t go to the specifics of what you’re doing. |
|  | Being invisible | **KY1/9:** I’ve sent emails [for collaboration] but no one responds from the US. I guess they are not sure who they are dealing with. |
|  | Matthew effect | **SA1/3:** as soon as I say that I’m from \*\*\*\*\* group and I’m interested in this and what can you tell me, they’ve always wanted to be very helpful. And at conferences when I’ve approached people – look, I’ve only been to specialized international conferences, so they do know my supervisor at those conferences because he has very specialized research within the field of malaria, so he’s quite known – so maybe it’s because they recognize him that they’re so approachable.  **KY24:** I am afraid that most of third worlds’ scientists will continue to work in their cocoons and only publish whatever they publish. Unfortunately having had stayed in Britain like you I think I stayed there for 4-5 years its highly unlikely that you will get an academic - a professor - having time to even read work from the third world because the professors out there they are already in networks and know if so and so is writing a paper that is an interesting paper. Not somebody who somebody has never heard who is from the third world. So we have that problem so until such time that all everybody will be open to these ideas from whatever corner they come I think we will still have most of the third world scientists basically being locked in their laboratories struggling with the funds they get and still trying to publish with what they have.  **KY24:** I think it’s a vicious cycle because you have no visibility so you don’t get noticed and then you get depressed so you don’t use your visibility so it goes round and round. |
|  | Becoming visible | **LB**: are you taught about managing your online presence?  SA1/3: No. I’ve read several things on it and tried to implement them, but that’s just personal. No, we’re not taught that at all, not at university in the courses I have done. In fact few [South Africans] are aware of that. We do get an email occasionally about such things from our – I want to call it an administration board, but I don’t know where these emails come from – they float around in the ether. They come from, they’re like general campus safety and things like that – it’s the mailing list – and recently we had one about managing your online safety and security settings and things – especially on social networking sites – and I did read up on that.  **SA2/6:** also enabling staff to become more visible because there is also very strict policy that you only our public relations people are allowed to have direct contact with the outside world. As far as general publications although we do publish in newspapers and so on, but to come with actual hard science.  LB: So disseminating outside journal articles is virtually impossible.  SA2/6: Yes, if you try to involve them its again a very tedious process and I also see that I tend to get ignored when I give the public relations people something people in my position are being ignored |
| Using university resources | Email, storage etc | **KY1/9:** when the university server goes offline you can lose data. Also, when you try to access your university email off campus it is very hard. That is why we prefer to use yahoo or gmail. |
| **Data engagement tools** |  |  |
| Repositories |  |  |
| Uses | Theoretical | **LB:** the university has a repository to put information you’ve created online. Is that something you are familiar with?  KY1/4: Yes.  LB: and you’d consider putting your information in it?  KY1/4: Definitely  **LB**: what about putting things in the university repository? Do you think that’s a good idea?  KY1/6/1: no hesitation. It’s a good idea. So whenever you go and contribute to the good of science you do something in the domain of science it’s not fair to keep it.  **LB**: do you think the repository should be more open?  KY1/8: I think information should be accessible. Any time somebody wants it. but the university has to pay for access, for being offered this access. So maybe it wants only to pay for its staff and students.  LB: but the digital repository of theses – should those have similar limitations or be available to everyone?  KY1/8: My opinion is that they should be available for everybody. That people should be able to see the theses that are produced in this university and they should be readable everywhere in the world. |
|  | In reality | **LB:** have you ever used the SA1 repository?  SA1/1: What exactly does the SA1 repository comprise of?  **LB**: do you use any other institutional repositories?  SA1/2: Not really. So once – if you’re no longer a student there you can’t access that.  **SA1/4:** I would consider using it - that would be fine. I don’t mind if my PhD would be accessed by anyone else – that’s not a problem. When you’ve finished your work and you’ve gotten out all the papers that you need then other people can see what you’ve done.  **KY1/8:** the online capability only works because I go through our server. Because if you go through, if you are in a public café you can’t go through to some of the documents.  **KY1/9:** I think the repository is more to increase the visibility of the university than to actually share.  **KY1/9:** the university encourages uploading to the repository, but doesn’t offer copyright protection.  **KY2/15:** The students have been examined … and there is nothing much you can get from a thesis. |
| Concerns |  | **SA1/10:** the direct contributions to the repository have not been great, but we haven’t promoted it – simply because we don’t have the capacity to manage it. So at the moment what we’re doing is migrating all of our existing ETDs – existing research that we have in the library that we’ve been digitizing. … and we’ve been migrating those into the open SA1 repository. Uh, the response has been quite remarkable. I get requests every week to take down material. Students didn’t realize that it would be made public and have a whole range of reasons why it can’t be made public. I even had one emailing me last night to say that they would be in \*\*\*\*\* until Friday and that they could come and speak to me about the reasons for it not to be made public.  LB: these are theses?  SA1/10: Postgraduate theses, so the research ethos is basically flawed. People are not being well-supported in producing their research. That’s why we’re so concerned about putting in this research support layer at postgraduate level, because it’s been very evident. It’s been a remarkable learning curve for us. Absolutely amazing.  LB: and why were they not keen on their work being shared?  SA1/10: Mostly it’s been 3rd party copyright issues and they weren’t quite sure how to handle it – and obviously the supervisors weren’t either – and now it’s out there. We’ve had a couple, one or two, who are planning to publish a book and on further investigation have indicated that the publisher hasn’t refused to publish the book because it’s already available online, but that they would like to have it suppressed for a couple of months so that they can get their book out. And we’re saying, actually the IP policy of the university doesn’t allow that. The policy is very clear – the author retains copyright, but the university has the right to publish for academic purposes. It’s very clear, and that’s what I’m responding. But this is what I’m reporting to all these committees. If students are coming to ask me to take these things down there’s something wrong with the research support. …. That people haven’t quite realized that your online persona becomes the future of your academic career. You have to manage it very carefully. And suddenly there’s this panic. The reasons have been quite wide-ranging, but it’s mainly 3rd party copyright, publication. I’ve had 2 supervisors making requests on behalf of their students. One acknowledged that the data hadn’t been properly anonymised, and that the interviewees could be identified if we didn’t change something. So now I have to get special permission to change something. The other is just saying: take it down there’s a mistake in it. And I’m saying: ok, we’ll put it under embargo for 6 months, but you need to sort that out. Who’s going to acknowledge the change – the guys been awareded the degree already. You actually don’t have the right to make changes. I don’t, and this is what ‘m reporting to them. I can’t change anything – I’m only the repository.  KY1/6/1: because in some points most of students wanted to bring their thesis and after giving their thesis to the university still they can publish from some part of the thesis. But that is not the case in the field. Once you submit your thesis it becomes now difficult because you have to publish all the papers you can publish. Once it is finished it should not be possible for the student to publish something which is also included [in the repository]. So this is a challenge. |
| Awareness of utility |  | **SA1/1:** there’ll be details in that PhD thesis that are really important but aren’t included in the publication for whatever reason, but that are helpful in knowing how to do the experiment properly. Talking to people, emailing them, cos there’s this stuff that’s not communicated. That’s been a huge problem in my project this year. Kind of threw me off for about 6 months was investigating the inner filter effect in fluorescent work, but it is so poorly detailed in publications online that it’s amazing - if you know about and your looking out for it – how many papers are being published that are saying actually all of that that was published previously can’t be trusted, or is wrong, because people weren’t correcting for this particular effect. |
| Altmetric tools |  |  |
| Not much in use | Focus on papers | **KY1/2:** Well, the most recognized is the peer-reviewed journals. The stress is on that because it has to be recognized. |
|  | Not of use | **KY2/1:** we have no time to learn such things  **KY2/3:** It’s about is it important that I should communicate on a chat platform. What’s the topic, will my opinion be honoured, who are these other people in the forum, you know, so there is a lot of question about the importance of going in to do anything.  **KY2/4:** So have your profile online, but try much as possible to have networks with other scientists in other universities. Unfortunately because of the situations back home with governments not being able to promote research due to lack of funding or very little it, the sort of research we are able to do is not much as in other parts of the world. |
|  | Not part of promotion criteria | **KY2/4:** But the problem is if you have such views [sharing data to benefit society and not to solely accrue publications] you will never get promoted. A few of us are strong enough to say we don’t need it and don’t need to be a professor in name. I am not changed by society. But there are only a few who can stand up to it and say I am convinced, and I want when I am writing my resume I want it to show more applied work I have done than just the articles I have written in international journals. I end up writing to show that I am not stupid and still academic if you want to classify me as that. |
|  | Not aware of what is available | **KY1/3:** You know, ok, it could be, you can only work with that which you are able to access. Maybe there could be some other sources which could be applicable but which you are not aware of. |
|  | Not interested | **LB:** do you use any other online data sources? Aside from commercial information – discussion forums?  SA1/1:No, nothing that involves other people. Maybe occasionally forums – particularly if I’m having a technical problem, like with a microscope I’m a bit worried about the inner filter effect and how much that’s going to affect my data. I might do a search and there might be a microscopy forum. I know for synthetic organic chemistry there’s lots of these forums. People try these different methodologies that haven’t worked. So in that sense these fora may be a useful source of information. It’s not really something I’ve explored. But no social network, Twitter, Facebook, no chat sites. I guess it’s more limited to email for those personal connections.  **LB:** With Academia.edu, do you have a profile or do you just look?  SA1/3: No, I just look  **SA1/6:** No, I don’t [use any altmetric sites]. I never got into it I guess. For me it’s not so important. It should be, but, yeah, I get so involved in my own space and my own work. For me just to get used to the idea of, you know, probing different things is like, ah no!  **SA1/7:** I tend to go on to the websites. I try and go on at least once a week and see what’s new. But I’m not very good … I don’t like social networking. |
| Capabilities |  | **LB:** is there any interest in disseminating outside publications – contributing to databases, chat sites, online forums?  KY1/3: [sigh] I think that is not going to score high.  LB: really?  KY1/3: No, I don’t think that’s a norm here. Other than publications.  LB: is that mainly because of the priority set on publications, or because people don’t have the time, or  KY1/3: Even the know-how. Time is definitely not questionable. For reasons our days are not 24 hours. I think they are less. Because you just find the day is gone. And looking back, what did I intend to do and what did I actually get done? So time is just moving up and … but, some of those that you were talking about, like chat platforms, it’s not everybody who knows about this. And then the issue of laptops and computers. Yeah, we have advanced – I cannot say we are just there, we now have it but how many people get into that net and they’re sole objective is to get into some chat whose topic is some global issue. Very few do that. So I think it’s the know-how, and they don’t know that it’s important to do that. So until you capture the importance you can’t get them to do that. Email is a mode of communication, but even to date, people take one week before they check their mail. No response |
| Professional networking sites | No benefit | **LB:** do you have any professional profiles yourself?  SA1/4: No. but I need to make a LinkedIn account – I’ve been meaning to make one for ages, but I just forget or I don’t have time.  LB: but you see value in having one.  SA1/4: Yes  LB: and any other accounts, like Twitter or a website?  SA1/4: No, I don’t really like Twitter, and I don’t really know what sort of website I would use if I – do you mean making your own website – nah, I wouldn’t delve into that.  **KY1/1:** I got a LinkedIn profile.  LB: do you find it helpful?  KY1/1: No, it’s just … I keep on getting a message that “so and so” would like to connect with you and I keep clicking yes, yes, yes. “So and so” is following your profile, but what next – there’s nothing much.  LB: so no benefit?  KY1/1: No, I just have it because other people have it.  **KY1/4:** Yes, it’s not that useful.  **LB:** What about LinkedIn?  KY1/3: I’ve only been seeing it, and I don’t know if it is because of ignorance or what, I’ve never used it.  **KY1/8:** I have a profile on RG.  LB: do you find it has contributed anything, or is it something you had because you felt you needed to?  KY1/8: I can’t see what it has contributed to me. I don’t know why. They say it is another way of measuring how successful a researcher is. And they say that normally I am better than 90% of RG users, so I’m wondering how that is good for me. Because I don’t see any good news coming out of it – someone saying we want you here to do this or that, or give a talk. I’ve never seen anything.  **KY1/8:** Why would I look up somebody on RG? Can you tell me why I would look on RG or Google? You see, what I want is just information. I don’t need individuals, just information.  **KY24:** I think you can understand why this kind of traditional approach where you do not actually see the benefit of it, of exposing yourself, you don’t see anyone walking into a profile saying hey this kind of person is the one who needs to do the project. I think it goes to the core that I spoke about, does industry get interested in what you are doing and is there anyone out there that can say so and so is doing this and therefore we need to approach and give him or her this project.  **KY2/14:** [in response to question of benefits of being on ResearchGate] Not really besides from students outside of the universities asking, they send me emails and say I have seen this and if I don’t respond to research gate they send me emails about how to do things. Some have sent an email especially if they haven’t heard from me because I put my email at the bottom of the publication and they ask questions. That’s the only thing that I have seen. No other serious person has come to me or shown interest in what I have done.  **SA2/3:** because for me there is this Twitter, baboo and there are so many I haven’t been able to understand which ones are actually useful. |
|  | Time to engage | **SA2/7:** I think it’s the time. I think it’s the time. I think it’s because of the time primarily. I’ve not to say it has not been helpful but I think it’s the time. |
|  | Access to posted information | **KY1/6/1:** And also Research Gate sometimes they send me a message. And also in RG, I’m registered there and when I open sometimes they inform me about new journal paper that I’d try to see if it is interesting to me and I’ll try to download. But when it is new it is not easy to get it, so I just leave it  LB: so they inform you about a paper but then you can’t access?  KY1/6/1: yeah. And it looks interesting but I can’t get to it.  **KY1/3:** ResearchGate I’ve been trying but I’ve not been able. Whenever I’ve tried to trace a paper and then I bump into ResearchGate I am not able to go beyond enrolling into it.  LB: do other people have this problem?  KY1/3: It’s a problem with most of the students I interact with here. |
| Websites | Having one | **SA1/3:** We actually don’t have one because for a while we haven’t had someone with the expertise to do it. And my supervisor hasn’t got money to pay for anyone professional to do it. Um, the other groups I’ve been at where they do have one, someone in the group does it and manages it and that’s their job – like I clean out the waste in the lab – but they have that skill set. We don’t have anyone with that skill set. And the other groups in the department that do have one they have several people or their supervisor themselves manage it. It’s a nice thing to have.  **LB**: is it something you’d consider?  KY1/4: No. Maintaining it would be a problem with all the work that I have and all the lab work. |
| Blogs/discussion forums |  | **SA1/4:** I mean you can never really trust what you read in forums and blogs and so forth. Although you can’t always trust what you read in papers though.  **LB:** Do you use any other types of information that aren’t directly related to peer-reviewed publications? Aside from Wikipedia do you make use of blogs, of discussions forums?  KY1/4: As scientists blogs not really. Nor discussion forums.  **LB**: do you use any online blogs or methodologies?  SA1/6: Methodologies yes, I do. I follow the lipid blog quite often.  LB: do you find that helpful?  SA1/6: Yes, definitely. A lot of experience from other people – because it’s on that blog – whatever they’ve gone through, and you ask questions and that kind of thing. Yeah, that’s quite helpful. So that’s mainly the lipid blog. But the other stuff that I’ve done, not that much.  LB: do you have a preference of who you’d listen to on the blog?  Well, yeah, I do scan, but usually I’ll wait for the expert – who’s actually got this blog going – for example the [Thane lab] they’ve done a lot of work, so I’ll mainly follow what that supervisor puts on – whatever it is. And people within that group. But people from outside I’m not so sure.  SA1/6: Yeah, that I’d be happy with that [Figshare] because then you can say this is what it means and then people who are interested can comment. You share information that way. That’s more structured. More useful.  **LB:** do you make use of blogs or discussion forums?  KY1/6/1: for research, no. for me no.  KY1/6/2: me neither |
| Mailing lists | Too much information | **LB:** so do you sign up to a lot of email lists then to get information?  KY1/4: Not really, because when you sign up … you see, I’m working on one stream, right, and if you sign up they can bring you for cancer, plasmodium, bacteria, that will be a lot of things to read.  LB: so you feel it would be overwhelming to get all of that?  KY1/4: Yea, you’d rather go to the site and actually look for what you want. Rather than everything coming in and you have to sort out. It’s too much time. |
| Twitter |  | **LB**: are you interested in using Twitter?  KY1/4: No. you see, the thing about social media is that it is just not the “in thing” because most guys on social media are either teenagers or people who have something to vent out – anger or such things.  LB: in the UK it’s the opposite – academics use Twitter to promote research projects and conferences, but it seems that in all the labs I’ve visited in Africa Twitter is not something that is being used.  KY1/4: In Africa Twitter is more of social. In fact as a scientist if I do my research and stand and say I got my information on Twitter they would just tell me to go away. It’s nothing.  **LB**: and neither of you use twitter. Is that because you don’t think it is useful for your research, or you don’t like twitter itself?  KY1/6/1: In fact for me, I’m saying for twitter it is not easy to get some information relative to the research. Because most of the discussion which are there is concerning social. So for me I’m doing chemistry. But I don’t know if it is possible. I cannot see a need to go to twitter to get information because I cannot even trust it.  **KY2/11/01**: I don’t think the information on Twitter is valid. |
| Gaining IT competence |  |  |
| Learning about IT | From o/s experience | **KY1/2:** Personally I do look at that. I am interested in that. I gained interest in some of these when I studied in Canada. So I found out that was the easiest way to get information. |
| Formal training | For undergrads | **SA1/1:** I have to thank my supervisors because they give me a very stable environment. I can go to them with my wish-list, my requirements and they’re usually very accommodating – sure we can get those chemicals, sure we can invest in that piece of equipment. We can pay for you to spend many hours at the microscope – where you pay an hourly rate. Just kind of “knock yourself out and do what you need to do”. That kind of trust they’ve placed in me has been very empowering – terrifying at first. You think, oh, all this time and money is – sort of might not come to anything. So, yeah, both of them \*\*\*\*\*, in particular as my primary supervisor has been very helpful and encouraging and helpful in an intellectual level as well as making the research possible. I think at [SA1] we’re quite lucky – it’s a pretty organized, well-run institution.  **SA1/2:** No, not really. I think the training that I had I received from my previous research environment [KEMRI] - that is where I learnt even to navigate through PubMed. That is where I learnt how to. There is another, it’s called Hinari, it’s also free, I think free for low income settings. So that is where I learnt how to go about journal access and so on and so forth. None of this was taught in undergrad.  **LB:** do you know if the IT department teaches the undergraduate students about how to access information online?  KY1/2: I have seen courses like that – advertisements – but it is not part of the curriculum. But the problem nowadays is that most of them seem to want money to train. The other thing is the library section – they organize for the students how to access the journals, references, what kind of reference methods should be used. And we organize with them and bring people from IT and library to talk to the students.  LB: so that is mainly about journal articles?  KY1/2: Journal articles, how to access, how to make references.  **KY1/4:** What happens, we have a unit on research. There you’re taught everything – how to access these online journals, how to use the journals, which ones to use, which ones not to use.  **LB:** so, talking about digital students. Do the students get any sort of training in making use of online resources in their undergraduate courses?  KY1/8: Yeah, they go through library training in the first year. So you find they are very good. In fact, the other thing I noticed is that there is a lot of learning that students train themselves how to use the internet with time. But they are given basics by the computer centre in the first year. Otherwise they continue learning and using it together, learning more and more.  **KY1/10:** we have had training only with MoZilla, but we can’t use that when the Internet is low. |
| Informal training | Peer learning | **SA1/3:** I think that the onus is on you. I asked around the older researchers when I first started, and asked them what they use and asked them what their experiences were.  **SA1/3:** In terms of talking to peers, yeah, I’ve done that a lot over the years. Still I have a lot of friends at the same level as me and we talk about things, we review products, we discuss.  **LB:** did you learn a lot about data access and data management from your peers as well?  SA1/4: We learnt some in undergrad – because we had to do 3rd year projects – writing etc.  LB: would that be mainly PubMed-based?  SA1/4: Yeah, getting research articles and reading them and trying to write a report of that. But then since I started postgrad, yeah, I’ve learnt from my peers, and part of it just going through it by myself – writing a thesis in honours was a big step – gathering all the data.  **LB:** are there any courses on how to use professional networking sites, twitter and so forth, or is that kind of peer learning?  KY1/2: We learn it from our peers.  **LB:** and things like developing an online profile or making use of alternative forms of information?  KY1/4: No, I think we are the digital age so some of these things you just know. You pick up.  LB: do you pick it up from your peers or from your supervisor?  Peers mainly. Because things like LinkedIn you hear it from your peers.  **LB:** Did you get training in your undergraduate on using online tools? Or did you mainly learn from your colleagues and peers?  KY1/6/2: for me, I mainly learnt from my colleagues. Also recently our sponsors organized for us a workshop on e-resource training. So I got information.  LB: and that was organized by the university?  KY1/6/2: no, not the university – the sponsor. |
|  | Mentors | **SA1/8:** Ok, that’s interesting that you say that because I’m probably not – I think I’m lacking a bit in that area in terms of being really up to date. What I’ll tend to do is I’ll search for things of interest but I won’t actively go out there and just have a broad spectrum. From time to time I will go and search, but I will actively go and I’ll be looking for something. It’s not like I’m actually browsing.  **LB:** with regards to your students, do you think that they have good IT training, or do they kind of learn while they’re working? Do they get a lot of IT training in undergrad?  KY1/1: No, they don’t. they don’t get. If they’ve got anything it’s up to the supervisors. Like now, there’s another project. [shows thesis]. This was for another student who I developed. I had to give the student the computing skills. We wanted to develop something for the department – a searchable database. Because of my background in the computing I had to train the student myself in those programming languages so that he is able to get those things and write this programmes and the rest. But for him to produce what you are seeing there I had to give the student the IT skills. I don’t think they’re given IT skills formally.  **KY1/8:** OK, that’s what I’ve noticed [that the students are learning from their peers]. I hear them talk digital language. Me, I know very little but I can see our students are very good now.  **KY1/8:** I wish I could have such competences and I don’t know how to even, I don’t know how to get those competences. I wish really to know now. Because without digital competence it is very difficult to function. |
| Teaching competence |  | **SA1/3:** we have undergraduate students with no English or computer literacy, and no experience in critical thinking.  **SA1/12:** we have a huge diversity in the undergrad backgrounds that has significant impact on how they engage with online resources.  **SA1/12:** how can you expect someone to master the computer when they don’t even understand the basics of word processing. Or, even if they know how to use Google they don’t know the right phrases to use? |
| **Research Environment** |  | **SA2/7:** Yes it’s tough and tell that to someone who’s in America [about the challenges of working in a LMIC], they would say: what are you talking about? |
| Culture of sharing |  | **LB:** Would you share processed data or would you prefer to always have it in a journal article?  SA1/3: Well, that would be up to my supervisor. Because we sign MOUs, so that would be up to him.  **LB:** there seems to be quite a lot of interaction between everyone. Do you think you get a lot of learning from your peers?  SA1/4: Yes. Especially in group meetings where everybody presents their work and everyone can see exactly what they’ve been working on. And we more than likely learn at least one thing in a meeting that we haven’t known before.  **SA1/6**: I think the thing with South African scientists is that people sit in isolation. And they’re rather struggle on their own than collaborate and get involved and start talking, you know.  **SA1/9:** So one of the guys we worked with in Botswana – he was actually Tanzanian (and there was an issue with that as well) – but he did a PhD in secret through a university in South Africa. Because he had a manager – his director – was intent on keeping everyone down here. This guy was just a real go-getter, and incredibly smart and already his manager had started moving and peripheralizing him. So he did a PhD through the Uni Pretoria. How he did that God alone knows. Then he came back and eventually one day said guys I’ve just graduated and I’ve got a PhD. And then they couldn’t deny the PhD, and there was a DVC in the university who was a great guy and he acknowledged the effort and then he – the DVC – promoted the guy.  **SA1/9:** Yeah, so I think there’s something in terms of the trajectory around confidence – power, confidence and openness – that really is worth examining in our context. And I think a lot of researchers in Northern contexts take a certain kind of confidence for granted in sharing. And I think for some of the researchers that we’ve been exposed to – I’m speculating here – but I could imagine for some of them at least – the openness is made more difficult in that they are – their sense of agency is undermined within the institution itself.  **KY2/2:** We don’t even have a tea room. And we are scattered in so many different places. When I first applied here they wanted to put me in one of the new buildings and I said what I am going to do there? … I want to be with my colleagues. |
|  | Research culture | **SA1/9:** the research agenda itself is struggling for survival in a lot of African institutions.  **SA2/1:** I think that is what we lack [a culture of research]. And I don’t necessarily see us making big gains in changing the culture of doing things. You realise that that is always the case that things are slow to change. We like things the way we’ve always known them. So if you’ve a level that you’ve operated on for a long time and you try to improve on that platform, and you may be raising the bar, but if you’re down there it’s going to be very difficult to make reasonable progress. I think sometimes I even sympathise with administration and everyone involved. You know when you inherit challenges it’s difficult to move on.  **SA2/1:** We also go to conferences which gives us the opportunity to present – national and international. But of course the university – what I lament is that we don’t have that platform to make it collegial and to encourage idea exchange. And quite interestingly if someone walks in from Germany or France we are all invited – big banners are put up to say come and listen to this person - but there is very little done to actually say that there’s someone from within our institution who can say something. It’s probably a perception of ourselves - that we are not doing much - but when its someone from France then they can give a good talk and we all need to go and listen. But I walked in last year, for example, and no one has asked me to give a talk.  **SA2/10:** Initially no but with time there was some significant improvement. It’s a fairly new university and it takes time to build a research culture. In the past there was more attention on the teaching and learning programmes and not much on the graduate training and research. But it seems to me that in the last few years there has been a change.  **SA2/10:** I think it’s the research culture because there are times when you have seminars and very few people will turn up. And there are some people that you think would like to see this type of data, to benefit and who could tap into it for their own research purposes – to advance their new research questions. But people don’t show up but I think the research director we have now is pushing boundaries and he’s going to organize more research seminars and at times he supports financially for people to organise seminars to expose what they are doing with their colleagues. Maybe also invite outsiders to come and participate as well. so in that way things will be changing.  **SA2/12:** Yes and now there is this problem of the publishing and getting money for publication. On one hand it’s very good because, for example, I attend conferences because I get money from the publications but on the other hand it’s making the focus limited because now I can say of course I have my own views and ethics is more important than money. So the way it is now they want to change a lot. They changed it a few years ago they said that if I publish with a student then I get all the money and I can decide what to share with the student then they changed it and now if I publish with a student I get half of the money and the other half is not given to anybody. Or if I publish with 2 students then I only get 1/3 of the money and the others nothing and that is not fair because earlier when I had a student and I published with them then I would get the money and share half with him because I thought he contributed half. But I know that most of my colleagues weren’t doing it. So students were complaining that they didn’t get the money, so they decided not to give the money at all. But what is the effect? It’s better not to publish with students because you will get all the money. So there are a lot of things that are not helping the research as it should be. |
|  | Institutional support | **SA1/10:** So, you know, there’s actually an awareness that scholarship has changed and we need to provide new services in the library to support this kind of scholarship. New infrastructure.  **SA1/10:** We do the support of scholarly communication, and that’s just one element. But we would like to see even in a monograph all the documentation around the monograph – the permissions, the copyright. Those are things that scholars don’t think about. They think if you put something out in open access it’s free and anyone can use it. But what about the licensing – those kind of issues. |
| IT support | For connection problems | **KY1/2:** Yes, actually whenever we have any problem with the computer you can go to them and they will always come and help.  **LB:** and what is the IT support like at the university?  KY1/6/2: they can help you out  KY1/6/1: about the connection but not the computer. If you have a problem with the internet connection you can go and see them. But if you have a technical problem with your computer then you have to go outside the university.  LB: so you have to go to a computer shop?  KY1/6/1: in that case, yeah, because the university cannot help you.  LB: and you can’t print – you have to print somewhere else?  KY1/6/1: yeah.  **KY2/12/01**: we must pay for IT support.  **SA2/2:** Sometimes - they have the help desk line but sometimes you log in something and they don’t respond. You have to phone them at times, whereas they’ve put the helpdesk system on the internet.  **SA2/12:** We had a problem here for IT support because the experts are very few. Much less than what are the needs, so even trying to find a person who can solve a problem. Like me, I had a problem running some computers that are connected in terms of monitor and keyboard – not in terms of sharing processors – but all the same even with that there is only 1 person who can help me with that, and that person is helping with lots of other things throughout the university, so it becomes difficult to get the help when you need. |
|  | Other assistance | **LB**: what about IT support and information about accessing online information?  KY1/1: I think it’s nonexistent as far as, occasionally the department keeps mentioning that we need to put our information on the web and I think that, um, I’m in a bit of a special situation because of my background on the web I’ve been able to be integrated into the IT, the so-called “web champions” – those who can do something for the department and for the college with the IT and I’m one of the people who’ve been given access. I also maintain a number of websites hosted nationally and locally because I’ve got web programming skills. So anything Javascript and myskill database and so on. I learnt it on my own, so when the university learnt that I’ve got those skills I was integrated. But, ah, the problem with the IT is that the staff keeps being changed. They are taken into managerial positions, this one at the top they are suddenly taken to the government IT, the directors or whatever you’ll hear they are not there and that there are new people. So now the kids on the ground, you hear colleagues saying that the kids from IT do not know how to configure their system and the rest. So they come to learn on the job. Those who are there earlier – late 90s and early 2000s – they are quite skilled, but the ones that are there, I have my doubts. I don’t know about others, but I have my doubts. But that’s the situation. |
| Internet provision | Connection on campus | **SA1/3:** Postgraduates have uncapped internet. It’s really fast – the fastest internet in [South Africa] practically.  **LB**: how do you feel about working at SA1? Is it a good environment?  SA1/05: Completely – especially with the progress that’s been made in the past couple of years – you can’t really do anything without good internet and the internet’s become really good. And they do provide a lot of access to the journals. Occasionally I come across a journal I can’t access, which is a bit frustrating, but by and large it’s fine. Especially because they support a lot of science journals – the good science journals which are the ones I’m reading anyway – are supported. It’s only some random little foreign ones sometimes that you don’t have access to.    **LB:** and the download speed?  KY1/1: I think, ah, I think it’s fairly ok.  **LB:** and the internet speed for downloads?  KY1/2: So far it is ok. The only problem with that is that sometimes it is down, sometimes it fluctuates. But when it is on it is quite good.  **LB:** and the internet connection, are you happy with the quality of the internet connection, the download speeds?  KY1/5: The university? Yeah, I’m ok with the wireless and the cable. But sometimes if the power goes off the net goes off also.  **LB:** with regards to your on-campus internet connection. Is it adequate for uploads and downloads?  KY1/6/1: sometimes  KY1/6/2: sometimes, but most of the time it is ok, but sometimes it delays.  LB: like when the electricity goes off  KY1/6/2: of course, when there’s no electricity then you don’t have wireless. And even when the electricity comes back it takes some time for it to stabilize.  **SA2/1:** No, no, no. So that’s also again because of, you know, to be honest there is some. We have problems with internet here. So we have access to internet. I hear now they want to put in wireless – we don’t have at the moment - although I understand the students in res have limited wireless access - but now they want to invest in wireless so again it comes from the wires and here and there you get disconnected. Sometimes it’s to do with a university-wide problem or it can be related to the building so I always carry my modem and if I see nothing here then I will back up. So how much can we do? So we have that challenge and last week we were off.  LB: The whole week?  SA2/1: Yes. So that means you can’t upload the papers you want to submit.  LB: or even back up your data?  SA2/1: so yes, we have our challenges!  **SA2/1:** Yes I remember when I was in the US at the airport you could just connect to the internet. In the US maybe it’s a right to have access to internet, but here it’s just a challenge to access it. It’s a huge inconvenience I mean one day without internet and sometimes it’s a week – you can imagine the implications. There’s traffic in my [mail]box from people outside the university. They don’t know that you must actually have a modem to see what is going on. It’s a real challenge. Having worked at 2 institutions like these I’d say it’s not too any worse here. But I mean I was a student at Rhodes university and also as a postdoc at some point and there you find it is much better. The traditionally advantaged institutions in South Africa are still advantaged. The disadvantaged are still disadvantaged and that is the fact of the matter. The government may be willing to address the gaps, but there are still gaps.  **SA2/1:** Yes there is commitment, so you can’t actually talk about a lack of commitment because there is commitment but also I think it’s things that you don’t expect that crop up because the system has not been like that. So, for example, we do have internet access but we have to maintain it and keep it and maybe understand that it’s important that we have it every day. Maybe that’s not the same level of understanding that it’s an essential service. Especially once you get people used to it. I mean if you told me that there would be internet service on Wednesday and Thursday and not on any other day then there’s always a way to structure things around it. But when you have it every day and suddenly you don’t have it there is a problem for someone with a schedule. So that’s exactly the issues. And part of it is when you look again. You talk of culture and I think it’s more the culture that needs to change – the way we do things and to realise that its every small bit that makes the whole. These things must be put in place. Not just the so-called big items on the agenda. It’s every little thing.  **SA2/7:** so when it’s there the internet, its fast enough but now I don’t want to say most of the times but its times when we don’t have access to internet.  **SA2/12:** Yes and we had to prepare a project proposal for budget with my students where they must hand it in on Monday. Last week I said they must do the literature research and I would do the proposal. But then they couldn’t do it because there was no internet so I had to postpone everything a bit.. |
|  | Surrounding infrastructure | **SA2/1:** Yes and part of it – I wouldn’t necessarily think it’s government or political - but if you are going to start a tractor in 1970 – even if you bring all the parts that will make the engine work there’s always something you’re going to have to deal with so. I think that is what we are dealing with, so it’s a system that has been ... It’s like leaving your house without someone occupying it for some while, and then you want to come back and make this precious place of value – you’re going to have to do background work. I think that is what we do on a very large scale. Working in a previously disadvantaged institution carries with it that burden and must deal with background. We are addressing issues of the past while trying to make this a modern institution all at once. So it’s a real challenge and if you not prepared for it you will give up.  **SA2/7:** very few people will be coming from afar to come and do a post graduate studies with us here.  **SA2/10:** In terms of technical support in the lab, it’s not there. At time we have a plug isn’t getting electricity and to have someone to come out and get it fixed may take a week so perhaps you need to move the freezer and send it to another building, find a plug and hook it up for a while. So sometimes the plug just goes dead for a day and there’s nobody on site who will come and find out what the issue is.. To make a report may take a few days. In the interim you need to find a solution to save the biologicals from breaking down and deteriorating. So those are challenges. I find I go to Johannesburg to get stuff, but it speaks to the culture because when you understand what it takes to run research as a programme and to put the bits and pieces together such that if you’re in the lab you stay in the lab because you’re not worried whether things will be supplied or not.  **SA2/11:** This is a challenge because the university doesn’t offer a start-up fund for equipment. … I would need to pay bit by bit and one by one. When I have funding then buy one piece of equipment and maybe after 5 years I would have my lab.  **SA2/12:** I have been at [SA2] since the end of 1997 and I started because there was a lot of personal problems with people still thinking the old way – that you could not start this type of thing in a black university with black students. all those type of nonsense but then I got a student, but basically I did not have computers - we didn’t have a single computer. Not even one to check the internet. So I got a student who was very good and he said he wanted to do his post grad here with me and I said but I don’t have anything to offer, so I think I am ready to recommend him to another big university and he said no, I’ve checked on the internet and I know what I want to do and I want to do it with you because they don’t offer what you are doing. I was lucky because I was attending a conference and I explained to one of my colleagues in Italy that I was very unhappy because I had this student is good and I didn’t want to lose him – but without a single computer …! And that colleague was a very open minded person he told me no you can’t say no to a student, so he said I will help you and we made some calculations on the computer for the lab. So we were making the calculations through email in somebody else’s laboratory, on their computers. And that went on for a few years and then we ended up with the first 4 computers from NRF, and then I got these ones later. And after that student finished his PHD he was the first PHD in our department and so far it’s the only one. We did not yet get another PhD. We have some PhD students, but no one has finished.  **SA2/12:** Yes for several reason when I wanted to start in the late 90’s it [computational chemistry] wasn’t so widely spread – even in South Africa. There was one at SA1 and they started group there, but even when I was trying to get journal articles through the interlibrary loans it turned that not even the big universities were subscribing to theoretical chemistry journals and then I had to ask other people in other countries to send me articles. So it was general that the field was still taking off and obviously with a university like this it was even more difficult because of the conditions, the limited resources. What I tried to stress is that it is actually a type of research where human resources are more important than other resources. The other resources are not so expensive because all you need is the computers and the software and once you buy the software it’s for the whole university so that isn’t a problem. Then we just need computers - we don’t need a special infrastructure we don’t need big equipment like in the analytical department where you need a lot of money for just one piece of equipment. They’re needed, because analytical chemistry is really important, but in my field it’s a lot easier in terms of resources because you need human resources. But with that I am alone.  **SA2/12:** we can develop for us but this area is a scarce skill area all over sub-Saharan Africa, so we could be a good African university reference for other African countries. We could actually put the effort of doing it – of developing a centre but there not enough confidence. Actually there are a couple of reasons. One is that there is not enough self-confidence as a whole for the university because we are not as strong as SA1, so we don’t feel that we can try this. And the other thing is that I would be the one running it, and I’m a woman and I’m foreign. I fortunately have some influences with some people but in a whole you can see that there are still left over misconceptions whatever you want to call it. |
|  | bandwidth | **SA1/12:** Even though we have good internet here, we have a bandwidth barrier that makes it difficult to skype.  **SA2/1:** Yes we do I had a Skype tele-conversation and I sit on the South African society of biochemistry and molecular biology council. So I should have been on Skype now but since morning – this is a new laptop that I’ve got and I can’t download Skype. For whatever reason, so I had to send them an email to say if you want to engage with me you have to call me on my cell phone.  **SA2/12:** Like I said you can get around it with a lot of patience - waiting when the internet is not strong enough to allow you to download things. But they’re always promising us that things will improve, but they are promising one year after another but maybe it will improve.  **SA2/12:** It is a difficult problem and I think we just need broadband or something to be able to support all our needs. And the problem is that it’s also very difficult to control the needs – to convince people to limit on certain type of uses and to allow the use only for work because students will just download everything – movies and things - and that keeps it busy so we see we have better usage after hours. Some years ago when I wanted to submit an article I have to stay remain after 9.  **SA2/12:** It’s very painful because you have to wait, and sometimes you are there downloading and it has already taken you half an hour and it is almost close to finishing and then the electricity goes out. Maybe for one second, but you have to start all over. And then you feel so unhappy.  **SA2/12:** But where I find it difficult is people don’t understand our situation – it’s not bad will, it’s just not being able to figure it out – is for conference registration. Sometimes trying to explain to the conference organiser that I am not able to put my data online because for some reason my system stops – it works for 2 entries and on the 3rd entry it stops. So, I have tried it several times, I’ve tried it from other computers on campus, and now I give up. Please help me! Trying to convince people that we are really having a problem of this type is difficult. They cannot imagine what the problem is – they’ve never experienced it. … That is because those sites are heavy. They have lots of fancy things what are very beautiful, but then also the templates you have to fit in things and for some reason if the system is weak the template will not respond. |
|  | electricity | **SA2/12:** what happens is the server goes off – the university server - and sometimes it is not able to restart so that means they have to work without and then we remain - first its 2 to 3 hours without electricity - and then days without internet.  **SA2/12:** Yes we end up spending much more time than it would be in a western country. But even the power failures, for example, they are not part of data sharing but are part of the vicious circle.  **SA2/12:** I am organizing a conference – but try to organise a conference when half of the time your internet isn’t working. … Today I am not teaching and I want to set up things for this conference that is coming, and I’m already late. So I set aside the whole afternoon for this, and now the internet went off around 12. Tomorrow I am teaching in the morning and running practicals in the afternoon. I don’t have this time and today when I had a good opportunity there is no internet. |
|  | Proxy servers for off campus | **KY1/2:** I think we still need more, because there are not many journals that the university has subscribed to, and you see we can only access it through the university line.  LB: so you can’t access it remotely from home?  KY1/2: For example, I have a wireless at home and every month I pay KS4000 and that means I can download as much as I want, but through the university because the university has subscribed, I can’t access it from home.  LB: so you can’t put in a proxy?  KY1/2: I’ve tried, but it failed, so I gave up [24:38].  LB: so basically all your academic work – your downloads and uploads – have to be done during working time?  KY1/2: Yes, I download most of the work here and then do it outside. You can do that I know but it is easier when you are within the university as when you are outside.  **LB:** and what about accessing journals and things when you’re off campus. Do you make use of a proxy to make use of the library materials?  KY1/5: When I’m off? In the house? It’s not possible. The proxy is only viable when you are within the university.  LB: oh, so you have to do all your downloads and uploads while you are on campus?  KY1/5: Yes.  **LB:** and can you access the university library off campus through a proxy?  KY1/6/2: no, we have to be here (laughs)  LB: that is inconvenient, because sometimes you just want to check something when you’re at home.  KY1/6/1: yeah. You have to be in the campus.  **LB:** Can you log on via a proxy?  KY1/3: No, from home you can’t. you see, from here I’m using wifi, so the moment you step out of the college you’re shut off and again in the estates where we stay as of now the internet is a bit expensive. It’s not affordable. So I do as much as I can here so that when I go back home I’m going to rest.  **KY2/11/01:** no, we have no proxy server to access things off campus. This makes it difficult for us part-time students, as we must do all our downloading of papers when we come to KY2.  **SA2/1:** Off campus, yes I think in principal I hear there is an arrangement. I think you go to them and say can I do this, I’m sure there is facility for that. There should be. I think I am aware of that but I haven’t bothered to do that because I don’t want to work from home. |
|  | Private internet provision | **SA1/12:** ad hoc internet access is very expensive and affects some of our students.  **KY1/2:** And you know not everybody can access this wireless at home in Kenya, because also we have a number of companies that have now come up but the payment is high. You pay for what you access – the TV programmes and also the wireless connection. And then every month you are paying an extra bill.  LB: [mentions \*\*\*\*\* comments] buying data bundles is expensive and for some undergraduates – especially from poorer backgrounds, this is a problem. They are not spending as much time as they should engaged online because of the cost.  KY1/2: And that’s why you find most of our students would be able only to support a 10 MB databundles which are cheap. But this one they just use for communication, for play around, but they are not looking at the scientific information. |
|  | Actual internet coverage | **KY1/2:** Exactly! In Kenya people say that we have internet everywhere but really how much can you download, and you have to have the equipment to be able to. You bought the data bundle but what you have is not enough for you to download any publication or anything like that. Some areas in Kenya we know that people can’t even access. Although we know the networking has been done but there is an assumption that everyone can access. |
| Work load | Undergraduate teaching | **SA1/9:** teaching loads were overwhelming and people were doing research while on leave, or they were taking leave to do research. They would pay themselves to go to a conference in China – out of their personal savings  **KY1/1:** I wish we had a system like in the UK. There are people in two groups whereby there are some who are going to be promoted as a result of research and they are also going to be promoted as a result of teaching students, but the ones the ones that are going to be promoted as a result of research they are called readers.  LB: and you don’t have that here?  KY1/1: No, you got a big group of students. Like between September last year and August this year I’ve had to teach 830 students.  LB: Undergraduates?  KY1/1: Yes, 830. They had a double intake and we weren’t told about it last year. Just in the middle of teaching we were told there is a new group that is coming. I usually have a group of around 400 students in first year engineering whereby the department is like a service course whereby they are contracted by the school of engineering. So in the middle of that one I’ve just been told in September that they’re sending another group of 400. And I usually have a 4th year course of around 30 students so you can be sure from September to whatever, I’ve never taught that one in my life. 830 students! Now I had to take that one – it runs from September to even up to now I will not be taking a break because I’ve been teaching continuously.  LB: so do you find time to do research?  KY1/1: No, you just do it in your own, you just have to find a way. And you’re expected to publish so as to advance, but that’s tricky. But it’s survival – unless you publish you perish.  **KY1/9:** The university runs parallel teaching programmes that increases the intake of students. It makes more money for the university.  **KY2/1:** my workload is overwhelming sometimes.  **KY2/1:** when you have a family too, it is difficult to find time for research after all the teaching.  **SA2/2:** And also for staff, sometimes their teaching they’ve got lots of students. For example, the first year students we have are staff who are carrying over 600 students. |
|  | PG supervision | **LB:** do you rely on PG students to do a lot of your research?  KY1/1: Um, ok, like now yes there is this one that I’m supervising for MSc she’s about to finish. There’s one that I’ve taken now for PhD and there’s some applications I’m writing to see if I can get another PhD student, and there’s another professor who’s told me he’s got another student. So if all goes according to plan by January I should have 3 PhD students. The MSc student should be finished by December because he’s currently writing up and then there’s one undergraduate.  LB: so that will at least start getting the research results in? That’s quite a stressful position to be in.  KY1/1: Well what else do you do? That is life! Even me, before this year, in fact I’d complained, but they said you are here to teach. And there is nothing you can do. |
|  | Teaching vs research | **LB:** so the primary focus of the department is on teaching?  KY1/1: On teaching. All other things come by the side.  LB: is that the normal situation for Kenyan universities?  KY1/1: Yes, but I don’t think they have as many students. I don’t think. But as I mentioned, this was a special case. My workload. Some of my colleagues have a smaller workload of 200 students per year, but I think, um, I’ve taught this course for about 5, 6 years but, ah, I’ve got the notes in soft copy and it’s …  **KY1/2**: I would say that there is much of teaching than of research, but we try to balance that. The case is that because of the number of students we have and you see when you give exams you have to mark a number of scripts, so you have to spend more time.  LB: and are the classes quite big?  KY1/2: Yes, the classes are quite big.  **KY1/8:** It’s not an environment that values research and development. It’s not a … I mean, it’s kind of a very lonely thing. You have to do it out of your own push. You have to even kind of recognize yourself [laughs]. So it’s an evolving environment heading in that direction, but the mentality is still very far away from what is needed.  **SA2/1:** I’m realising that I‘m doing less and less of that [research]. So, I used to read papers … it’s actually a poor way to do research.. You want the literature to prompt you in a certain direction. We play catch-up. It’s not ideal. But I read – not so much at home -I used to do that before I took up this job. Then I realised that I was going to wreck my home so I do most of my work here but occasionally I will print out a paper and I ride the bus back to town so I can read and that is when I can review theses that I get sent from other colleagues from other institutions. So I read on the bus. In between just look at this and make the changes. |
|  | Admin | **SA2/1:** It’s a real challenge and there’s lots of work. There are meetings - you have to rush to meetings in between teach and sign papers. There is a lot of administration involved, I mean although we are moving into what is it ITC era we still have challenges and I think a lot of administration is still stuck in the traditional way of doing it. There is paperwork to register students - they will walk in to sign the piece of paper and this takes a lot of time.  **SA2/1:** . The scope is too wide, and I think that is what makes this job difficult because you can’t exhaust the scope of stuff you do. It would be better if I knew what my day would present.  **SA2/2:** No, it’s very difficult. You see, you’re sitting here with this file trying to put together some experiments for honours but now I have other issues that I need to finish which are administrative issues that I need to submit to the Dean. So the support to the HOD it’s not good at all. So as I was indicating the HOD work gets no support – not even a secretary - so we do everything so we not left with time to do research.  **SA2/2:** we waste a lot of time on things we shouldn’t be doing, rather than concentrating on our core business. |
| Hardware | Computer provision | **SA1/3:** And as a resource if you don’t have a laptop we have computers available here.  **SA1/11:** yes, I can provide my students with computers, but they come out of my grant money and aren’t provided by the university.  **SA1/11:** extra storage and computing aren’t covered by my grant, but I may be able to shift things around.  **KY1/2**: The university has really tried to make the internet available to all of us. So online we can always connect. And now it depends on the individual person – do you have a computer, or what kind of computer you have.  LB: so you have to bring your own computer?  KY1/2: Yes, we have to bring our own.  **KY1/3:** we have laptops, but they are not provided by the university.  **KY1/9:** we must even pay for our own paper for printing!  **SA2/12:** We had a problem and I don’t know if it’s in other countries but in South Africa we had a problem that most donors agencies – now it seems they are discussing to change it - but the funding companies included NRF when you ask for computers you can ask for anything but not computers. So you can apply for a travelling expense to go to a village or for subsistence or for consumables for printing, paper, chemicals. If you are a chemist that doesn’t need chemicals but need computers then you are stuck because nobody is ready to give you computers – they tell you it’s not their policy. Now we are trying to change that – I’m putting a proposal with a strong motivation for computers and I hope they accept it. My students and my colleagues are trying to collaborate for this proposal. But up to 2 years ago when my master students made the proposal for their master project they had R50 000 per master but they could not ask for a single computer on their budget. so they ended up not being able to spend the budget because they don’t allow conference and that would be data sharing - they don’t allow conference and computers on that budget and we don’t need anything else. It’s so silly. |
| Software |  | **SA1/3:** if you need virus software you can get that here. If you need MatLab or graphing software from the ICTS. Or, if I need specialized software for my work my supervisor and I will chat it over and he will buy it. So, no, I’m not hampered in any way.  **SA1/6:** Some of it is restricted. So most of the data I do have access to – most of the information – but a good example is when I sent some stuff overseas for analysis and now for some reason I don’t have access to the software that necessarily opens up their data. So I can’t physically go and read the raw data, which is what I’m supposed to be doing. So that has been one of the challenges. It’s very frustrating. So in terms of that – it kind of opens you up to building new relationships and being with different kinds of people, and you learn from them. Within [SA1] or even [Stellenbosch] it’s ok, but once you start going overseas you don’t know what happens. And then months later they’re like, you know what, here’s your data. And you try to open it and you don’t have access. So that’s one of my biggest challenges right now.  LB: is there money to buy the software?  Um, for the software I don’t think it’s determined on money, but it’s what came with the actual instrument, which we don’t have here. So I’m trying to work out a way to convert it to a different form. To sort of open it up somewhere at SA1.  **KY1/1:** Oh dear, supported [by the university], I don’t think so. Software-wise we just get software through your own means. Like now, even for example the operating system is supposed to be given. Like now with moving from Windows XP to Windows 7 the university is supposed to have the license otherwise you have to purchase.  LB: you don’t get it automatically?  KY1/1: No, you don’t get it automatically.  LB: and other chemistry software – you’d have to buy it yourself?  KY1/1: Of course. Unless it it’s free for download. Otherwise you just have to purchase that. And the department cannot purchase software for the staff. They do not have … perhaps they would have wanted but they do not have the capability.  **LB**: and software? Can you download software you need from the university?  KY1/3: You have to buy. Ok, like the operating systems has is the XP, they’re still with XP up to now. And other people have moved up to Windows 8.  LB: even things like Endnote for reference managing?  KY1/3: Yes, we have to.  **LB**: and software? Do you get university software?  KY1/2: Usually we buy our own. The university provides not any software. We can download a few, but mostly we get our own software  **LB:** do you get any software from the university?  KY1/4: Ok, as chemists maybe to draw the structures and all that we are given them by the university. But for other softwares, no.  LB: so you have to buy it yourself or does your supervisor buy it for you?  KY1/4: We buy it ourselves.  LB: does that include things like reference managers?  KY1/4: Yes [although didn’t seem to know what it was]  **LB:** do you get updates on your operating system?  KY1/6/1: you have to buy it to begin, but once you get set up you can be updated.  SA2/6: we would like this programme called SciFinder which is $20000. It’s mostly used to by the chemist of which it’s us here, but now the downfall has been - and I think they even if they had the money now - they will always be reluctant to give us the money because we have not have been producing enough post graduate students and PhD and Masters. We have not been producing enough articles so as a department we do not have a leg to stand on to say give us what we want since we are giving you this in terms of outputs. So they really will be pushing but I don’t think they will be pushing 100% for that because now they will be wondering okay what if we give them this and the status quo will remain? So it’s a loss. |
| Offices |  | **LB:** do you have a separate office to work in?  KY1/4: No, we always work in the lab.  **LB:** so your supervisor is very helpful and gives you lots of support?  KY1/5: Yes, even prints for us. The downloads.  LB: oh, so if your supervisor doesn’t print is there an option to print for students in the department. Or do you have to go to the library?  KY1/5: You have to go to the tuckshop. |
| Comparison to USA |  | **SA1/5:** I have been at Vanderbilt for 6 months.  LB: did you find it different?  SA1/5: Very, very different.  LB: in what way?  SA1/5: Ok, well, obviously there’s the whole factor of Nashville being a totally different culture. The setting was very, very different. Um, and the things like the climate and that sort of thing. But the university was pretty amazing. Like the research that I was doing cost $500 per day because it’s high throughput screening so you’re literally testing like 3000 compounds every day and the machinery is just insane and they literally have a whole group just dedicated to keeping track of the compounds. Like the whole facility just for the high throughput screening. So obviously different groups within the university access this HTS core and they have robots for controlling things. So just the scale of things and what they have access to is incredible. Also, it’s based in a hospital, so there’s a hospital on the university campus and all the high throughput screening happened in the hospital and all the chemistry happened in the chemistry building so it was kind of a lot of walking between different departments and different buildings which is quite different from what I’m used to here. |