Breaking silos to bring innovation

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Introduction

In July 2021 the tinder box of South African society was set alight. Rioting and looting by millions of South Africans from all walks of life occurred. Groceries, toiletries, electronics, and alcohol were amongst many items stolen from big and small businesses alike. No one was spared.

During these dark moments, I thought of the young girl from Tsolo in the Eastern Cape, or the unemployed matriculant without parents from Eshowe in KwaZulu-Natal. For them, a better life is a bridge too far. In these times we need to think about education and understanding. Many in the population do not perceive the long-lasting impact of their actions.

In the words of Mahatma Gandhi: 'Live as if you were to die tomorrow. Learn as if you were to live forever.'

To improve South Africa, innovation by Generation Z is of utmost importance. For too long, South Africa has relied on old methods or old tools used in the developed world to attempt to combat problems unique to South Africa. Policies and laws will not change century-old ways of thinking in areas such as race, gender, and sexuality. Neither will financial debt nor the national health insurance fix underlying health problems found within communities. The crises are issues such as food insecurity, polluted air, and poor water quality, amongst others. Solutions for the South African problem need to come from within, from the institutes designed and created to help better South Africa. For this, we need to allow innovation to be foremost in our strategies, and to start training thinkers and innovators, in addition to training technicians.

In 2011, the University of Pretoria (UP) created a strategic plan for 2025 that outlined various indicators and goals that it aimed to achieve. It was hoped that through these goals, the university would transform itself into a world-class institute, creating knowledge and tools to help improve the current status quo in South Africa and the global south.

This paper will address three different areas. The first undertaking will be to evaluate the status quo of the university. In order to understand the status quo, the current structure of the university will be looked at, with a focus on both undergraduate and post-graduate degrees and the make-up of the student body. The structure of the faculties and departments, together with staff across the university landscape, will be critically evaluated to identify potential gaps.

The second aspect that will be investigated is how current teaching and learning is conducted within the university. We will delve into the new methods of teaching and learning that have been developed, and evaluate whether these methods are needed within the university.

The third area of enquiry will be to look at the need for the breaking of silos between different professions to further enhance and ready students for the working world. The importance of working across disciplines will be discussed; together with creating an understanding of how each profession fits into society and the role that each can play. The role that the university plays in ensuring that graduates are employed will also be evaluated.

The status quo

UP can trace its origins back to 1908, with the establishment of the Pretoria campus of the Transvaal University College. Since then, the university has expanded to seven distinctive campuses. UP currently has nine faculties, viz. Humanities; Law; Education; Theology; Economics and Management Sciences, Natural and Agricultural Sciences; Engineering, the Built Environment, and Information Technology; Health Sciences; Veterinary Sciences; and a Business School.

The original idea behind the university was that it would be a repository and creator of knowledge. However, modern universities have become institutions, with the purpose of enabling school leavers to be further educated so that they can gain viable employment.

In 2020, UP had 53 430 enrolled students, of whom 36 547 (68%) were undergraduates and 16 883 (32%) were postgraduate students. The racial breakdown of the student population has hardly changed, with 28 886 students (54%) being African in 2020, compared with 27 537 (52%) African students registered in 2018. This represents an increase of just two percentage points over the two-year period.

An essential indicator of 'decolonising education' is the increasing number of individuals who were marginalised by the colonial system, and who are now entering the higher education system (Mzangwa 2019). The idea behind 'decolonising education' is removing barriers that prevent the marginalised from entering institutes of higher learning. To help redress the underlying socio-economic woes of the country, those that were previously excluded need to be provided with sustainable ways of entering the economy to uplift homes and change lives.

The importance of a changing demographic is essential to help both the country and the institution to grow, and to enhance the country.

Each faculty has a distinct management structure, with one dean and two deputy deans, and support staff. The faculties are further divided into separate departments, each with its head of department, academic staff, and support staff. Departments are spread across the seven faculties, with some solitary faculties on a single campus, such as the Faculty of Veterinary Science on the Onderstepoort Campus.

This highly siloed approach, at department and faculty level, leads to a lack of knowledge of what colleagues at the same institution are working on. This is evidenced by the number of research projects with similar objectives being conducted independently of each other within faculties and within the university. The effect of this is that many researchers compete for the same research funds, and there is no holistic view of an issue in which many departments are interested. The current structure perpetuates working in isolation and poor understanding of other staff members' roles in the broader teaching community, resulting in students receiving an education which is not holistic.

This siloed approach leads to barriers, such as difficulties in transferring innovative teaching methods between faculties that have shared experiences or similar programmes. The siloed approach means that it is challenging to identify and solve systemic problems within UP, as there is little sharing of experience between faculties.

Most of the research at university can be described as grant-driven, with limited impact-led research being conducted. There are many reasons for this, with two main drivers being performance management structures and the absence of strategic partners at research staff level.

Performance management at the university is geared towards achieving a goal on one's own; staff members are disadvantaged when they work with colleagues,

whether in terms of joint publications or joint funding requests. When the goals of academics are to obtain grants and publish in high-impact global journals, the capacity of top researchers to find solutions to local problems are limited.

At the executive management level, multiple strategic partnerships with government and the private sector exist. Unfortunately, at an action level, these partnerships are ineffective, and the objectives of these partnerships are not integrated within broader research themes.

Pedagogy in a new world

Just as the Covid-19 pandemic has reshaped the global economy, politics, and values, it has also accelerated the reshaping of higher education.

With higher education moving into the online world, understanding of how to effectively teach is changing. It is now a pre-requisite for institutes of higher education to evolve to stay relevant. For this reason, the institution needs to critically reflect on the foundation of the broader teaching and training philosophy employed at the university.

An important part of this is that the university has primarily been a research-intensive institute that seeks to drive research and innovation at a postgraduate level. At the undergraduate level, the focus has been on transferring knowledge from renowned researchers to students, through the creation of comprehensive lecture notes and slideshows of information about a topic. This has led to limited time and focus on allowing undergraduate students to seek out knowledge or to innovate during their degree studies.

In an unfortunate twist, taking this approach with undergraduate students led to stifling of innovation through the creation of barriers. These barriers range from time-intensive lectures to the teaching of outdated methods within specific fields. There is limited focus on integrated thinking. The focus is rather on 'regurgitation' of information.

Teaching and training need to be understood as comprising an ever-evolving set of tools which students are encouraged to master, and through which the university seeks to ensure that undergraduate students are more prepared for the working world today. However, UP focuses its teaching and training on the twentieth century, and not on the twenty-first.

To achieve change and to remove barriers to innovation, the university needs

to change its teaching and training philosophy. It needs to focus on ensuring students seek and understand information acquired via online sources, while allowing them to innovate in the creation of solutions.

Undergraduate students in the field of health science should have artificial intelligence (AI) tools embedded within their curriculum. The health science fields are among the fastest-growing areas of AI innovation, and they will be part-and-parcel of healthcare in the future. Ensuring students are introduced and comfortable with AI will help ensure that those graduating from UP will develop new tools to combat health challenges.

Education in new spaces

UP is a leading research institute globally, but for historical reasons it has focused on having students physically present on one of the many UP campuses in Pretoria.

The Covid-19 pandemic has challenged the norm of expecting students physically present on campuses. During the pandemic, students worked across the country, the continent, and the globe to attend classes and to write tests. This forced lecturers to learn and use different methods of engaging with students. The methodology has centered on the motto of 'Prepare, Engage, Consolidate', and online applications such as BlackBoard have been fundamental to its success. Asynchronous and synchronous teaching has been used to ensure understanding of the work, and to increase engagement between students and lecturers.

For students, online teaching has created flexibility within daily routines, whilst shifting responsibility from lecturers to students. Although the teaching methodology has been adapted, the content of modules has remained the same. The new approach has enabled students to work to earn in order to pay for tuition fees, while many students have been able to stay at home, substantially reducing the costs of a university degree. This is extremely important for marginalised students, who historically have been oppressed by political systems such as apartheid and colonialism.

When evaluated in a silo, the impact of being able to study from home instead of having to reside in Pretoria in order to attend the university is small, but within the larger system, the impact is potentially massive.

For lecturers, Covid-19 has helped to free up time in busy schedules that are routinely filled with research activities, academic writing, student supervision, lecturing, and marking. It has given academic staff the flexibility to create in-depth lectures in their own time, improve engagement with students, and evaluate their knowledge through different tools available via the BlackBoard application.

Overall, moving online has been relatively seamless. It has enabled students to be taught at the same level in many faculties, and it can be considered a success for UP.

Whilst it has been a success for students currently attending UP, the online teaching environment has opened up the possibility of higher education for many more people around the country. This can be looked at in the context of growing unemployment within South Africa, with the youth most affected, and where the current political and economic situation provides no opportunity of escape.

As part of its vision to contribute to improving the country and assisting the global south, UP can play a role in expanding access to education. By reaching into areas that have not previously had access to institutions like UP, there is an unlocking of human potential to develop solutions to the unique challenges experienced in the global south. When discussing and considering where to expand, it is important to consider that ultimately, we need to consider the young girl in Tsolo, or the unemployed matriculant in Eshowe.

Lessons learned during the Covid-19 pandemic are transferrable to those who have limited access to higher education due to their socio-economic problems. Using lessons learned during the Covid-19 pandemic, the UP can propel its research, innovation, and social impact to new levels.

The author proposes the creation of hybrid campuses in rural areas of South Africa to open the doors of education to the marginalised that were previously excluded from institutes of higher education. This will also foster a knowledge-seeking drive within the youth in these communities, due to the physical proximity of these campuses.

The campuses should consist of IT infrastructure to allow students to access online lectures and engage virtually with students from other campuses across South Africa. They should focus on teaching first- and second-year students enrolled for various degrees. For a short period during the year, students from these hybrid campuses should be brought to existing campuses to satisfy the

practical requirements of their degrees.

Through the creation of hybrid campuses, the university will be at the forefront of education, and it will play a major role in the upliftment of society and in innovation.

Innovating in old spaces

South Africa is one of the most unique countries in the world. According to the Biodiversity Finance Institute (BIOFIN), South Africa is the third most biodiverse country, and it hosts over 95 000 known species. It embraces multiple biomes, such as deserts, forests, and an exceptionally unique biome called *fynbos*. This diverse environment supports the economy through tourism, fishing, and farming. Despite incredible biodiversity, South Africa is burdened with a multitude of social problems that require unique and innovative solutions.

To arrive at inventive solutions, an innovative and changed university is needed. Changing the university requires old structures to be deconstructed systematically. Deconstruction of a structure is achieved by allowing all those involved in the structure to openly self-reflect on their experiences within the structure. It requires those leading the process of deconstruction to critically evaluate shared ideas and perspectives, to fully understand the root causes of the problem, and to ensure that an echo chamber is not created.

Through the process of deconstruction, the university can incorporate aspects of old structures into a new structure, based on the founding principle of being a trailblazer in innovation. Looking at the current set-up within the university, a system-wide problem is the complete separation of departments and faculties from one other. This leads to limited engagement and hardly any interaction between those from different professional backgrounds. Specific events are necessary to ensure interaction.

To accomplish this, the university needs to focus on the improvement of transfer of ideas, experience, teaching, and research between what have been historically divergent faculties spread across various campuses. It also should focus on ensuring that both staff and students understand their roles in society. By ensuring that these two aspects are fundamentally adressed in both the system and in staff members, solutions developed within the university will have all these aspects in mind.

Greater cross-pollination between historically separate faculties

Before determining how to improve cross-pollination, a clear understanding of what cross-pollination involves needs to be developed.

Cross-pollination can be defined as the process of applying the pollen of one flower to the pistils of another flower (Crespel & Mouchotte 2017). In the academic context, it can be defined as the process of moving information from one professional context to another. In the university setting, this can be described as the moving of knowledge, experiences, skills, or perspectives from one department or faculty to another.

Cross-pollination in flowers occurs to help improve genetic diversity, and ultimately produces improved plants. In the university setting, the aim would be similar, to improve the outcome and impact of initiatives across the university.

The 'water cooler effect', which helps people build social networks, has been described as an everyday opportunity to improve productivity and increase engagement (Wu et al. 2011). The reason for this is that during random encounters at water stations, people engage with each other, and share ideas and problems experienced during the day. These types of discussion can help spark new relationships, improve existing initiatives, and address challenges through joint problem-solving and sharing of experiences.

Space and time are the main barriers to bringing about these types of engagement between colleagues. During the Covid-19 pandemic, the absence of 'water cooler' talk has been described as one of the most important reasons for the reduced productivity of those working from home.

Currently, the universities' organisational structure has inadvertently created physical barriers between colleagues from different backgrounds. These physical barriers involve staff members situated in offices divided by faculties and departments, and not organised in terms of their common shared interests.

The university has identified this as a problem and has started working towards changing this through the creation of the 'Future Africa' centre and campus. The campus is to serve as a node for people to build and improve existing national and global networks. One of the aims of the centre is to provide a high-level structure to connect professionals from different backgrounds across Africa, but there is a limited focus on connecting people within the university with one another. Although this initiative is a start, its impact is likely to be limited, as there is a marked absence of continuous engagement between colleagues.

Combatting the siloed structure at the university level requires radical, but slow change. While moving away from the current structure, it is important to remember that not all levels of staff within the university can or need to be involved in breaking down physical barriers.

An initial step should involve defining the objective of moving away from the siloed structure, and deciding how such change will be measured.

From the author's perspective, the aim should be to create a culture involving cross-pollination of ideas, projects, and problem-solving between disciplines. The process should be initially directed at academic staff, filtering downward to post-doctorate students and post-graduate students, in defining the objectives and intricacy of research proposals. Finally, undergraduates will reap the greatest rewards, because they will learn in innovative classes, taught by lecturers with different professional backgrounds, further enhancing cross-pollination.

Measuring the impact of a strategic shift in the structure of academic staff across the university is likely to be difficult. The author, through his master's research project, proposes a standardised baseline to evaluate the impact of the shift. The baseline will consist of a systematic review of publications output per department and per faculty. The baseline should consist of three indicators: (1) the total number of publications from the respective department and faculty; (2) the number of authors per publication from different departments, faculties, and institutions; and (3) the professional backgrounds of the identified authors.

A comprehensive analysis of academic staff should be conducted to determine where their research and teaching interests lie, which will allow for clustering of academic staff on the basis of these interests. Staff clustered in terms of a particular interest should be assigned offices in the same building, which will lead to increased engagement and subsequent cross-pollination across professional backgrounds. This will ultimately filter into integrated research proposals.

While the structural shift will involve physical movement and mixing of departments and faculty staff members, the intention is for cross-pollination to filter down to undergraduate students. Undergraduates are the main clients of the university. The exchange of ideas at undergraduate level will occur mainly through the creation of integrated lectures between students from different degrees and faculties. It will allow for students to be taught by academic staff from different professional backgrounds.

The cross-pollination will lead to undergraduate students having new input to innovate through their degrees and later, in their working lives.

Enhancing the employability of students

The main business of the university is to produce graduate students. Ensuring that the university is continuously growing and attracting potential clients, it should aim to produce graduates who are employable. For this to occur, students must be ready to enter employment as soon as they leave the university, which means they must be knowledgeable and effective in their fields.

From a student perspective a degree is no longer sufficient (Tomlinson 2008), there needs to be a broader focus on making students ready for the world of work. Soft skills (Bhagra & Sharma 2018) and being able to apply theory practically (Avramenko 2012) are recognised as two evolving areas which can help make students employable.

In the view of the author, for an improvement in these two areas to occur, students need to have a better understanding of their roles within their professional fields and in society. This means they need to understand how they can contribute to both improvement and digression in society.

For this to happen, cross-pollination is vital to enable students' minds to be exposed to new ideas and different points of view.

A reimagined UP

The aim of the 'Reimagined UP' should be for graduates to play a pivotal role in the improvement and success of South Africa. UP sits at the intersection of the past and the future, in an environment consisting of social and economic problems. Along with these problems, there is vast untapped potential, and a need for innovation of new and engaging solutions to tackle the problems that are not unique to South Africa, but shared by the global south.

To achieve this, UP needs to reflect on its current aims, organisational structures, and pedagogy.

The aim of the university should be to improve access to education to marginalised communities, and to help decolonise the university. This should occur through the creation of satellite hybrid campuses in areas where higher education was never previously accessible. This will create a positive environment

for youth in these communities. The innovation should focus on making students ready for work by emphasising the development of soft skills and the application of theory in real-world situations.

To help accomplish these aims, UP must focus on breaking the physical, social, and academic silos that currently exist throughout the academic staff of the university. This must be done by enabling continuous and informal dialogue between staff from different backgrounds, through the breaking down of physical barriers.

UP already has the intellectual capacity and infrastructure necessary to accomplish these goals and to make it a leading university globally in terms of innovation, research, and teaching. All that is lacking is continuous and strong leadership to take a risk to be number one.

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