Portfolio of Evidence

HELTASA/CHE National Excellence in Teaching and Learning Award 2017

Siddique Motala
Contents
1. Introduction ........................................................................................................................................................1
2. Teaching Context ................................................................................................................................................2
3. Teaching Philosophy ...........................................................................................................................................3
4. Teaching Methodology .......................................................................................................................................5
5. Examples of practice ...........................................................................................................................................8
6. Teaching Effectiveness .................................................................................................................................... 10
7. Research .......................................................................................................................................................... 12
   Current research .................................................................................................................................................. 12
   Research outputs ............................................................................................................................................... 12
   Research supervision ....................................................................................................................................... 14
   Research Contributions ....................................................................................................................................... 15
8. Industry Responsiveness ......................................................................................................................................... 16
9. Institutional Development ......................................................................................................................................... 16
10. Community Involvement ..................................................................................................................................... 18
References ............................................................................................................................................................... 20
Appendices
1. Introduction

I am a senior lecturer in the Department of Civil Engineering & Surveying at the Cape Peninsula University of Technology (CPUT) in Cape Town. I have been a teacher in higher education since 2005 and my area of interest is teaching & learning, with a specific focus on geomatics education. Here are some highlights of my application:

Qualifications
BSc (Land Surveying), University of KwaZulu-Natal; MSc (Engineering), University of Cape Town; Higher Diploma in Higher Education and Training, CPUT. Currently studying: 4th year, PhD (Education), University of Western Cape.

Teaching
I am a reflective practitioner who enjoys teaching. I have a formal qualification in Higher Education (HDHET). Because of my interest in teaching and learning, I have based my PhD research on teaching and learning in engineering education. I have taught degree and diploma courses (at UCT and CPUT) at undergraduate and postgraduate levels. My teaching has been commended by my students and peers. I was promoted in 2016 to the position of senior lecturer.

Research
Much of my published research is focused on the scholarship of teaching & learning. I supervise research at Masters, Honours and BTech level. My research is currently focused on decolonization and socially just pedagogies in engineering education.

Professional and Academic Leadership
I am a registered professional land surveyor, and actively contribute to the South African Geomatics Council (SAGC) on academic issues. Because my teaching practice and research have been recognized as innovative, I have been asked to present about my teaching & learning practice across various faculties and forums at CPUT and other universities. I have been instrumental in forwarding the reputation of CPUT as a leader in teaching with technology.

Community Involvement
I have a close research relationship with community organisations such as the District Six Museum, and many of my students have conducted research in collaboration with the Museum. I contribute to the international Open Source community by producing teaching materials.

Siddique Motala
2. Teaching Context

Geomatics education in South Africa

I teach within the discipline of geomatics, which is situated in the engineering faculty. In South Africa, geomatics qualifications at universities, like other engineering qualifications, are focused on maintaining minimum standards and covering specific technical knowledge areas. These standards are prescribed by the South African Geomatics Council (SAGC), which is the statutory body that is responsible for regulating the geomatics profession. For registering as a geomatics practitioner, SAGC requires that the educational institution, at a minimum, cover specific content areas. These content areas are heavily biased toward mathematics, science and technology. This tends to minimise the importance of affective, social and creative graduate attributes that should be nurtured during their education, so as to produce more well-rounded and industry-ready graduates. A result of this is a lacuna in the holistic education of geomatics students.

In addition to this, the current geomatics curriculum is not just technicist, but also politically loaded in a way that entrenches certain discourses. Current geomatics education is an extension of the old surveying education which was developed during the apartheid era (and in turn was influenced by colonial education). There has been very little research conducted to interrogate the philosophical underpinnings to see if the current curriculum is striving to offer a socially just education or simply upholding the old colonial knowledge status quo.

The student groups that I teach are diverse, and reflect not only the heterogeneity of South African society at large, but there is an increasing presence of students from other African countries in my classes. This presents some very interesting challenges and opportunities. In unequal societies such as ours, the knowledges of the upper and middle classes are considered to be valuable, and the marginalisation of the previously disadvantaged individuals continues. This marginalisation and othering within the higher education system is propagated by factors such as language underpreparedness (Postma & Postma 2011) and inequalities associated with race, gender and generation (Bozalek 2011). My teaching builds on an awareness that students possess valuable knowledge which can benefit the revitalisation of the geomatics curriculum.

My teaching aims at micro-instances of experimental activism that addresses these issues. I attempt to bridge the gap between the so-called ‘hard’ and ‘soft’ sciences with specific interventions, and I attempt to celebrate diversity in class by giving my students a voice.

Current teaching

The Surveying division of the Department of Civil Engineering and Surveying offers two main undergraduate qualifications: the National Diploma in Surveying, and the National Diploma in Geographical Information Science (hereafter called the ND: Survey and ND: GIS respectively). I teach, or have taught, the following undergraduate courses:
First year: Survey Drawing, Computer Skills 1, Geography 1.
Final year: Control Surveying 3, Surveying 3, Geographic Information Systems 3, Spatial Analysis 3, Map Projections 2
The courses Geographic Information Systems 3 (GIS3) and Spatial Analysis 3 were introduced and completely designed by myself.
At BTech level, I teach a course to students across two departments taking a BTech in Cartography, Surveying, or Town Planning. This course is called Geographic Information Systems 4.

I also supervise postgraduate students at the BTech and MTech level.

**Previous teaching**

I was employed at the University of Cape Town (UCT) during the period 2009-2011. I was the course convenor and lecturer of the following courses:

- Elementary Surveying – taken by undergraduate Geomatics and Construction Economics & Management students;
- Surveying 1 – taken by 2nd year Geomatics students;
- Geomatics 1 – taken by 1st year Geomatics student;
- Geographic Information Systems 1 – taken by 2nd year Geomatics students, and BSc (Hons) students.

I also supervised undergraduate research (final year research projects) and postgraduate research (Honours and Masters level).

**Other relevant experience**

Apart from my official duties at the university, I also conduct private GIS consulting work. I sometimes conduct GIS training courses for individuals or companies. This is beneficial to my teaching as I am made aware of industry training needs, which is very important in the rapidly changing discipline of GIS.

### 3. Teaching Philosophy

I have been an educator for a decade, and my teaching philosophy is constantly evolving. As part of the Higher Diploma in Higher Education and Training (HDHET) that I competed in 2006, I produced a portfolio in which I articulated my teaching philosophy at the time. Comparing my teaching philosophy from 2006 to how I feel now reflects vegetative growth – some ideas have matured and the annular rings around them have become bark, relatively unpliable but giving strength to what lies beneath. Others were leaves, having lived for a season to make life energy, only to die, be discarded, and yet provide compost for the next round of ideas. Rhizomatic growth connects many different experiences and ideas together, and I see much in my teaching that is reflective of the rhizome (Deleuze & Guattari 1987), which I learnt from the philosophy of posthumanism. I have been conducting research on posthumanism, which is the theoretical framework of my PhD research. I have been heavily influenced by the contributing philosophers since delving into this rich body of knowledge.

Here are the main points that shape my current teaching philosophy:

**Social justice**

The Department of Higher Education and Training has spelt out its main policy objectives in the White Paper for Post-School Education and Training, and of particular interest to my teaching are the objectives:
“- a post-school system that can assist in building a fair, equitable, non-racial, non-sexist and democratic South Africa;
- a post-school education and training system that is responsive to ... broader societal and developmental objectives” (Department of Higher Education and Training 2013, p.4).

Within many undergraduate curricula, these objectives are largely ignored or not made explicit. This evades the responsibility of being true to the claimed ethics of the present. Capitalism has crept in and the ‘free market’ dominates. Pedagogical practices are needed to attain objectives that talk to issues of social justice. Attempting to meet these objectives is made all the more difficult in a rapidly changing society such as South Africa. These objectives call for reflective, socially and environmentally aware practitioners with high ethical standards. This translates into a curriculum that is responsive to developmental needs. In attempting to develop a socially responsive learning experience, I have tried out numerous interventions, such as storytelling and online instruction.

I have attempt to conscientize my students towards issues of diversity, the natural environment (which we are part of) and history. Through geomatics technology, an attempt is made to understand the structural and material inequalities that exist in South Africa today.

**Critical and decolonizing pedagogy**

I attempt to grow students’ critical awareness by problematising Western hegemony. Most of my practical examples of mapping are centred on Africa. This is an attempt at micro-instance of activism, a decolonizing methodology, where light is shed on our continent. In this regard, my storytelling method uses stories from African history. The stories always have an ethical basis, and encourage an awareness of world issues. I attempt to develop student learning experiences that alert them to issues of equality and empowerment by encouraging fairness and diversity. It is deeply aware of the situated nature of existence, and develops a local knowledge that gives students voice.

**Creativity**

My teaching encourages creativity and my approach to education is experimental. As part of the Spatial Analysis 3 course, students are required to produce their own digital stories. This is a hugely creative process, one that geomatics students would have encountered for the first time in their university education. It is also my attempt at blurring the boundary between art and science. The stories that are produced have rich pedagogical potential, and have found their way into my curricula.

**Collaboration**

I maintain strong ties with industry and other groups whose interests overlap mine. As an example, I have developed strong relationships with the Open Source GIS community. I have assisted in the development of material for GIS teaching, for example, the Quantum GIS online manual, [http://docs.qgis.org/2.8/en/docs/training_manual/](http://docs.qgis.org/2.8/en/docs/training_manual/). The teaching and learning activities in my course Spatial Analysis 3 are closely aligned to the training manual.

I have a longstanding relationship with the District Six Museum. More recently, I have forged student ties with the University of Michigan School of Information’s Global Information Engagement Program (UMSI GIEP).
I promote collaboration amongst students, which assists with the development of their communication skills, time management, project management and helps to promote diversity.

**Student-centred and deep learning**

I believe that employing a student-centred approach to teaching and learning is a better approach than the traditional “talking head” teacher-centered approach that is so often used in HE. The focus of education should be on what the student does, and through meaningful engagement with tasks, students can adopt deeper approaches to learning. In this regard, John Biggs’ *constructive alignment* is a useful, practical approach that assists in setting up and maintaining a balanced learning system, through careful consideration of the critical components such as curriculum, teaching methods, assessment and the climate that is created in student-teacher interactions (Biggs & Tang 2007).

4. **Teaching Methodology**

**Introduction**

As part of my development as a lecturer, I have attempted many different types of pedagogical interventions over the last decade. Being experimental, some interventions have proven to be ineffective in adequately encouraging student deep learning, whereas others have shown promise. Apart from the traditional lecturing method employed by most lecturers (stand up in front of class and deliver a lecture) I use other methods, such as using online lecturecasts, teaching with tablets and digital storytelling. My teaching methods are adaptable and fluid – I prefer not to plan my classes with levels of detail that would constrain the evolving nature of my pedagogy. I have been commended by staff and students alike for my teaching methodology and ability. I have been invited to talk to different academic audiences about my teaching methods. For example, I have been invited to the University of Johannesburg to present a seminar on my teaching and research.

I will report here on some of the teaching methods that I employ currently.

**Evidence:**

See reference letters and letters of support for the CHE/HELTASA award (Appendix E) from:
- Mr Zukhanye Mayekiso – a former student and CEO of Geo-Q Technologies
- Professor Vivienne Bozalek – my PhD supervisor and Director of Teaching & Learning, UWC
- Professor Christine Winberg – ex-director of Fundani, CPUT
- Dr Jennifer Whittal – an ex-colleague from UCT

See Appendix E for an invitation brochure from the University of Johannesburg Scholarship of Teaching & Learning seminar series, advertising my talk. A report on the seminar can be found at [http://sotlforsocialjustice.blogspot.co.za/2015/03/motala-seminar-on-critical-posthumanism.html](http://sotlforsocialjustice.blogspot.co.za/2015/03/motala-seminar-on-critical-posthumanism.html)

**Storytelling**
I have introduced storytelling in three of my undergraduate courses, namely Map Projections (taken by third year surveying students and second year GIS students), Geographic Information Systems 3 (an introductory GIS course, also taken by third year surveying students and second year GIS students) and Spatial Analysis 3 (an advanced spatial analysis course taken by third year GIS students). The combination of GIS and storytelling within GIS education has been reported on (Motala & Musungu 2013) but is not as common as it is in other disciplines such as history that come from a long tradition of using storytelling as a pedagogical tool.

Storytelling was used in two main ways: stories that were told to the students by me, and stories that the students told. These stories could be digital or told in person. The digital stories that were produced are made available online to students, mostly via YouTube.

For the stories that I told, I used stories from African history as the main source of content. It was used as a way to educate students about a much-neglected aspect of African heritage, as well as have an overarching, interesting theme to base discussions on. This exposure to African history is especially important for South African society, whose collective historical knowledge seems more located in the Global North than its own continent. This bias is common in countries that were colonized at some point in their past. Exposure and critique of the hegemony and power relations that exist is important as a decolonising methodology (Bozalek 2011). Each story was told through the lens of GIS, and the links to sections in the curriculum were made explicit. Attention was focused specifically on spatial analysis techniques and mapping. The stories that I chose to tell, as well as the way in which they are told, needed to be constructed to grow awareness of alternative points of view, and promote dialogue.

Storytelling has proven to be an innovative and effective method of teaching, especially considering that it is located within an engineering curriculum. Students are very receptive to stories that I tell, but have shown more resistance at first to producing their own digital stories. After being guided through the process over the course of a term, they show appreciation for the intervention within the context of their education. The assessment strategy has been modified over the last few iterations of the course - it contains more formative assessment than before, and the process has been emphasised instead of the final product.

**Evidence:** Abstract of published paper entitled “Once upon a place: Storytelling in GIS education” that I presented at an international conference (Appendix A). This paper describes my storytelling methodology in my GIS courses.

**Focus on Africa**

Being geography-based, GIS technology affords me the opportunity to create spatial themes around which my teaching is based. I base most of my practical examples on Africa, and my students are required to acquire basic knowledge of the continent. They must learn, at the very least, the names and locations of all the countries in Africa. Without this basic knowledge, they would not be able to adequately answer some assessment questions. For example, in my Map Projections course, students are asked to suggest the type of mapping for specific African countries. Without knowing where they are (e.g. are they located at the Equator, in mid-latitudes, etc.) and their shape (e.g. Zimbabwe is approximately round, Malawi is a long, thin country) they would not be able to apply their knowledge of map projection choice correctly. This is not solely a geographic exercise – students are then equipped to be able to start appreciating aspects of world history and politics (e.g. colonialism, globalization and international power relations) which I discuss in class.
**Evidence:** Map Projections test 1 2013 (Appendix B). To be able to answer the questions shown, students need to know the locations of African countries and cities.

**Constructive alignment**

I find that John Biggs’ model of constructive alignment (Biggs & Tang 2007) to be very useful in my teaching practice. Constructive alignment is a practical framework, which assists in the design of the teaching/learning activities, curriculum objectives and assessment tasks. I have reported on how I utilized constructive alignment in one of my courses in a paper that I presented at an international conference. I now use constructive alignment in much of the course development work that I do.

**Evidence:** Abstract of published paper on Constructive Alignment, entitled “Constructive Alignment of an introductory university Geographic Information Systems course” that I presented at an international conference (Appendix A) explaining how I implement the principles of constructive alignment in my courses.

**A connected teacher**

It is important for me to maintain close ties with industry, and give my students exposure to the world of work. Many GIS practitioners have been invited to present to my class over the years. It is important for me to invite a variety of people to present guest lectures, so that students are exposed to the diversity of the workplace. In particular, I keep in touch with my ex-students, who are regularly invited to present guest lectures to my current students. Graduates who have come from historically disadvantaged backgrounds make a big impact, as these graduates act as role models for many students. GIS practitioners who operate within the Open Source movement are often welcomed by me, who share the benefits of free and open source software with students.

**Evidence:** Letter from Mr Z. Mayekiso, founder and CEO of Geo-Q, a GIS company (Appendix E). He is an ex-student who freely gives of his time to inspire students through his interesting talks.
5. Examples of practice

There are many examples of curricula, teaching & learning activities, and assessments that I can provide, but I will restrict this section to two courses, Geographic Information Systems 3 (GIS3) and Spatial Analysis 3, as these are two courses that I have developed from their inception. I will discuss two examples of assessment / teaching & learning practices. These are two small instances of reflective practice within the greater scheme of my practice, but I hope that they will convey a sense of the thought that goes into course development.

Digital storytelling

The combination of GIS and storytelling is not as common as it is in other disciplines such as history that come from a long tradition of using storytelling as a pedagogical tool. Storytelling was used in two main ways: stories that were told to the students by me, and stories that the students told.

One of the stories that I tell is the story of Ibn Battuta, the medieval Moroccan traveler, who was a contemporary of Marco Polo, and who travelled further than Marco Polo, but is not as well known. The Ibn Battuta story is well received in the GIS3 course as students are practically exposed to an interesting application of GIS. Some of the GIS functionality that was showcased during the Ibn Battuta story was: overlay analysis (e.g. to see which countries that the River Nile passes through), database queries (e.g. to identify which urban centres that he passed through are now cities containing more than 1 million people), attaching imagery to attribute tables (e.g. to show a picture of the Lighthouse of Alexandria that he observed shortly before it was destroyed by an earthquake), and calculating the total distance that he travelled.

Another example story that I use is the story of District Six, which is particularly powerful as the CPUT Cape Town campus is located on the site of the old District Six.

Students have, over the years, shown appreciation for the storytelling approach.

Evidence: GIS3 Test 1 2013 (Appendix B). Question 5 uses a screenshot from the Ibn Battuta story; Analysis of student feedback on teaching (Appendix D)

Student stories

I will now turn my attention to the stories that I get my students to tell, in one major assignment. In Spatial Analysis 3, students are required to create a digital story that can be told with maps. They are encouraged to tell a story that is about a social issue, or one that is personal.

Evidence of course development: Digital storytelling assignment briefs, presented over 3 years 2012-2014 (Appendix B).
It can be seen that I made small changes over the 3 years, depending on my learnings from the previous year.

In 2012, I was very prescriptive on the types of analysis that the students needed to use in the production of their stories:

*The spatial analysis and GIS processing contained in the story must, at a minimum, have the following:*
- Data capture (e.g. digitizing, co-ordinate importing, or raster image georeferencing)
- Database analysis;
- Overlay analysis;
- Buffer analysis

It was found that the students only attempted the types of analysis mentioned. The following year, I made it more open-ended:

*The spatial analysis and GIS processing contained in the story must, at a minimum, have the following:*
- Data capture (e.g. digitizing, co-ordinate importing, or raster image georeferencing)
- At least 3 types of spatial data analysis

During 2013, I realized that students worked together on their stories, and this produced some unanticipated advantages, such as collaboration and interpersonal communication.

I thus decided in 2014 to give students the opportunity to work on their stories collaboratively:

*You may work in teams (not > 2 people) for this assignment. If you work in a team, do a story on an issue that both of you agree on.*

This digital stories produced over the three years progressively improved. This was due, in part, to the incremental changes above, but also because of the way I changed the assessment of the digital stories. Over the period reported, the assessment went from being focused on the final *product*, to the *process*.

In 2012, it can be seen that all the marks were allotted depending on the quality of the actual digital story. In 2013, I decreased the weighting given to the story itself, to make sure that the students focused on the questionnaire.

In 2014, I implemented most of the changes, as can be seen in the appendix. I introduced a story circle, where students discussed their stories in a plenary session in class. They then had to conceptualise their story and produce a storyboard. This really assisted in helping them to visualize their final product. They were told that if they followed the process and respected the formative evaluation, they would pass the task and automatically obtain 50%. The other 50% would be allocated according to the quality of the digital story itself. This seemed to provide an injection of creativity, where students were not afraid to express themselves as they knew that they had passed the task already.

One of the benefits of the production of digital stories is that they can be archived. If a student agrees to it, their story is uploaded to ‘CPUT Stories’, a YouTube channel containing many examples of student digital stories produced across many departments at CPUT.

**Evidence:** See [https://www.youtube.com/user/CPUTstories](https://www.youtube.com/user/CPUTstories) for a link to the CPUT stories channel. This channel is a valuable resource for students. Even students who do not take the Spatial Analysis 3 course are referred to the channel as they benefit from seeing how other students use GIS software.

My students’ digital stories have drawn acclaim from various quarters. As a decolonizing methodology, it is very effective in presenting alternative points of view. I have been asked by the Cape Higher
Education Consortium (CHEC) to present my digital storytelling methodology and assessment strategy to one of their short courses. I have also been invited to speak at the University of Johannesburg and the University of the Western Cape about my teaching.

**Evidence:** See letter from Prof V. Bozalek, and letter from Prof C. Winberg (Appendix E);

**Other online resources**
Besides making student digital stories available, I also produce videos that are widely used by students. I have, in collaboration with other colleagues in the Department of Civil Engineering and Surveying, produced an online repository of lecturecasts.
I also make extensive use of the MyClassroom Learning Management System to make online resources available to students, e.g. the above-mentioned lecturecasts.
Students are also encouraged to contribute to an online forum each year, on MyClassroom. This encourages online collaboration, which supplements the in-person collaboration that is fostered in class.

### 6. Teaching Effectiveness

**a. Peer Assessment of Teaching**

In 2007, I took part in an illuminative evaluation of one of my courses (Map Projections 2), which involved being evaluated and critiqued by peers. I made my course notes and assessment materials available, and I video recorded one of my lectures, so that my peers could have a better understanding of my teaching methods and style. The results of the evaluation was fed back to me, and it proved to be very useful.

Some colleagues have expressed the desire to acquire skills in GIS. I have offered my colleagues the opportunity to attend my introductory GIS classes to develop their own GIS knowledge. This allowed me the opportunity to have my teaching critiqued.

**b. Student Assessment of Teaching**

I have consistently been commended by my students on my clear and thoughtful teaching style. **Evidence:** Letter of support from an ex-student, Mr Mayekiso (Appendix E).

**Course evaluations**

I conduct course evaluations every year to constantly be aware of my teaching effectiveness. CPUT has produced a generic course evaluation template which students complete each year – this is usually done for one course per lecturer. Whilst satisfactory for providing CPUT with an overall impression of the effectiveness of lecturers, I have found that these evaluation instruments are not effective in providing me with qualitative information that will be helpful in fine-tuning
my courses. I have therefore developed my own course evaluations which I get my students to complete, in addition to the CPUT evaluation. I have developed 2 questionnaires. The first questionnaire is very similar to the CPUT evaluation, with 3 extra qualitative questions, and an extra column for students to provide comments.

**Evidence:** Student feedback questionnaire for GIS3 (Appendix C).

Another questionnaire has been developed which I use for my Spatial Analysis 3 course – this consists of exclusively qualitative questions.

**Evidence:** Qualitative questionnaire for Spatial Analysis 3 (Appendix C).

I have found that this questionnaire has been most helpful in developing the Spatial Analysis 3 course. Spatial Analysis 3 is a course that I have developed in its entirety (it was introduced for the first time in 2012 and I have been the only lecturer for the course) and is the course that is the site of my PhD research. It has thus provided me with some very important information via the questionnaires.

**Results:**

As I have an enormous amount of data contained in student evaluations, I have decided to narrow my sample of data and report on 2 courses for which I have consecutive annual course evaluations, namely GIS3 and Spatial Analysis 3. I have also decided to cut off the data before 2011, so I am only reporting on my teaching for the last 5 years. For GIS3, I have used the questionnaire shown in Appendix C and I have analysed the years 2011-2013 to illustrate my reflective teaching practice. For Spatial Analysis 3, I have used the qualitative questionnaire in Appendix C and analysed the years 2013-2014. As this is a detailed qualitative analysis, I have included it as an appendix.

**Evidence:** See Appendix D for an analysis of the GIS3 and Spatial Analysis 3 student evaluations.
7. Research

Current research

My main areas of research are: geomatics education, posthumanism, GIS, spatio-temporal mapping, participatory mapping and informal settlement upgrading.

I am currently studying towards a PhD in Education. My thesis is entitled “Critical Posthumanism in Geomatics Education”, and it is largely based on the digital storytelling intervention in my Spatial Analysis 3 class. I belong to an NRF-funded research project, called “Posthumanism, the Affective Turn and Socially Just Pedagogies in Higher Education”. I have been immersed in the philosophical framework of posthumanism, and am heavily invested in research around decolonization, bridging the gap between art and science, and socially just education.

I have been granted an international fellowship at the Centre for the Humanities at Utrecht University in the Netherlands. The Centre is run by world-renowned philosopher Prof. Rosi Braidotti. I attended a Summer School course convened by her in 2015, and then visited the Centre again in 2017. An international perspective helps to contextualize my teaching.

My research on teaching & learning has been developing steadily over the last few years, and my PhD research has given me the theoretical and methodological tools to move my teaching and research forward substantively. My research is an example of interdisciplinary work that is located at the intersection of geomatics, art, and critical pedagogy. It is a site “where multiple discourses intersect” (Nayar 2014). In a deliberately playful yet resistant stance, I have chosen to not respect the boundary between art and science. I have engaged in what Haraway calls art/science activism (Haraway 2016), using the navigational potential of storytelling to chart a path towards an ethical becoming.

Research outputs

Since 2011, I have produced 4 accredited, peer-reviewed journal articles, 8 peer-reviewed conference proceedings, and have co-authored one book chapter (in press).

Accredited journal articles


**Non-accredited journal articles**


• Musungu, K., Motala, S. & Mancitshana, B. 2013. Enhancing community participation when planning informal settlements. *PositionIT*, March

**Peer-reviewed conference proceedings**


**Award:**
Best presentation at the 13th International Multidisciplinary Scientific Geoconference SGEM 2013, Albena, Bulgaria

**Conference presentations**


**Book chapter**


**Research supervision**

**Masters level**
I have successfully supervised one MSc (Geomatics) student at UCT and one MTech (Cartography) student at CPUT

**Honours**
I have supervised 7 students at UCT who graduated with a BSc(Hons) in GIS.
**BTech**
I have supervised 8 students at CPUT who have graduated with a BTech in Surveying or Cartography (GISc).

**Research Contributions**

**External examiner**
I have been, and continue to be, an external examiner for UKZN (Honours research) and UCT (Honours and Masters research). I have examined 2 Masters dissertations and 17 Honours level projects. I am also an external examiner for selected GIS courses at UCT.

**Reviewer**
I have acted as a reviewer for the South African Journal of Geomatics, South African Journal of Higher Education, and Southern African Humanities, three academic, peer-reviewed journals. I was also a reviewer for the following peer-reviewed, academic conferences: AfricaGEO 2011 and SASEE (South African Society of Engineering Education) 2103.

**Conference organizing and publishing**
See “AfricaGEO” in section (9) below.

**Collaboration with other departments**
I have fostered close ties with colleagues from other departments, and one of the benefits is interdisciplinary collaborative research. For example, I collaborate with the F’SATI space science programme at CPUT in remote sensing and GIS research. I have presented at the 2nd CubeSat workshop in 2014 on the development of a regional Masters programme in GIS and remote sensing. I also collaborate with staff from Fundani and the Education faculty on research in digital storytelling.

**Research Groups**
Member of and contributor to:
- African Centre for Cities (ACC)
- Centre for Research in Engineering Education (CREE)
- Posthumanism, the Affective Turn and Socially Just Pedagogies – an NRF-funded research group
8. Industry Responsiveness

The South African Geomatics Council (SAGC)
I was a member of the Educational Advisory Committee for GIS education, and evaluate applicants who wish to be registered as GIS practitioners.

AfricaGEO
I was on the organizing committee of AfricaGEO 2014, the largest geomatics conference on the continent. I was one of two academic chairs of the conference, and was responsible for the publishing of approximately 100 papers in two tracks (the industry and academic track).


Western Cape Spatial Information Forum (WCSIF)
Member of the Western Cape Spatial Information Forum (WCSIF), an initiative run by the Western Cape government. I am regularly asked by the WCSIF to present at its annual meeting on innovative research and teaching & learning practice.

9. Institutional Development

CPUT

I am the Curriculum Officer for the Department of Civil Engineering and Surveying, and am responsible for the strategic direction of the department in terms of developing a suite of new geomatics qualifications, such as the Diploma, the Bachelor, the Honours and the Regional Masters. This, together with my experience gained in the Teaching & Learning Committee, has given me significant insight into the development and management of academic programmes.

SASSCAL Regional Masters qualification:
I am the CPUT representative for the design and implementation of the Regional Masters in GIS and Remote Sensing. The Southern African Science Service Centre for Climate Change and Adaptive Land Management (SASSCAL) is an initiative of the German Federal Ministry of Education and Research, in co-operation especially with Angola, Botswana, Namibia, South Africa and Zambia. The SASSCAL task 303 aims at developing a regional postgraduate programme in Earth Observation, GIS and Remote Sensing in collaboration with the Namibian University of Science and Technology (NU), Cape Peninsula University of Technology (CPUT), the University of Botswana (UB) and the University of Zambia (UNZA) with assistance from the
Germany Space Agency (DLR) and the University of Trier. I have traveled to Namibia and Zambia, and hosted an international delegation in Cape Town. The Department of Electrical Engineering at CPUT is also involved in the SASSCAL project, and there are strong ties with the F’SATI satellite programme. The programme is preparing an innovative Masters level qualification that will be held across sites and countries. It will significantly boost regional cooperation, knowledge production and knowledge transfer in Southern Africa.

**Teaching Development Grant**
In 2012-2013, I was a recipient of the Teaching Development Grant which was used to set up a multimedia studio in the Department of Civil Engineering and Surveying. The studio contained two soundproof booths and state-of-the-art equipment for recording lectures and publishing online content. It has been used to record lectures which are published online for students. Students are also allowed to use the multimedia studio to produce their digital stories. The multimedia studio has been recognized by the institution and the Department of Higher Education and Training as a resounding success, and has been praised.

**Evidence:** See letter from Prof. Winberg (Appendix E).

**Links with CREE**
I have been the CPUT institutional representative on the management committee of the Centre for Research in Engineering Education (CREE) based at UCT, largely due to my interest in engineering education and my desire to foster inter-institutional linkages.

**UCT**
I was employed by the Geomatics Division in the School of Architecture, Planning and Geomatics as a lecturer, and took over as undergraduate and postgraduate programme convenor in 2010. This experience has given me a solid grounding in undergraduate and postgraduate administration.

**Evidence:** See letter from Dr J. Whittal from UCT (Appendix E).
10. Community Involvement

I am extensively involved in community projects, which has a direct benefit to my teaching practice and research.

**District Six research**

I initiated a relationship between myself and the District Six Museum in 2006 when I realized that the Cape Town campus of CPUT was born out of the ashes of the old District Six. I wondered if the Museum would be interested in knowing exactly where is the location of some of the old demolished buildings of District Six. The relationship is longstanding, and I have assisted them with numerous research and teaching projects. At CPUT and UCT, I prepared tasks for students to calculate the coordinates and locate the positions of some important buildings that the Museum identified. I have also supervised 2 BTech students who undertook research related to the mapping of District Six. I am currently (in 2017) supervising a BTech student who is using geomatics techniques to find the exact location of historic sites that used to exist in District Six.

At UCT, I have supervised 4 Honours level thesis projects based on District Six research, done in collaboration with the Museum.

**Evidence:**
Abstract of published journal article on the mapping of District Six (Appendix A);
Letter from Dr J. Whittal from UCT, proving my long-term involvement with District Six research (Appendix E).

**WC Education Department**

I have offered my teaching services to the Western Cape Education Department, and have conducted a free GIS course which was attended by Geography subject advisors. The Department identified a need for teachers to be trained in GIS software. Advisors were then provided with Free and Open Source GIS software (QGIS), software, notes and a training manual during a one-day training course.

**Non-governmental Organisations (NGOs) and community upgrading**

I have good ties with NGOs such as CORC/SDI, the Isandla Institute and Violence Prevention through Urban Upgrading (VPUU). I generally cooperate with these organisations on informal settlement upgrading research. In the past, the NGOs have expressed a need to have a problem solved with GIS technology, and these problems are tackled by my students as part of their
research. This has proven to be very successful in most cases, fostering positive collaborations between community organisations and academia.

My involvement in community upgrading through mapping has also led me to get involved with a project being run in the Department of Civil Engineering and Surveying. This project aims to erect a community centre in Khayelisha, and I have been lending my expertise to the civil engineering students who are involved.

I have recently partnered with the University of Michigan School of Information’s Global Information Engagement Program (UMSI GIEP). Through this program, one of my postgraduate students works in collaboration with students from the University of Michigan to provide assistance through spatial analysis to the Haven Night Shelters in Cape Town.

**Evidence:** Abstract of published research paper entitled “Exploring the potential for geographical knowledge systems in upgrading informal settlements in Cape Town” explaining how we partnered with VPUU (Appendix A).

**Free and Open Source software**

In principle, I agree with the ethos of the Free and Open Source GIS (FOSS GIS) community, where access to information technology is democratized through the participation of a community of practitioners. I support the use of open source licenses for GIS software. Open source software and its source code is made available for anybody to use or modify. An example of such a software package is Quantum GIS (QGIS). Over the years, I have introduced QGIS into my teaching, and now the Spatial Analysis 3 course requires all the practical work to be done using QGIS. This is beneficial to new graduates, as they do not have to deal with the prohibitive cost of acquiring GIS software.

I have fostered strong ties with the FOSS GIS community, and I have also committed my time to producing teaching material for them. My teaching material has been, and continues to be used by global QGIS users.

**Evidence:** The online QGIS training manual can be found at [http://docs.qgis.org/2.8/en/docs/training_manual/](http://docs.qgis.org/2.8/en/docs/training_manual/) and a link to one of the modules that I co-developed: [http://docs.qgis.org/2.8/en/docs/training_manual/complete_analysis/analysis_exercise.html](http://docs.qgis.org/2.8/en/docs/training_manual/complete_analysis/analysis_exercise.html) This manual is a very important resource used internationally by people who are learning how to use QGIS.
References


Appendix A

Abstracts of selected published works
ONCE UPON A PLACE: STORYTELLING IN GIS EDUCATION

Siddique Motala, Kevin Munyaga
Department of Civil Engineering and Surveying, Cape Peninsula University of Technology

ABSTRACT

This paper reports on a case study that aims at examining the effects on student learning of Geographic Information Systems (GIS) by introducing storytelling in teaching/learning activities, such as stories being told to the students, and stories that the students told. After the introduction of storytelling, positive effects on student motivation were observed, as well as demonstration of higher-order learning. Narratives helped students to internalize the learning, especially when the narratives were personal.

Keywords: Storytelling, GIS education, higher order learning, motivation

Constructive Alignment of an introductory university Geographic Information Systems course

Siddique MOTALA, South Africa

Keywords: Geographic Information Systems, GIS education, constructive alignment, SDLO taxonomy, curriculum objectives, teaching and learning activities, assessment, evaluation

SUMMARY

John Biggs’ concept of ‘constructive alignment’, as applied to an introductory Geographic Information Systems (GIS) course at the University of Cape Town is reported on. A brief explanation of the principles of constructive alignment is given, and the benefits that are seen in the implementation is discussed, together with a contextualization of GIS education in South Africa. Constructive alignment is a holistic framework, which enables in the design of the teaching/learning activities, curriculum objectives and assessment tasks. A constructive alignment model was developed for the GIS course and is described here. The preliminary findings of this action research are reported on. It was found to be a useful tool in GIS course design, and can be used on an ongoing basis to refine the total learning experience of students.
Evaluating an animated and static time series map of District Six: A visual and cognitive approach

Dinnyhalls Delwood1, Sibongile Motsa2

1 Chief Director, National Geospatial Information, Department of Rural Development and Land Reform, Cape Town, South Africa. dinnyhallsdelwood@gmail.com
2 Department of Civil Engineering and Surveying, Cape Peninsula University of Technology, Cape Town, South Africa. smotsa@cppu.za

DOI: http://dx.doi.org/10.4314/sajg.v4i5.7

Abstract

Visualization of spatial information is an important aspect in the representation of map displays. Maps today are readily adopted in a variety of methods in displaying spatial information temporally and at time series phenomena. GIS technology has incorporated tools for analyzing these spatio-temporal trends. However, map users are overwhelmed by the amount of information in these map displays and therefore experience cognitive overload. In this study we find that static and animated maps have their respective advantages in the visualization of the map reader by placing participants through a structured set of questions. All these factors assist in the visual and cognitive realm of the map reader. District Six is a unique area that has experienced significant spatial change in the last century, mainly attributed to its political history. This has been depicted in a conventional static and animated time series map representation which has been designed to facilitate the understanding of the spatial change that occurred during this unique period of history. In this paper a methodology has been investigated and implemented in the design of the map, by enhancing the map reader’s experience in visualizing time series spatial data. We conclude further that visual, cognitive, and emotional and cognitive factors that collectively strengthen the map reader’s ability to learning spatial information.
Exploring the potential for geographical knowledge systems in managing informal settlements in Cape Town

D. Lethukho*1, H. Mlambo2, L. Dikgang3

Department of Civil Engineering and Surveying, Cape Peninsula University of Technology, Cape Town, South Africa; *Institute of Geoinformatics, University of Bonn, Germany

E-mail: lthukho@capetowncity.gov.za

Abstract

Most of informal settlements are often faced with lack of structure services. These services are as such as water, sanitation and electricity. Challenges encountered in providing these services often use Geographical Information System (GIS) for easier prior to progressing arrangements in these areas. However, the information used in the GIS model is often limited by the physical characteristics of the informal settlements being analyzed. The solution to these problems is to develop an information system that allows for the calculation of costs of the settlement's infrastructure prior to the upgrading of the settlement.

The work done in the study is considered as part of the South African Department of Housing services in order to ensure that essential services are provided. The paper demonstrates the use of introducing GIS spatial models and mapping in relation to informal settlements upgrading based on information gathered from the residents of the informal settlements. Over the past, previous research on the informal settlements upgrading using GIS was limited together with ITRU which represents residents of Makuhini Park community, simple because they have limited knowledge of the area. The research utilized a methodology of GIS analysis for informal settlements upgrading using GIS, mapping and analysis of different decision methods. Buffer analysis, Network mapping, Location analysis, Attribute mapping, and Huff Gravity Functions. This study was carried out in Makuhini Park in Cape Town. The study has revealed that the use of information technology on GIS analysis for upgrading could be very valuable in making effective and efficient decisions during informal settlements upgrading process.

Key words: Informal settlements, GIS, participation, Buffer Analysis, Location Analysis, Huff Gravity Functions, Network Mapping, Multi-Criteria Evaluation (MCE)
Appendix B

Samples of Assessments
Question 5

Refer to the map below, which is useful in telling the story of Ibn Battuta, the medieval North African traveler. The map was created by using GIS software.

5.1 How many raster layers were used to create the map? (1)
5.2 How many vector layers were used to create the map? Give a possible name for each vector layer. (3)
5.3 Which vector layer is not labeled? (1)
5.4 What is the topological relationship between the city of Alexandria and the country of Egypt? (1)
5.5 What is the topological relationship between the country of Egypt and the country of Libya? (1)
5.6 What is the third topological relationship, which is not mentioned above? Give a South African example of this relationship. (2)
5.7 What is the name of the country that contains the cities of Fes and Tanger? (1)
5.8 List 3 cartographic elements that are present in the map, and briefly describe each. (3)
5.9 Which cartographic element on the map looks incorrect or useless? Explain why. (2)
Question 3

The map of Africa in the appendix might help you for this question.

You are approached by someone wanting to create maps of specific countries, for education purposes. She wants you to suggest what type of map projection would be most appropriate. For each of the following countries, suggest a projection surface and an aspect of the projection:

3.1 Morocco (2)
3.2 Lesotho (2)
3.3 Uganda (2)
3.4 Antarctica (2)

3.5 Give a reason for your answers in (3.1) - (3.4) (2)

Question 4

Refer to the map of Africa in the Appendix. It was drawn using the Mercator projection, and shows the locations of the capital cities of each country.

4.1 Ibn Battuta, the medieval Moroccan traveler, went from Morocco to Egypt during the first part of his journey. Draw the rhumb line between Rabat (capital of Morocco), and Cairo (capital of Egypt). Hand in the Appendix with your answer book. (2)

4.2 What is another word that has the same meaning as rhumb line? (1)

4.3 Will the geodesic follow the same path as the rhumb line that you drew in (4.1) between Rabat and Cairo? Give a reason for your answer. (2)

4.4 An architect in Luanda, Angola wants to know the direction between Luanda and Mecca, because he is designing a mosque there. Will the Mercator map assist him? Explain your answer. (2)

4.5 What is the approximate azimuth from Luanda to Mecca? Your answer should be correct to within 30°, so if you do not have a protractor, an estimate will suffice. Show the angle on the Appendix. (3)

4.6 Why is it important for the architect to know the direction to Mecca? (1)

4.6 What is the main difference between the Mercator projection and the Peter’s projection? (2)

[10] [13]
Assignment : Digital Storytelling and Spatial Analysis

Tell a story using maps
You are to tell a story that must be able to be followed on a map, and must contain numerous spatial analysis techniques.
The story might be:
- Your life story up to now;
- A trip you have taken;
- An analysis of some specific event (in your life or someone else’s);
- An analysis and explanation of some historic event;
- …..

Analysis
You must do all the analysis. The spatial analysis you use must be incorporated into the story. The spatial analysis and GIS processing contained in the story must, at a minimum, have the following:
- Data capture (e.g. digitizing, co-ordinate importing, or raster image georeferencing)
- Database analysis;
- Overlay analysis;
- Buffer analysis

If you use other types of analysis, you will be awarded extra marks. If you use other analysis techniques that have not been covered in this course, you will be awarded even more marks!

Submission
There are numerous ways that you can submit:
- A video file containing a narrated story (audio) and still maps (images) or moving maps (videos captured from the GIS);
- A website containing the story, with hyperlinks to videos, maps, analysis screenshots, etc.;
- A presentation by you to the rest of the class (if you choose this option, you get an extra week as the presentation will be scheduled a week after the hand-in date). This could be a PowerPoint presentation.

Some useful information
Free website creation: Wix.com, yola.com, webs.com, webnode.com, etc.
Free screen capture software: camstudio.org
Free audio editing software: http://audacity.sourceforge.net/
Media converter: Real player http://uk.real.com/

Due Date: Friday, 19 October 2012
If you choose to do a presentation to the class: 26 October 2012

This assignment counts for 15% of the total course mark.
Assignment : Digital Storytelling and Spatial Analysis

Tell a story using maps
You are to create a video that tells a story. The story must have a spatial component (you must use maps in telling the story), and must contain numerous spatial analysis techniques.
The story could be your story or someone else’s story. It could be about a social issue that you are interested in. The script must be written by you.

Analysis
You must do all the analysis. The spatial analysis you use must be incorporated into the story. The spatial analysis and GIS processing contained in the story must, at a minimum, have the following:
- Data capture (e.g. digitizing, co-ordinate importing, or raster image georeferencing)
- At least 3 types of spatial data analysis

Presentation: Conference
On the day of the conference:
1. Present a video file containing a narrated story (audio) and still maps (images) or moving maps (videos captured from the GIS);
2. After your video presentation, there will be a 5-10 minute discussion.

Some useful information
The script should not be longer than 300 words.
Free screen capture software: camstudio.org
Free audio editing software: http://audacity.sourceforge.net/
Media converter: Real player http://uk.real.com/
Other students’ digital stories: search for “CPUT stories” on YouTube

Conference Date: Thursday 31 October 2013 at 9:00
Questionnaire: after the conference, you will be asked to complete a questionnaire about what you have learnt.

This assignment counts for 20% of the total course mark.
Assignment: Digital Storytelling and Spatial Analysis

Tell a story using maps
You are to create a video that tells a story. The story must have a spatial component (you must use maps in telling the story), and must contain numerous spatial analysis techniques. The story could be your story or someone else’s story. It could be about a social issue that you are interested in. The script must be written by you.

You may work in teams (not > 2 people) for this assignment. If you work in a team, do a story on an issue that both of you agree on.

Analysis
You must do all the analysis. The spatial analysis you use must be incorporated into the story. The spatial analysis and GIS processing contained in the story must, at a minimum, have the following:
- Data capture (e.g. digitizing, co-ordinate importing, or raster image georeferencing)
- At least 3 types of spatial data analysis

Presentation: Conference
On the day of the conference:
1. Present a video file containing a narrated story (audio) and still maps (images) or moving maps (videos captured from the GIS);
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Free screen capture software: camstudio.org
Free audio editing software: http://audacity.sourceforge.net/
Media converter: Real player http://uk.real.com/
Other students’ digital stories: search for “CPUT stories” on YouTube

Conference Date: Thursday 30 October 2014 at 9:10
Questionnaire: after the conference, you will be asked to complete a questionnaire about what you have learnt.

This assignment counts for 20% of the total course mark.
Appendix C

Student feedback questionnaires
## GIS3 student feedback questionnaire

**Student Feedback on Teaching**

**Course:**

______________________________

### Instructions

Rate your lecturer for each statement according to the following rating:

**A** - strongly disagree,  **B** - disagree,  **C** - neutral,  **D** - agree,  **E** - strongly agree

<table>
<thead>
<tr>
<th>Question</th>
<th>Rating</th>
<th>Comment (optional)</th>
</tr>
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<tbody>
<tr>
<td>The lecturer speaks clearly.</td>
<td></td>
<td></td>
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<tr>
<td>The lecturer starts class on time.</td>
<td></td>
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<tr>
<td>The lecturer provides reasonable opportunities to interact with students in lectures and outside lectures.</td>
<td></td>
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<tr>
<td>The lecturer behaves in a professional manner and treats students with respect and dignity.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The lecturer provides clear guidelines on the standard of work expected from students.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The lecturer is well prepared for classes.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clear, well written up-to-date lecture notes / handouts and other learning material are made available for student on time.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All sections of the work are allocated a fair amount of time.</td>
<td></td>
<td></td>
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<tr>
<td>The lecturer's classes are well planned.</td>
<td></td>
<td></td>
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<tr>
<td>The learning objectives of each class are clear.</td>
<td></td>
<td></td>
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<tr>
<td>The lecturer's presentation is logical and coherent.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The lecturer stimulates interest in the subject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students are involved in the learning activities and encouraged to think for themselves.</td>
<td></td>
<td></td>
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<tr>
<td>Teaching media (e.g., PowerPoint, overhead slides, Blackboard) are used to help students engage with the concepts being taught.</td>
<td></td>
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<tr>
<td>The lecturer prepares students for assessment tasks and gives clear instructions.</td>
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use the back of this sheet if you need more space
<table>
<thead>
<tr>
<th></th>
<th>All assessment tasks include clear assessment criteria.</th>
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<tbody>
<tr>
<td>17</td>
<td>Assessment tasks are directly relevant to the material actually taught.</td>
</tr>
<tr>
<td>18</td>
<td>Assessment tasks require an in-depth understanding of the subject (rather than rote memorization).</td>
</tr>
<tr>
<td>19</td>
<td>Submitted work is returned within a reasonable time.</td>
</tr>
<tr>
<td>20</td>
<td>The lecturer’s feedback comments are useful.</td>
</tr>
<tr>
<td>21</td>
<td>The assessment workload is appropriate and reasonable.</td>
</tr>
<tr>
<td>22</td>
<td>What aspects of this course do you appreciate or value?</td>
</tr>
<tr>
<td>23</td>
<td>What aspects of this course do you find particularly difficult?</td>
</tr>
<tr>
<td>24</td>
<td>What aspects of this course do you think need attention?</td>
</tr>
</tbody>
</table>
**Spatial Analysis student feedback questionnaire**

**Spatial Analysis Digital Storytelling evaluation**
**and End of Year Course evaluation**

<table>
<thead>
<tr>
<th>Question</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question 1</td>
<td>Did your GIS knowledge improve after completing this task and seeing the other students' stories? Explain.</td>
</tr>
<tr>
<td>Question 2</td>
<td>Did you learn anything about a social issue/s or did your general knowledge improve? Explain.</td>
</tr>
<tr>
<td>Question 3</td>
<td>If you had another chance to do this task, what would you do to improve your movie?</td>
</tr>
<tr>
<td>Question 4</td>
<td>What aspects of the Spatial Analysis course do you appreciate or value?</td>
</tr>
<tr>
<td>Question 5</td>
<td>What aspects of the Spatial Analysis course do you find difficult?</td>
</tr>
<tr>
<td>Question 6</td>
<td>What aspects of the Spatial Analysis course do you think need attention?</td>
</tr>
</tbody>
</table>
Appendix D
Analysis of student feedback on teaching
GIS3 student evaluations 2011-2013

For the statements 1-21, students were asked to respond to the following question:

Rate your lecturer for each statement according to the following rating:
A - strongly disagree,  B - disagree,  C - neutral,  D - agree,  E - strongly agree

For ease of reading, the questions are shown below:

1. The lecturer speaks clearly.
2. The lecturer starts class on time.
3. The lecturer provides reasonable opportunities to interact with students in lectures and outside lectures.
4. The lecturer behaves in a professional manner and treats students with respect and dignity.
5. The lecturer provides clear guidelines on the standard of work expected from students.
6. The lecturer is well prepared for classes.
7. Clear, well written up-to-date lecture notes / handouts and other learning material are made available for student on time.
8. All sections of the work are allocated a fair amount of time.
9. The lecturer's classes are well planned.
10. The learning objectives of each class are clear.
11. The lecturer's presentation is logical and coherent.
12. The lecturer stimulates interest in the subject.
13. Students are involved in the learning activities and encouraged to think for themselves.
14. Teaching media (e.g., PowerPoint, overhead slides, Blackboard) are used to help students engage with the concepts being taught.
15. The lecturer prepares students for assessment tasks and gives clear instructions.
16. All assessment tasks include clear assessment criteria.
17. Assessment tasks are directly relevant to the material actually taught.
18. Assessment tasks require an in-depth understanding of the subject (rather than rote memorization).
19. Submitted work is returned within a reasonable time.
20. The lecturer's feedback comments are useful.
21. The assessment workload is appropriate and reasonable.

The responses to the questions were captured and represented in bar graphs, shown below. Responses of ‘D’ and ‘E’ are taken to be favorable responses, requiring no attention on my behalf. ‘C’ responses are neutral responses, and were taken cognizance of. ‘A’ and ‘B’ responses are those which I paid most attention to.

The next three questions are:

22. What aspects of this course do you appreciate or value?
23. What aspects of this course do you find particularly difficult?
24. What aspects of this course do you think need attention?

These were questions that I added, and have proven to be very beneficial for curriculum development and course improvement.

Results for 2011:
The actual questionnaires that the students completed can be found in Appendix E. The graphs below show how many ‘A’, ‘B’, ‘C’, ‘D’ and ‘E’ responses were recorded for the 2011 cohort.

![Graph showing responses for 2011](image)

In 2011, the GIS3 sample (n=20 students) contained 5 instances where students gave ‘A’ responses and 7 instances of ‘B’. The numbers of ‘D’ and ‘E’ responses were 163 and 177 respectively. A and B responses (negative responses) consisted of 2.7% of all responses, and D and E responses (positive responses) consisted of 77.2% of all responses.

Of the 12 negative responses (strongly disagree or disagree), the statements that occurred more than once were:
- The lecturer starts class on time.
- Submitted work is returned within a reasonable time.
- The lecturer's feedback comments are useful.

I clearly had to deal with my time management and feedback to students.

Qualitative responses:

The aspects of the course that students most valued:

- “Practical is more interesting”
- “The practical work”

These sort of responses were typical, and occurred many more times. I designed a set of practical exercises that were very well received.

Another student appreciated my interactions with them and the discussions about my professional experience in the GIS industry:

- “The interaction with the students and discussing what the field out there is up to”.

The aspects of the course that need attention:

- “More prac and less theory evaluation”
“More practical tests”
“Practical classes should cover more detail”

During 2011, I had the course separated into practical sessions and theory lectures. Students would have preferred to have the theory significantly reduced and the practical element increased. It was not unexpected as GIS is a practical discipline, and students often feel that mastery of the software is all that is needed. Whilst this is important, the theoretical grounding is what will ensure longevity in the industry, as software is constantly developing.
What the responses above showed me was the clear distinction between theory and practical work that was evident in the course. I decided to present the software and theory in a more integrated way in the next iteration.

In 2012, I took cognizance of the previous year’s results and attempted to address them in class.

In 2012, the sample (n=28 students) contained 6 instances where students gave ‘A’ responses and 12 instances of ‘B’. The numbers of ‘D’ and ‘E’ responses were 268 and 235 respectively. A and B responses (negative responses) consisted of 3% of all responses, and D and E responses (positive responses) consisted of 85.5% of all responses.

Of the 18 negative responses, the statements that occurred more than once were:
All sections of the work are allocated a fair amount of time.
Submitted work is returned within a reasonable time.

It can be seen that the students had a real problem with me taking too long to return their submissions within a reasonable time, as this appeared two years in a row. This was something I needed to pay closer attention to.
I believe that I took too long on some sections, as I had introduced the storytelling intervention during this year, and focused on it in some sections of the curriculum. In retrospect, I could have focused less on the stories, but as this was the first time and was passionate about the intervention, I understand the time taken.

Qualitative responses:
The aspects of the course that students most valued:
The majority of students (more than 50%) expressed that the practical aspect of the course was most valuable, as did the cohort of 2011. For example:
“The practical part is more understandable”
“Practical sessions”
“The practical work that we do in class and for the assignments is very interesting”

There is more evidence of students appreciating the integration of the practical aspects with the theory:
“Practical applications of the work”
“The examples of GIS use, and practical sessions”
“The practical session give clear understanding of GIS”

As this was the year that I introduced storytelling into the curriculum, I started to see appreciation of it:
“The story of Ibn Matuta. Helped a lot”
“stories”
“The lecturer makes the subject interesting. Because he knows it well.”

The aspects of the course that students found difficult, and thought needed attention:
“Theoretical part”
“Theory”
“The theory is not well explained and sometimes difficult to understand”
“The lecturer should discuss the theory more, so that we can have a better understanding”

Being a third year level subject, the theory is difficult to understand in some places, so I did expect comments like this. However, I took these comments into consideration when planning the next iteration.

In 2013, I took cognizance of the previous two year’s results and attempted to address them in class.
Despite having many pressures on my workload, I made a concerted effort to return student submissions timeously. Students clearly appreciated the formative feedback, so that they could attempt big summative assessments having obtained some feedback from me.
I also continued to further integrate the theoretical and practical aspects of the course, in the teaching (such as the storytelling) and assessments (in the assignments and tests).
In 2012, the sample (n=18 students) contained no ‘A’ and ‘B’ responses. The numbers of ‘D’ and ‘E’ responses were 205 and 162 respectively. A and B responses (negative responses) consisted of 0% of all responses, and D and E responses (positive responses) consisted of 97% of all responses.

I believe that the marked improvement in my teaching effectiveness was due to the added effort I placed on areas that previous student cohorts identified as problematic.

Qualitative responses:

The aspects of the course that students most valued:

Again, the majority of students appreciated the practicals, and some appreciated the combination of theory and practicals:

“Practical and theory”
“‘The practical work was really interesting’
“The practical applications”

The storytelling was well received:

“The history part about Ibn Batuta was really good”

Needed attention:
There were not many suggestions this time around on how the course should be improved, and I interpret this as the course being well designed and well executed. As before, some students did feel that the theory was difficult, but there were not as many such comments as in previous years. However, as before, the results were taken into consideration and the course was further improved in 2014, but not as significantly as in the 3 previous iterations.
Spatial Analysis 3 student evaluations 2013-2014

Spatial Analysis 3 is a new course that was introduced in 2012. I have developed this course exclusively, and I am very proud of how it has developed. The questionnaire I used in 2012 was the usual questionnaire I used for all my other courses (such as the GIS3 questionnaire in Appendix C) but I found this to be insufficient for the sort of data I was looking for, to fine-tune the course and the digital storytelling intervention. I therefore developed a simple, 6-question questionnaire that is proving to be very useful. After students have been through the semester and produced their digital stories, they are required to complete the online course evaluation. It is a combination of a course evaluation and an evaluation of the specific intervention.

For ease of reading, the questions are repeated below:

Question 1 Did your GIS knowledge improve after completing this task and seeing the other students' stories? Explain.
Question 2 Did you learn anything about a social issue/s or did your general knowledge improve? Explain.
Question 3 If you had another chance to do this task, what would you do to improve your movie?
Question 4 What aspects of the Spatial Analysis course do you appreciate or value?
Question 5 What aspects of the Spatial Analysis course do you find difficult?
Question 6 What aspects of the Spatial Analysis course do you think need attention?

I could not complete a course evaluation in 2015 due to student protest action on campus, but I do have the 2 previous years’ evaluations available. The major assignment of this course requires students to produce a digital story which combines mapping, spatial analysis techniques and digital storytelling (described in section 4). This assignment forms the case study of my PhD research.

I obtained a lot of rich information from the questionnaires, and some highlights are shown below.

2013 results

In 2013, I used the qualitative questionnaire for the first time.

Did your GIS knowledge improve?
Students all said that their GIS knowledge improved, but what struck me from their answers to this question was their surprise at how they could use GIS creatively:

“…was very interesting and illustrated that with a little creativity one can create informative and interesting presentations to communicate their point more effectively.”
“Seeing other students stories made realize that I need to think more out of the box and research more so that I could learn more about other people. And also to be more creative.”
“I realized how creative some students can be”

One of the objectives of my PhD research is to see how storytelling can be used as a tool to investigate how points of compatibility between the ‘hard’ and ‘soft’ sciences can be found. The quotes above indeed show that students can be encouraged to use creativity in carrying out very technical, engineering-type tasks.

Did your general knowledge improve / did you learn anything about a social issue?
Students showed their appreciation for acquiring knowledge about different domains:
“Yes, I learned a lot about history, different cultures and it also gave you insight to how people perceived certain events.”

“Definitely, the various topics used were very informative, plus the research I conducted for my own story (Rhino Poaching) revealed some interesting facts about that phenomenon.”

“Yes, it did, other than working together with fellow students, it helped me understand the social issues they face. My topic was very close to my heart, I've always wanted to research my heritage, and this project just opened a new door to discovering who I am.”

These were very powerful and poignant learnings. Some students expressed how this task taught them something about themselves:

“My topic was very close to my heart, I've always wanted to research my heritage, and this project just opened a new door to discovering who I am.”

“I also learn from Mr Pama story because Mr Pama story was based on our history of Xhosa people.”

The storytelling intervention is also aimed as a decolonizing pedagogy, where students are given the opportunity to present their own subjugated knowledges to each other, challenging the dominant doxa present in the curriculum. The following quote shows this consciousness:

“Yes, In my own story, It was interesting to note the societal stereotypes associated with rhino poaching regarding the nature of the poacher, as well as the stereotype that Black people ARE generally not concerned with the plight of animals. This (according to the stereotype) is generally the concern of middle to upper class white South Africa.”

Aspects of the course that were appreciated:

Students really enjoyed using the software:

“The practical work on Quantum and Arc is interesting and well explained.”

Linking the knowledge from different domains, indicating higher-order thinking:

“I appreciated how this course can be integrated with other aspects such politic such as analyzing census, property boundaries etc.”

“The fact that we were supposed to create videos about social issues and explore in-depth spatial analysis, and how we can use it in the working world as a vital component.”

“The lecture give us a chance to think for ourselves. And with that we are able to relate some of the staff we did in class in the work place.”

Aspects of the course that needed attention:

There were no overwhelming themes that came through, but some of the comments that were taken cognizance of:

“The course could do with a bit more one-on-one assistance to students that struggle slightly.”

“On how to answer the question about the types of analysis.”

The comment above refers to a section in the assessment where students are required to explain how to solve practical problems using GIS. Students found this particularly difficult as they are meant to write about how to solve a specific problem with GIS. This is not easy to do in a written test, without using the software.
2014 results

In 2014, I focused on how students should answer the application of spatial analysis questions. I assisted them by suggesting four questions that could serve as thinking tools to answer each question:

1. What input layer/s will I use?
2. What type/s of analysis will I use?
3. Describe the analysis operation/s
4. What is the result of the analysis?

These proved very useful in the course, and the questions were answered more effectively in the test, when compared to the same questions of 2013. One student explicitly showed appreciation for this methodology: “the different types of spatial analysis. and how we worked through each in the class to see what they do.” This comment refers to how I systematically worked through analysis problems using the four questions above as guides.

Did your GIS knowledge improve?
All students replied in the affirmative, and some explained further.

“Yes it pretty well did because you learn from other people and obviously you have to ask other people when you don't know something.”
“Yes. seeing how everyone used the knowledge learned in GIS over the course, I managed to broaden my vision of just how t can be used to depict and communicate about anything if you just apply your mind and put in the creative effort.”

These students showed that their learning of the software was influenced by collaboration with peers. This was an explicit objective of the course, as I encourage conversation through giving time in lectures for group discussion, and I also require them to complete some assessments collaboratively.

Making connections between mapping and other issues:
“I have learnt how to include or use GIS concerning social issues”
“the presentations opened levels that I did not think of exploring”
“it also helped me to understand that mapping can be used in all fields not only specified areas.”

If one would look at it through a taxonomy of learning, e.g. Bloom’s Taxonomy, an application of knowledge to previously unknown domains is shown (Synthesis or Creating). This certainly indicates higher-level thinking, activated through the creative process.

Which aspects of the course needs attention/ found difficult:

“More time for practical things and more tutorials on software functions. (finding out what more cool stuff one can do). So maybe a little more brushing over a few more software functions if time allows that is.”
“The time pressure, and the little time for experimenting with the software in terms of time for playing around in class. But in the end, that is probably not needed because having to perform assignments by trial and error and own research really makes one remember the things you discover when you explore in your own time, and that is a better approach in the end.”

The quote above shows that the student was pressed for time, and appreciated my hands-on approach to using the software. However, in the same comment, the student realizes that time constraints of the
structured semester could not practically provide for more time to ‘play around in class’. They realized the importance of discovering the software through self-study and research, which I emphasized in the course.
Appendix E

Letters of recommendation and correspondence
27 June 2017

To Whom It May Concern:

This letter is my personal recommendation for Siddique Motala. Siddique taught me 3rd year GIS and Surveying in 2005. At the beginning of that year I was very despondent to Surveying until I met Siddique. Siddique was not only a lecturer but a mentor in the field of Geoinformatics. His passion for the field was infectious and the instilled a desire to succeed in the field.

After two years of graduating from CPUT I started my company Geo-Q Technologies building location based solutions for organisations. I have been constantly in touch with Siddique and have given annual guest lectures to his 3rd year class on GIS, opportunities and skills required in the industry. I do these lectures to hopefully inspire 3rd years like I was inspired by Siddique.

I fully support Siddique's application for the Excellence in Teaching and Learning Award.

Sincerely yours,

Zukhanye Mayekiso Founder & CEO

Rosebank Corner, Cnr Jan Smuts & 7th Avenue, Parktown North Johannesburg
UNIVERSITY OF THE WESTERN CAPE

DIRECTORATE: TEACHING AND LEARNING

RE: Recommendation for Siddique Motala in his application for HELTASA/CHE National Excellence in Teaching and Learning Award 2017

I would like to support Siddique Motala’s application for the HELTASA/CHE National Excellence in Teaching and Learning Award 2017 as I believe he deserves national recognition for his scholarly and practical work in the field of Higher Education Teaching and Learning in South Africa. I met Siddique on a Cape Higher Education Consortium (CHEC) short course on developing a Proposal for Educational Research Project in Higher Education in 2014. I was the facilitator for Siddique’s proposal, after which he decided to enroll for a PhD in Higher Education studies at UWC with myself as his supervisor. Since this period, I have witnessed an extraordinary growth in Siddique and his interest in the scholarship of teaching and learning. He has been very involved in the National Research Foundation (NRF) projects on Socially Just Pedagogies, of which I am the principal investigator, and is the recipient of a Staff Development grant for his PhD on one of these projects. He has also been awarded an Erasmus Mundus fellowship to pursue his interest regarding his scholarship and his PhD work which pertains to his teaching. He has visited Utrecht University twice as a fellow of distinguished Professor Rosi Braidotti’s Centre for Humanities Research and worked closely with Prof Braidotti, who has given him advice on his work. He also attended a Summer School at Utrecht University run by Prof Braidotti, which has assisted him to develop his conceptual work in his thesis.

Siddique Motala is a very talented teacher and has been acknowledged for his pioneering work in the Engineering Faculty of his university. His use of digital stories in his teaching has been acclaimed and he has received research grants to further his work on this and has been requested by a number of courses and universities to present on his work in this area. His thesis will make a contribution to the Geomatics curriculum in South Africa, as he is looking at the current and past national Geomatics curriculum and making recommendations about it.

With regards to scholarship, Siddique has also been involved in writing and co-writing chapters and articles for publication, as well as conference presentations, which have benefited both himself and the colleagues he has co-presented and written with.

I have no hesitation in supporting Siddique Motala’s application for the HELTASA/CHE National Excellence in Teaching and Learning Award 2017 as I believe his work in teaching and learning in
South Africa deserves national recognition. There are few people in his field who are working in such creative and socially just ways to make a difference in students’ lives.

If you need any further information, my contact details are on the top of the page.

[Signature]

Prof. Vivienne Bozalek
Director Teaching and Learning
University of the Western Cape
To who it may concern

I have known Mr Siddique Motala since his enrolment for the Higher Diploma in Higher Education and Training, his participation in the CHEC Quality Teaching in Higher Education programme, and his enthusiastic involvement in teaching and learning projects. He is an exemplary university teacher, showing both passion for his subject of Geographical Information Systems (GIS) and innovative and inspiring teaching.

Mr Motala was a recipient of the first Teaching Development Grant in 2012, which he shared with colleagues to set up the multimedia studio in the department of Civil Engineering and Surveying. He demonstrated some of the work achieved on this project during the DHET inspection visit to CPUT in 2013 – for which CPUT received high praise. Mr Motala was involved in piloting the use of tablets in the ‘flipped classroom’, and has been very involved in the digital storytelling project. He has used digital stories in combination with GIS technology to enable his students to tell their stories of their journeys to CPUT, which they accurately plot, using the technology of their discipline. Many of the students’ stories are showcased on CPUT’s digital stories website and have been commended for their innovation mix of social media and professional level technologies. The innovative work that is doing with students is helping the institution understand what decolonizing higher education practices might comprise.

Mr Motala’s deep interest in higher education teaching and learning is accompanied by a passion for transforming the GIS/Land Surveying profession in South Africa, for the purpose of making this a more inclusive and more accountable profession. To this end he is currently engaged in a PhD study on this topic at the University of the Western Cape that is supervised by Professor Vivienne Bozalek, and which is supported by an NRF research grant. His work has been highly commended by a number of distinguished scholars in the field, such as Professor Rosi Braidotti.
(a Philosopher and Distinguished University Professor at Utrecht University and director of the Centre for the Humanities in Utrecht).

Mr Motala was promoted to senior lecturer in 2016 and in the same year was also the recipient of the Engineering Faculty’s Teaching Excellence Award. He is most deserving of these honours as he has shown his dedication to his students, to his profession, and to scholarship by taking his work in student development and professional development to a very high level of study and engagement.

I wholeheartedly endorse his application for the CHE/HELTASA National Teaching Excellence Award in 2017 and wish him success.

Yours faithfully,

PROFESSOR CHRISTINE WINBERG
SOUTH AFRICAN RESEARCH CHAIR: WORK-INTEGRATED LEARNING

e-mail: winbergc@cput.ac.za
Website: http://www.cput.ac.za
28 June 2017

To the Ad-Hominem Promotions Committee

REFERENCE FOR MR SIDDIQUE MOTALA

I heartily support the application by Mr. Siddique Motala for the CHE/HELTASA National Excellence in Teaching & Learning Award 2017. I have known Siddique since his studies for his Masters Degree in this Department and I was a newly appointed academic member of staff. Since then, Siddique has spent time in practice away from academia and returned to the academic environment at CPUT, then UCT where he was my colleague, and then moved back to CPUT.

**Academic and research ability:** I was not involved with Siddique’s research at the time of his MSc however, he began research work while at UCT and engaged with others on the campus in the area of education research and research in land rights in District Six, Cape Town. Siddique has shown himself to be engaged in written and oral forms of communication consistently well and superior to his peers. He is able to make connections with other researchers and practitioners from outside of his host institution and build collaborative links. He is also able to attract funding and present himself very well at international conferences. Siddique and I shared the role of scientific chair for the AfricaGEO2014 conference. This meant that we handled all the reviews and technical programme design and management. In addition, Siddique prepared a creative closing presentation acknowledging the contributions of the presenters from all around the world.

**Teaching ability:** In his ability to communicate, Siddique is a top performer. He is well able to convey both simple and difficult concepts, and is able to tailor his explanations to the level of the audience. Siddique had consistent positive feedback from the student online course evaluations and is acknowledged by staff and students at UCT as a competent teacher. He participated with enthusiasm in all aspects of teaching and on our annual survey camps. He is an approachable and likeable person who has a rapport with students and staff alike.

**Leadership and Administration:** Siddique served as Programme Convenor for the BSc Geomatics programme at UCT. As such he was responsible for the academic programme and attendance at all relevant Faculty meetings and reporting to the Head of Department and the Dean. In all other aspects of administration Siddique is a willing, efficient, enthusiastic and involved contributor. He replies timeously to emails and other queries of an administrative nature. He has played a representative role on Departmental and Faculty committees and is an active and positive contributor in meetings.
Public and professional service, incl. Social responsiveness: Siddique is a SA Geomatics Council-registered Professional Land Surveyor and is a respected member of the South African profession who is still actively involved in cadastral surveys. He has been involved with non-profit organisations in community service and engagement through research and consulting.

Character and collegiality: Siddique has a very pleasant personality, and is well liked by both staff and students. He has excellent interpersonal skills and shows sound moral judgment and a developed personal value system. He is a “self-starter” and can perform independently as well as participating fully and constructively in group work situations. His work demonstrates that he is thorough, rigorous, insightful, and yet creative.

Yours sincerely

Dr Jennifer Whittal

ASSOCIATE PROFESSOR
"Our Mission is to be an outstanding teaching and research university, educating for life and addressing the challenges facing our society."
As part of the SOTL@UJ activities, there will be a seminar by Siddique Motala on:

Critical posthumanism in Geomatics education

This presentation reports on current PhD research which investigates the use of storytelling in a geomatics undergraduate programme at the Cape Peninsula University of Technology (CPUT). Like other engineering qualifications in South Africa, geomatics undergraduate programmes are focused on maintaining minimum standards and covering specific technical knowledge areas. These standards tend to minimize the importance of affective, social and creative graduate attributes. Furthermore, no research has been conducted to interrogate the philosophical underpinnings to see if the current geomatics curriculum is striving to offer a socially just education or simply upholding the old colonial knowledge status quo. There is also a shortage of practical examples of how innovative pedagogical practices could be used to mitigate such problems.

This research project examines the use of storytelling as a potentially innovative transformative pedagogical practice in South African geomatics education. The framework that is used to theorise this intervention is critical posthumanism, which emphasises a respect for diversity, non-human others and sees the rhizomatic connectedness of all things. Critical posthumanism is a strand of posthumanism that seeks to posit affirmative reconceptualisations of human subjectivity. This research contributes to a growing multidisciplinary body of research on engineering education, and is unique in that it combines critical posthumanism and storytelling in geomatics education.

Mr Siddique Motala is a lecturer in the Department of Civil Engineering & Surveying at the Cape Peninsula University of Technology. He lectures surveying and Geographic Information Systems (GIS), and is currently studying towards a PhD in education.

The aim of SOTL@UJ is to support a community of practice at UJ with regard to the scholarship of teaching and learning and to generate scholarly debate about social justice in relation to the