TEACHING PORTFOLIO

Janet van Niekerk 2025

I have been involved in higher education teaching since 2012 and have lectured foundational and applied statistics courses as well as short courses for academic development of staff at universities and Public Health institutions.

Table of Contents

1.Executive Summary

Aristotle said “Educating the mind without educating the heart is no education at all.” This is especially true in South Africa where we learn in a diverse setting, with diverse styles and diverse prior knowledge. Through my latest international teaching experience in Saudi Arabia, United States of America, Portugal, France and other countries, this quote became all the more palpable and has influenced my teaching profoundly. I used to think that teaching was conveying information, but now I know that teaching is to touch lives, forever. The core of my teaching methods are the students and their learning. With this in mind, I have embarked on a journey to develop systems that are used to better current teaching methods, while aiming to never be disadvantageous to any student. My aim is to meet them where they are, and walk next to them to where they need to be.

My teaching experience can be summarized largely into two realms: firstly, undergraduate and graduate courses development and teaching in a traditional university setting, and secondly, short course development and delivery to Statistics departments at various international and national universities, public health institutes and research centers.

During my tenure as a senior lecturer at the University of Pretoria (UP, until 2018), I have developed and restructured various undergraduate and postgraduate courses. In first- and second-year Mathematical Statistics courses I innovated assessment-free tutorials for the aim of learning instead of the traditional assessment usage, as well as introducing industry-based projects in the first-year courses to align with the University of Pretoria’s vision of work-readiness. During my tenure at King Abdullah University of Science and Technology (KAUST), I was contracted as a lecturer for the second year Mathematical Statistics courses at UP during the COVID pandemic (2020) where I developed an industry-based project to aid work-readiness as described in the National Development Plan for 2030 (see Chapter 9)[1]. This innovation displayed a far reach and I was invited by Prof. Paulette Bloomer to present a seminar on this endeavor at the annual Teaching Indaba. Also, during my tenure at KAUST, I developed and taught lecturing blocks of two postgraduate modules in the Department of Statistics at UP during 2021 and 2022. Prior to 2018, I developed and taught the Biostatistics for Biological Sciences (BME780) course at UP and taught it again in 2022, while tenured at KAUST. From 2019 until now I was an extraordinary lecturer at the University of Pretoria. In 2024, I was a contracted

[1] National Planning Commission, 2012. National Development Plan 2030: Our future–make it work. *Pretoria: National Planning Commission*. Available at http://www.gov.za/sites/www.gov.za/files/devplan_2.pdf, accessed on 28 November 2017.

lecturer for a self-developed lecturing block of a postgraduate Bayesian statistics course at the University of Stellenbosch.

The disruptions of late 2016 at the University of Pretoria served as a catalyst for me to consider the fragility of teaching in person, in extreme circumstances, and as such I developed a framework (including sourcing of open-source software, roll-out on ClickUp and flipped classroom style pre-quizzes) for efficient and non-burdensome (in terms of data usage for students and filming the lecture for lecturers) online lecturing that formed part of the movement to hybrid learning[2]. We implemented this system to replace one contact lecture a week in 2017 for the first year Mathematical Statistics course and subsequently in 2018 for the second year Mathematical Statistics course.

I have been invited by the Deputy Dean: Teaching and Learning in the Faculty of Natural and Agricultural Sciences, as well as the Deputy Dean of the Faculty of Economic and Management Sciences at the University of Pretoria to present seminars about this system. I have presented a seminar about this system also at the Mamelodi campus on invitation, one such seminar is available at https://www.youtube.com/watch?v=jyN974hdVjg. This development became essential when the COVID pandemic arose and various lecturers used this framework.

Moreover, I used this system to implement Just-in-Time teaching (see Novak et. al. (1999)[3]) to ensure that that deep learning takes place in class, by conveying the factual content online.

These innovations were part of the reason that I won the Department of Statistics Teaching award in 2017 and was nominated by students from the NAS faculty for the best first-year lecturer award.

More recently, during my tenure at KAUST, I had no formal teaching responsibilities but was invited to teach short courses (which I developed) at the Centers for Disease Control and Prevention (USA), Flatiron Institute (USA), University of Lisbon (Portugal), Bordeaux Public Health department (France), University of South Africa (RSA), Universitas Airlangga (online available https://www.youtube.com/watch?v=a-unDONKoRw, Malaysia), KAUST (KSA) and some others. These opportunities

[2] Available at https://www1.up.ac.za/cs/groups/staffandstudent/@contrib/documents/document/chby/nde0/~edisp/uppr414591.pdf. Final access on 25 November 2024.

[3] Novak, G, Patterson, E.T., Gavrin, A.D., and Christian, W. 1999. *Just-In-Time Teaching: Blending Active Learning with Web Technology*, Upper Saddle River, NJ: Prentice Hall.

helped me to evolve as a teacher, of not only students but also peers, peers with various backgrounds and domain expertise.

My continued involvement in teaching at South African universities (and abroad) since 2018, while at KAUST, is a testament to my love of teaching. My passion to teach led me to complete the Higher Education teaching certificate from Harvard University in 2022 (Annexure I).

Since I started as a lecturer in the Department of Statistics, UP, in 2013 (previously junior lecturer since 2012), I have gained invaluable teaching experience and I keep reforming myself into the teacher I need to be for the audience in front of me, in that particular setting and circumstances. This dynamic view of teaching is what drives me to constantly develop new innovative approaches while being rooted in experience-driven tried and trusted methods.

2.Teaching philosophy

I believe that learning happens through being involved in your own learning process and accepting ownership of your learning (see Conley and French (2014)[4]), especially in my discipline (Statistics) where original ideas and problem solving are of utmost importance. I strongly encourage the active participation of students in the learning process (see Barkley (2010)[5]) and this is solidified by the industry-based project which forms part of the course outcomes.

The implementation of Just-in-Time teaching (see Novak et. al. (1999)[6]) ensures that deep learning takes place in class and that the factual content is conveyed online. Online lecturing is an important approach to teaching in this millennial time and I have employed this in my courses. I believe that this approach to hybrid learning is very successful. Fairness is a non-negotiable principle to me and I convey this in my teaching. I am very respectful toward the students (see Annexures A and D) and acutely aware of their different levels of prior knowledge and socio-economic environments when teaching.

Student support plays a vital role in the learning environment and in the tutorial sessions a safe space for learning is created, where peer instruction is used and no assessment whatsoever. The lack of assessment aids in creating a supportive learning environment where students are engaged in their learning process (see Meyers and Jones (1993)[7]). After assessment activities, I provide feedback on the mistakes as well as the innovative and well-though out answers (see Clarence et. al. (2016)[8]). I believe that they learn from what you do not say, as much or more than they do, from what you do say.

My approach to teaching is rooted in humility and dignity (see Annexure B). I am very passionate about conserving the environment and I convey this in my teaching through minimum paper usage, to mentor environmentally conscious and responsible citizens. I strive to be a role model for the students, and to inspire them not only in academics but also in life (see Annexures A-D).

---

[4] Conley, D.T. and French, E.M., 2014. Student ownership of learning as a key component of college readiness. *American Behavioral Scientist*, *58*(8), pp.1018-1034.

[5] Barkley, E.F. 2010. *Student engagement techniques. A handbook for college faculty*, San Fransisco, CA: Jossey-Bass.

[6] Novak, G, Patterson, E.T., Gavrin, A.D., and Christian, W. 1999. *Just-In-Time Teaching: Blending Active Learning with Web Technology*, Upper Saddle River, NJ: Prentice Hall.

[7] Meyers, C. and Jones, T.B. 1993. *Promoting active learning: strategies for the college classroom*, San Fransisco, CA: Jossey-Bass.

[8] Clarence, S., Quinn, L. and Vorster, J (eds). 2016. *Assessment in higher education: Reframing traditional understandings and practices, Grahamstown ZA: Rhodes University.*

3.Teaching track record

Table 1. Teaching involvement

Year	Module	No of students	% pass	Hours lectured	Hours tutorials	Weeks involved	Student evaluation	Total involvement
2011	BME120	1400	88%	3 pw	2 pw	14	4.1	I was responsible for the Afrikaans content and setting up half of the assessments.
2012[9]	WST111	380	70%	8 pw	6 pw	7 weeks	4.6	I was the coordinator in 2014, 2015 and 2017. I set half of all the learning activities and assessments. I am also responsible for the mentoring of the tutors of the course.
2012[10]	WST121	520	74%	8 pw	6 pw	7 weeks	4.6	I was the coordinator in 2014, 2015 and 2017. I set half of all the learning activities and assessments. I am also responsible for the mentoring of the tutors of the course.
2018[10]	WST 211	280	70%	8pw	6pw	7 weeks	4.8	I developed my block of the course (half) and set half of all the learning activities and assessment. In 2021, I developed an industry-based project as the practical component.
2018[11]	WST 221	250	72%	8pw	6pw	7 weeks	4.2	I developed my block of the course (half) and set half of all the learning activities and assessment. In 2020, I lectured remotely from Saudi Arabia. In 2021, I developed an industry-based project as the practical component.

[9] For six years (2012 - 2017).

[10] For two years (2018, 2021).

[11] For three years (2018, 2020, 2021).

2016[12]	STK 353	50	89%	1 pw	-	1 week	NA	I presented an expert lecture in this course and did not conduct student feedback.
2015[13]	NME702	30	NA	2 pw	-	1 week	4.7	I present the quantitative research methodologies part of this course.
2021[14]	STC 720	30	NA	1.5 pw	-	4 weeks	NA	I developed the content and exam for my block of teaching.
2024	STAT 441 STAT 711	18	100%	3 pw	-	7 weeks	NA	I developed the content and exam for my block of teaching. This course is presented at Stellenbosch University.
2016[15]	BME780	50	94%	9 pw	10.5pw	3	4.6	I was the coordinator of this course. In 2016 I was solely responsible for the lecturing part of the course. In 2017 and 2018, I was responsible for 50% of the course (lecturing and setting of assessments). In 2022 I was involved as the coordinator (remotely).
2018[16]	STAT 340	15	100%	2 hrs	-	1	NA	I was a replacement lecturer in this course when the lecturer would travel for work. It is presented as a PhD level course at KAUST.

[12] For three years (2016 - 2018).

[13] For three years (2015-2017).

[14] For two years (2021-2022).

[15] For four years (2016-2018, 2022).

[16] For seven years (2018-2025)

4.Teaching excellence portfolio

In this section the main innovations implemented will be discussed in detail. Each subsection entails one innovative practice with its own evaluation and reflection section. The three innovations, which are the focus of this section are online lecturing, no assessment tutoring and industry-based project.

a. Online lecturing

i. Rationale

In this age of technology driven systems we cannot be ignorant to the fact that the students we are teaching are also part of this technology driven phenomena. If we teach the same way in which we taught a couple of years ago, we are failing our students. It is our responsibility as teachers to adapt to our students is such a way that we can actively engage them and teach them in a way that is natural for them, especially at a first year level. This type of millennial student coupled with large classes begs for innovative practices. This is also evident in the vision of the university to move towards a hybrid learning environment[17]. It is within this framework that I implemented an online lecturing system which consists of high quality videos with sound and a feedback platform to guide the next contact lecture. Using videos as online lectures is most definitely nothing new. The case in South Africa is different to most countries, as many of our students do not have internet access from home or maybe very limited access with a small amount of data. So, although videos have been used internationally, we cannot just adopt that strategy since a large number of students will be severely disadvantaged through a system where videos are used which requires a lot of data. Live streaming of lectures is also not an ideal option for our country since most students cannot participate in the live lecture due to either internet inaccessibility, deficient hardware, extensive travelling time or the likes. The system I developed, is thus unique in the sense that high quality videos of a very small size are used, which can be streamed or downloaded, together with a feedback platform on ClickUP.

ii. Planning phase

The notion of online lecturing is understood in a variety of ways. Some feel that uploading notes serves as online learning. For me, however, an online lecture should only be called so if it is almost exactly like a contact lecture, but is virtual. The search for software and hardware to achieve this was quite challenging since in my courses I use notes in PowerPoint or Adobe, but I also use statistical programming software to convey a practical approach. There are some options for annotating PowerPoint slides or adding comments in Adobe but to me, this is hardly sufficient for an online lecture. The only way that I would be satisfied with my system is if the students have the exact same type of

[17] Available at https://www1.up.ac.za/cs/groups/staffandstudent/@contrib/documents/document/chby/nde0/~edisp/uppr414591.pdf. Final access on 14 January 2018. (Policy S4691/17)

lecture they would have had in a contact session, with me using different software on my computer but also handwritten notes on my tablet. I thus needed to acquire software that can produce a high quality video compatible with my lecturing system, using multiple software programs and devices, and be flexible for use with any lecturing style using technology. It should be easy to use for teachers with a ranging set of technology expertise and comfort levels. The practical considerations of editing and merging videos are very important as well. If a mistake does occur during the lecture and 30 minutes of the video has passed, the user should be able to still use the past 30 minutes and not have to redo and retake the video until a continuous full video with no mistakes is achieved. The usual filming of a person with a video camera does not have this feature since it is quite clear where the video was cut and merged. Additional to the already strict requirements for this software, was the fiscal price of the software. Universities in South Africa are under immense financial pressure and a very expensive software with necessary expensive additional hardware would not be viable at all. After many days and weeks, I finally found two software programs that can jointly achieve this. The one is a screen capture software that can construct a video of your computer screen (as you would have projected in the lecture hall) and the other is used to display a tablet screen on the computer so that the tablet can also be captured in the video. If a mistake is made in the construction of the video, the user can just continue where they left off on a new video, and these two videos (without the error) can be merged very easily. On top of all this, the software for screen capturing is free and no special hardware is needed, not even a special microphone headset.

iii. Implementation

The online lecturing system was employed in Mathematical Statistics 111 and 121 with great success as measured by a digital survey as well as a hardcopy questionnaire (see Annexure F).

One of the four contact lectures per week was replaced by an online lecture which consists of a video, a challenge and a feedback option. Each online lecture was shared via ClickUP as a folder with the above content. The video is embedded on the platform to enable streaming as well as download. The students will then watch the video, within which a challenge is assigned. They will then solve this challenge and upload their attempt as a question-less ClickUP test. There is also an open question for any feedback at the end of the test. I will shortly discuss each of the three components:

1. Video

The video consists of a screen capture which can be adjusted to capture only a part of the screen of your computer as well. You can then use multiple programs on your screen and these will all be part of the video. This then enables the student to have the same experience as they would have had in a contact lecture. It is so important to keep the same style of lecturing as to not hinder the learning of the students by constantly (weekly) change between two different lecturing styles. Voice is recorded through a microphone.

The built-in microphone in most laptops is sufficient. I, however, used an inexpensive set of earphones with a walk-and-talk option since these have a built-in microphone. Most cellphones come with these type of earphones, so most of us would already have a pair. This software has a built-in compressing function which keeps the video high quality. As an example, a 40 minute video would be about 80 megabytes (see Figure 1).

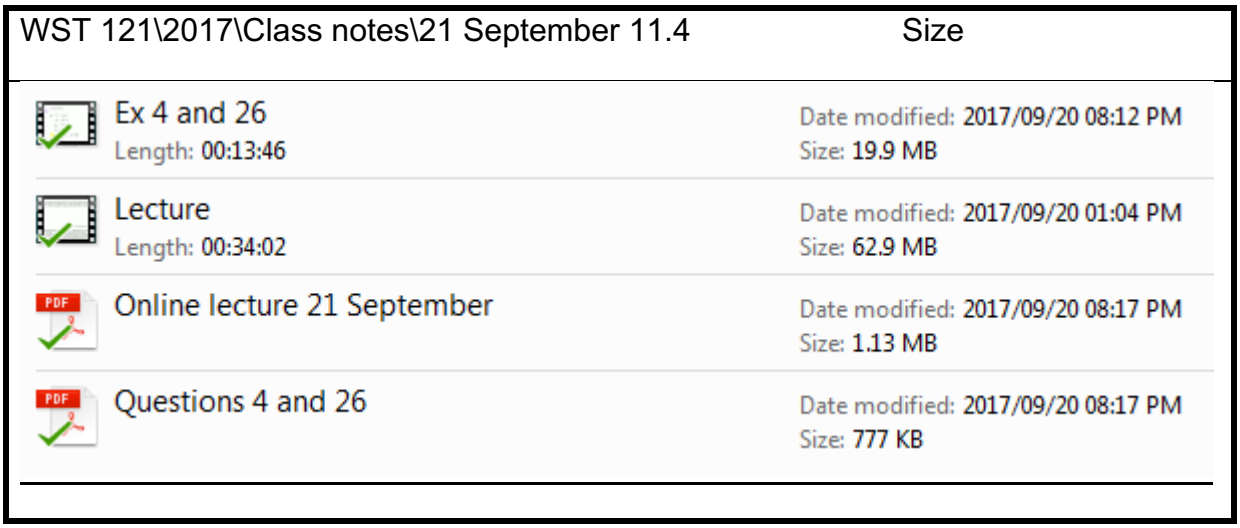


Figure 1: Screen capture of an online lecture folder on my computer

2. Challenge

To keep with my lecturing style with which I pose a challenge in most of the contact lectures for the students to solve in groups, I gave a challenge in each of the videos. This is usually a typical test type question pertaining to the lecture content. They then need to solve this challenge and upload their attempt as part of a ClickUP test. The test has no typed questions, only a question number. This might seem strange but this is very effective since they have to watch the video to get the question. The challenge is not always given at the end of the video, but sometime during the video. This system of posing a challenge at a random time in the video, successfully forces them to watch the video and not just fast forward to the end to complete the challenge to get it done. The answers submitted are then of better quality and more reliable, in conveying the level of understanding of the content. Most often, the students get asked different details (using a random block) about the challenge so that copying of answers does not bias the results (see Figure 2).

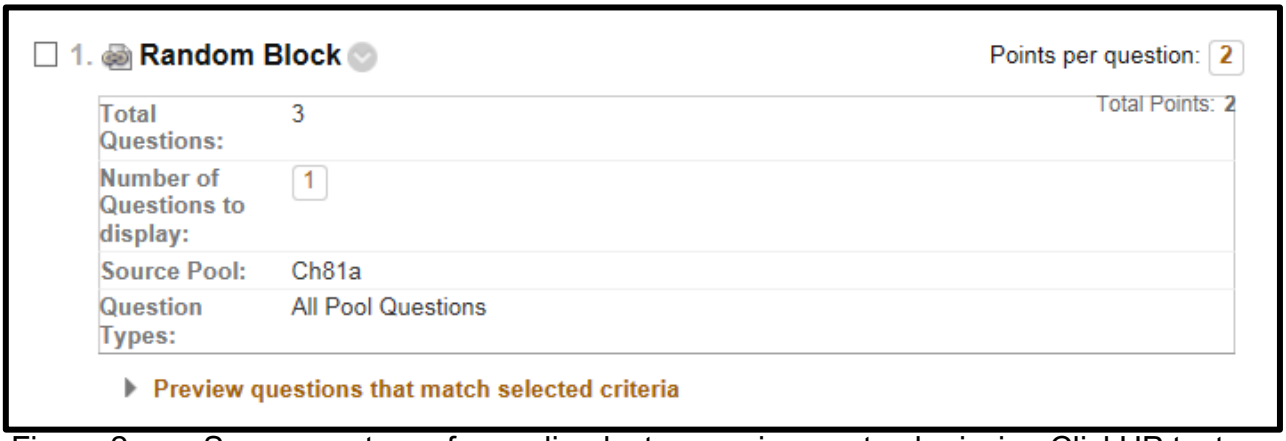


Figure 2: Screen capture of an online lecture assignment submission ClickUP test.

3. *Feedback*

There is an open question in the test for any feedback from the students' side. This is the online version of a minute paper (see Angelo and Cross (1993)[18]) which I use in contact lectures. I would then go through the feedback before the next lecture, which will be a contact lecture, to guide my approach to the next lecture. This is very valuable for me as well as for the students since many of them feel that they have a better chance of asking a question this way, than in front of hundreds of students in class. This feedback platform thus gives them a voice, especially for the shyer students whom would never ask something in a contact lecture. For me it supplies feedback on the point where I should continue with the next lecture.

iv. Evaluation

The system was evaluated through an online survey as well as a hardcopy questionnaire to afford me the opportunity to make real-time adjustments to the system (see Shafer (2017)[19]). The results were very positive (see Figure 3). Although the system was initially developed to prepare the students for a situation in which contact lectures are not viable, it ended up being much more than that.

---

[18] Angelo, T.A. and Cross, K.P., 1993. Minute paper. *Classroom assessment techniques: A handbook for college teachers*, pp.148-153.

[19] Shafer, L., 2017. Making student feedback work. Available at https://tinyurl.com/ybwohq3m, accessed on 20 November 2017.

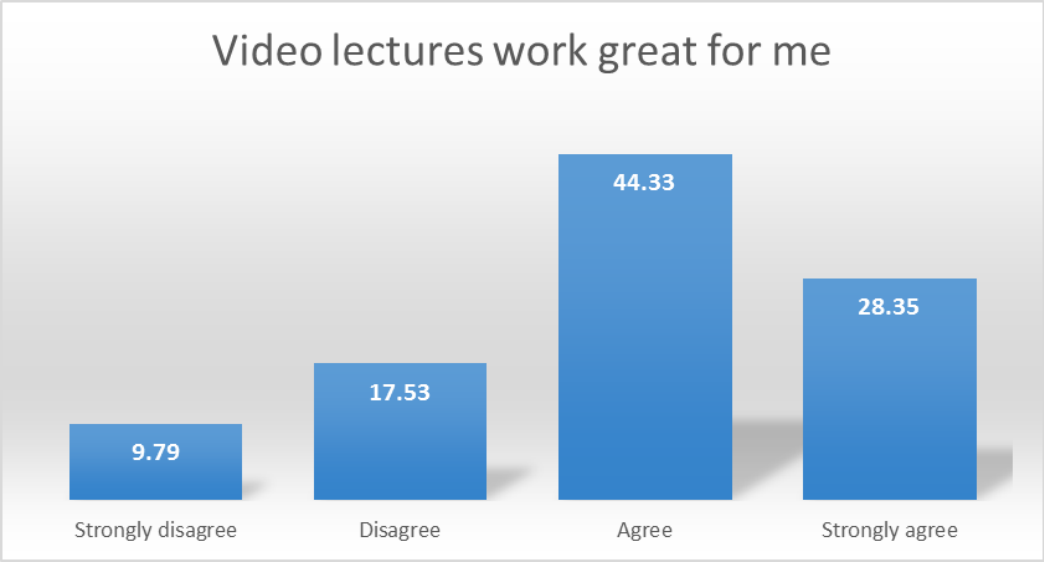


Figure 3: Summary of evaluation survey of online lecturing system

Through this system, the students gained soft skills (see Figure 4) which forms catalysts of the graduate attributes as set out in the UP Policy on Curriculum Design and Development (Addendum D: S4458/12)[2]. One of the major advantages from the students' perspective is that they have the lecture frozen in time. They can review the lecture whenever they feel the need or for test revision purposes. This availability lowers their anxiety about missing something in a contact lecture since they write slower or their attention span is shorter than most other students. Often, we are not empathetic to students being people. Students also get sick or they have to travel for personal reasons, which causes a lot of anxiety for them. Through the online lecturing platform, they can then easily catch up a lecture if they missed it due to some circumstances.

A system like this one fits in perfectly with the vision of the university to move towards hybrid learning. Most students feel that they want this system in all their subjects since most other subjects do not offer any truly hybrid learning methods yet.

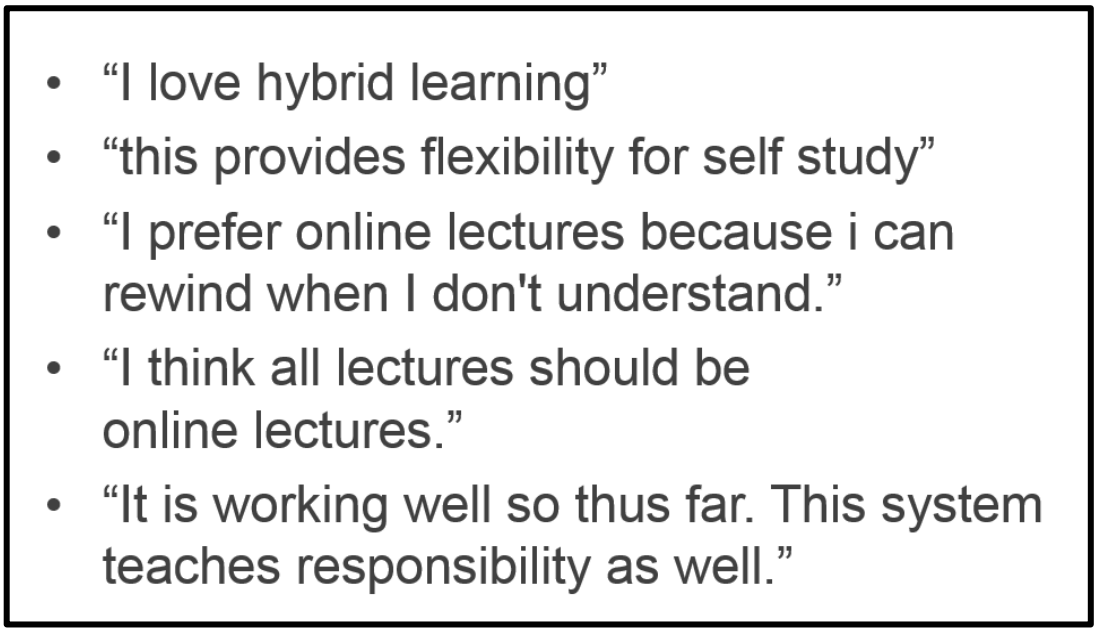
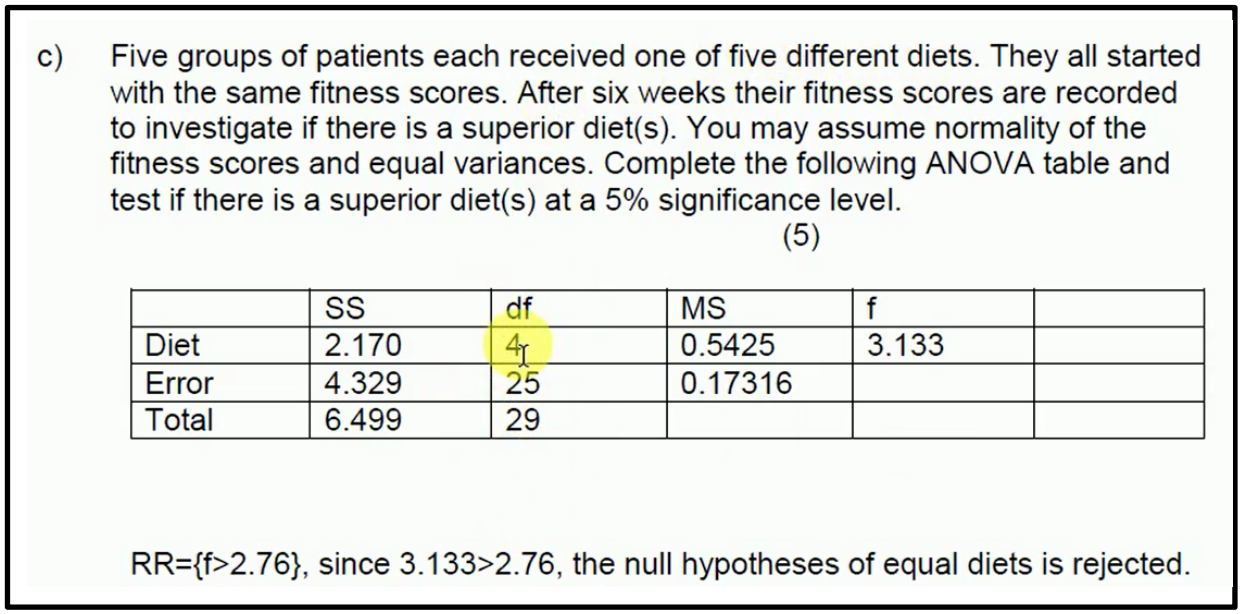


Figure 4: Some qualitative feedback on the evaluation survey of the online lecturing system

v. Reflection

Although the initial aim of the system was to develop a proper online lecturing system that can be used in circumstances where contact lectures are not possible, so much more emanated from this venture. This system proved to be a platform that can be used very efficiently for feedback on assessment (see Figure 5) or extra explanation of difficult concepts. I have also used this as an introduction video where I show student how to navigate to get to ClickUP and how to get to the different folders within a course, where to see their marks etc (this idea was catalyzed from focus group interviews conducted by Dr. Ina Louw with the BME780 2016 students, see Annexure B). This was very beneficial to the students, since most of them are first-year students. The possibilities with this software is endless.

Some of the initial feedback guided me to use the earphones for recording the voice and shifting the challenge in the video, to not always be given at the end. After these changes were made, the system was without critique from the students. As the system matured, I started to shift the more theoretical, usually quite complex, content to the online lecture. This shift was dual purposed. Firstly, the students then have the explanation of the more complex content at their disposal to review as often as needed. Secondly, this shift opened the contact lectures to be more practical and based on solving challenges in groups with my participation, which is not possible in an online lecture. The level of understanding of the students raised due to this shift since the contact lectures were now more hands-on and they were easily engaged.



c) Five groups of patients each received one of five different diets. They all started with the same fitness scores. After six weeks their fitness scores are recorded to investigate if there is a superior diet(s). You may assume normality of the fitness scores and equal variances. Complete the following ANOVA table and test if there is a superior diet(s) at a 5% significance level.

(5)

	SS	df	MS	f	
Diet	2.170	4	0.5425	3.133	
Error	4.329	25	0.17316		
Total	6.499	29			

RR={f>2.76}, since 3.133>2.76, the null hypotheses of equal diets is rejected.

Figure 5: Screen capture of the feedback on semester test 2 video.

A small number of students find it difficult to download even such a small video due to slow internet connection on campus. To remedy this I will in future upload the video on the Share folder in the informatorium where their datasets for practicals are uploaded in any case. The students can then just copy the video onto a memory device when they attend their practical sessions which is once a week. The students therefore do not need to find additional time to access the computer labs and download the video from ClickUP.

This online lecturing system was implemented early 2017 and has matured throughout the year. It is my view, possibly biased, that every course should include a system similar to this one. I have been invited by the Deputy Dean: Teaching and Learning in the Faculty of Natural and Agricultural Sciences, as well as the Deputy Dean of the Faculty of Economic and Management Sciences to present seminars about this system. I have presented a seminar about this system also at the Mamelodi campus on invitation. The peer feedback is incredibly positive due the possibilities and ease of use of the system. I am really proud of what I have achieved and see a bright future for this method of hybrid learning where the students do not sacrifice anything in the process, but gain immeasurably.

vi. Sources

Examples of complete videos have been uploaded to my google drive and is available using the following link: https://tinyurl.com/y8kmgwgl.

b. Eliminating the third voice in tutorials

i. Rationale

My view on tutorial sessions is that they should be used for learning rather than assessment. As I embarked on my first year of lecturing, I noticed that the tutorials are, exactly like when I was a student, driven by assessment every week. From a student's perspective, we sometimes had to choose which tutorial marks to just forego since the load of assessment in every single tutorial for all subjects every week, is just too much. Usually the assessment is not constructively aligned but instead used as a measure to force students to participate and prepare for the tutorial session. This system resonates with the work done initially by Vygotsky (1980)[1] and later Eun et.al (2008)[20] on the voices in the zone of proximal development. The tutorial session is the optimal place for guided learning to happen, through both an instructor (tutor) and peers. However, if the main aim of the tutorial session is assessment then no or limited peer instruction takes place. More importantly, a safe space for learning is not created through the intimidation of assessment. Although, assessment is an important aspect of teaching, it should not be used as a tool to force participation of students. Even though students are encouraged to come prepared to tutorials (as in the case of assessment), they should still be welcomed and not belittled if they come completely unprepared.

ii. Planning phase

My ideal tutorial session would be with a limited number of students, in a venue where everyone can move freely and not necessarily sit in rows with plenty of tutors who can provide individual attention to students. I guess this is the dream for most of us. However, the reality is, especially in South Africa, that most groups are very large (larger than one hundred students) and venues are typical lecture venues where the students sit in rows. This set-up did not intimidate me to relinquish my ideal, but I chose to embrace this challenge.

Firstly, I identified a number of key facets needed to make this venture a success. A set of problems for each session should be developed that resonates well with semester tests and exams, and not only be based on textbook exercises. The key factor, in my opinion, in this venture is the human capital. Tutors who have good communication skills and empathy for others were needed. In most cases, tutors are often thought of as the strongest students in terms of academic achievement. For this tutorial system, the strongest students are not necessarily the best fit. The tutor should have the ability to empathize with a student on the verge of giving up on the course, or who just has a troublesome week, above being able to explain the content of the course. The search for these type of tutors were hard initially since the tutors themselves were unsure about the system and what it entails. Currently, many tutors want to be part of this system since

[20] Eun, B., Knotek, S.E. and Heining-Boynton, A.L., 2008. Reconceptualizing the zone of proximal development: The importance of the third voice. *Educational Psychology Review*, *20*(2), pp.133-147.

they experienced themselves how well it works and how much it means to the students in terms of academic, social and emotional support and an overall positive classroom climate (see Parks (2017)[21]).

During 2015 the faculty's Education Consultant (Dr. Ina Louw) conducted a large survey about tutoring in NAS and she shared her discoveries in literature with me (see Louw (2018)[22]). In this research she provides parallels between the tutorial system I developed and the study by Murphy et al. (2015)[23] which is based on a co-learning environment.

iii. Implementation

This tutorial system was implemented in WST121 in the second semester of 2014. This provided an optimal opportunity for evaluation of the system since the majority of the WST121 students already participated in WST111, which used the previous tutorial system. The implementation of this tutorial system was met with great enthusiasm since the students were quite relieved about losing the threat of assessment when it was so present in most of their other courses. They quickly realized though, that this does not cancel the requirement do to something. A tutorial session consists of a summary session, solving a set of problems and then a discussion session with feedback. This practice is in line with principle 5 (Goal-directed practice coupled with targeted feedback enhances the quality of students' learning) as discussed by Ambrose et.al. (2010)[24].

1. Summary

Each session is two hours long and every student attends once a week. The session starts with a short summary of the content discussed in the previous week's lectures. This helps to focus their attention, especially if they come unprepared. The short summary is not at all an overview of all the content, but rather sketches the broader picture of the section/chapter and illustrate some links to previous work (see Figure 6). After this is completed, each student receives a set of problems to solve within roughly one hour.

---

[21] Parks, M., 2017, September. Simple Strategies to Develop Rapport with Students and Build a Positive Classroom Climate. In *The National Teaching & Learning Forum* (Vol. 26, No. 5, pp. 4-6).

[22] Louw, I. (in press). Reclaiming Tutorials as Learning Spaces in the Sciences. *Mentoring & Tutoring: Partnership in Learning.*

[23] Murphy, C., Scantlebury, K. and Milne, C., 2015. Using Vygotsky's zone of proximal development to propose and test an explanatory model for conceptualising coteaching in pre-service science teacher education. *Asia-Pacific Journal of Teacher Education*, *43*(4), pp.281-295.

[24] Ambrose, S.A., Bridges, M.W., DiPietro, M., Lovett, M.C. and Norman, M.K., 2010. *How learning works: Seven research-based principles for smart teaching*. John Wiley & Sons.

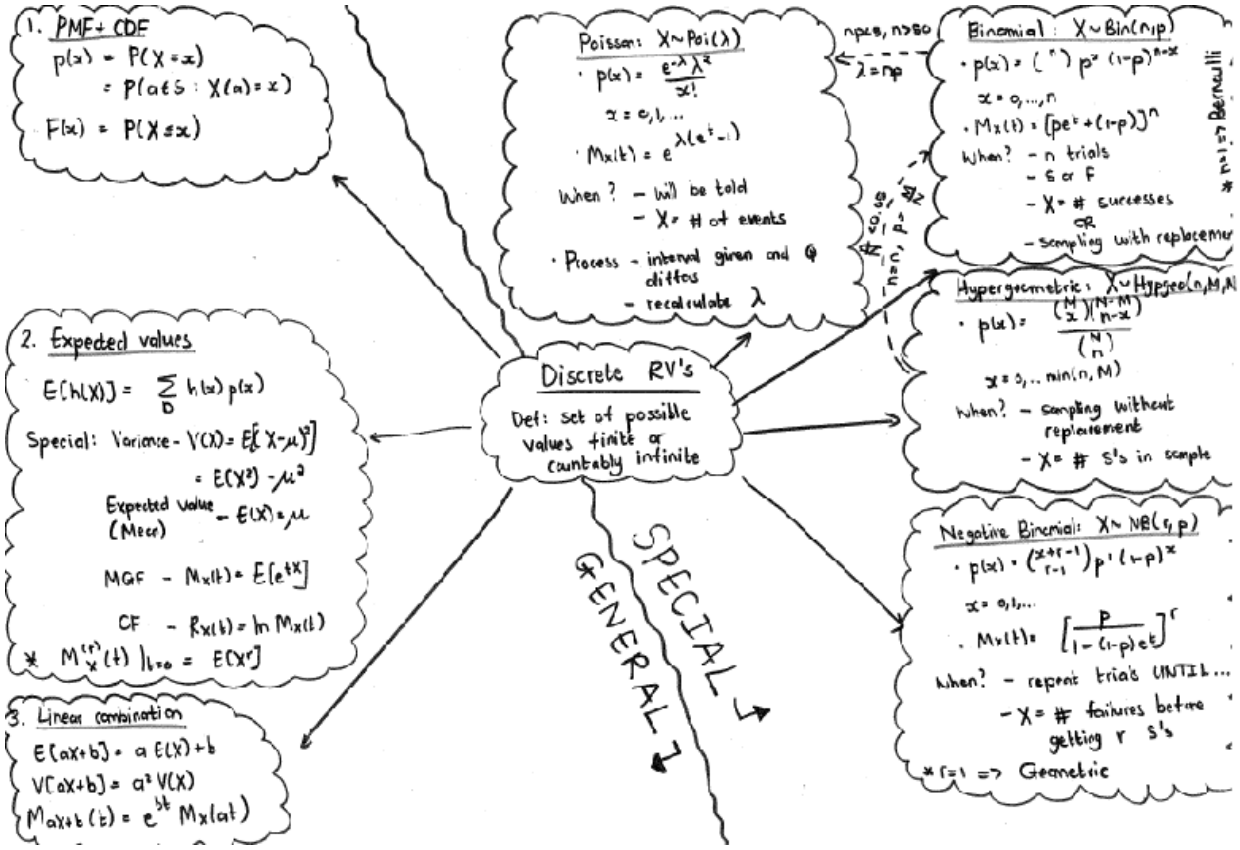


Figure 6: An example of a summary made during a tutorial session

2. *Solving a set of problems*

A set of problems is developed by the lecturer and should resonate well with the assessment in the course like class tests, semester tests and exams. The problem set is available for students on ClickUP before their session, so that they can look at the questions and prepare. Each student then receives the set of problems which they have to solve within the next hour. They can do this individually or in groups of any size. They are allowed to talk, walk around, climb across tables if need be, write on the board with chalk if they need to etc. In the first implementation in 2014, the tutors felt like the tutorials were organized chaos. This is firstly because they, themselves, went through their undergraduate courses, attending tutorials where someone stands in front and speaks for two hours, while the students take down solutions. Secondly, the tutorials are organized chaos. When hundreds of students are allowed to engage with the content, using their natural style of learning, it is quite chaotic. But this is exactly where the magic happens.

Students are exposed to other learning styles from their fellow students by peer instruction. They are guided towards finding a solution by the tutors, although the tutors never explicitly gives a memorandum. They can use different media to express themselves. By being allowed to walk around, they are active and not constrained to a chair and table for two hours. This constantly causes a shift of energy and hence keep

them engaged. The tutor merely serves as a facilitator and not as a lecturer. The tutors walk around between the students and often have to also climb over tables to get to the students, which afford the students the opportunity to ask a question without the fear of peer judgement. The tutor then guides the student or group towards framing their thinking process, in order to find a solution for a problem similar to the one at hand. The students thus need to get to the solution by themselves and the tutors are not allowed to give the students a memorandum of the question. This approach works especially well with a Mathematical subject like Mathematical Statistics since there is often not only one method to solve the problem and arrive at the same solution. The students are encouraged to find their own solutions without having to conform to one specific way of solving a problem. This results in deep learning and not merely copying a solution from a previous similar question (see Novak et. al. (1999)[7]).

Using this approach is very beneficial for learning since a safe space is created and the third voice of assessment (see Eun et.al (2008)[16]) is eliminated. The students always leave the tutorial session empowered since they managed to solve the problem/s themselves. This increase in self confidence is of immeasurable value in a hard subject where a lot of insight is required.

A sociological advantage is that students have an opportunity to make friends and find peer support within the course. Especially in the first semester, most students come into the course without knowing anyone else. They are very busy in the first year with a full load of core courses and ancillary courses. Within this system of tutorials, it is part of the course to make friends with their classmates. It is really beautiful to see and experience the forming of friendships through this type of tutorials. After the first couple of weeks they even sit in their tutorial groups in all the lectures as well. Another advantage of this system is that students who struggle with the language initially, can benefit immensely from peer instruction from a fellow student who can explain to them in another language besides English. This type of student is therefore provided with a support network for the content of the course as well as the language barrier.

3. Discussion

After about 90 minutes, a discussion facilitated by a tutor takes place. In this discussion the tutor comments on the topics that most of the students experienced difficulty with while working on the set of problems. They also provide guidance towards solving some of the problems but they do not explicitly give the complete solution or memorandum. This is what ensures the success of this system. Students attending the tutorial but who are not actively participating, and just waiting for the solutions, always leave disappointed. After the first couple of weeks, they start to realize that they are the ones responsible for learning and the only way that they can benefit from the tutorial session is if they participate. The students then leave the tutorial session with the set of partially/completely solved set of problems on which they can work further and consult various parties within the course for guidance.

iv. Evaluation

The system was evaluated through an additional question on the student feedback form and the average score across groups and years (2014-2016) is 4.4/5. See Figure 7 for a comment on the student feedback instrument from the first implementation, amongst others.

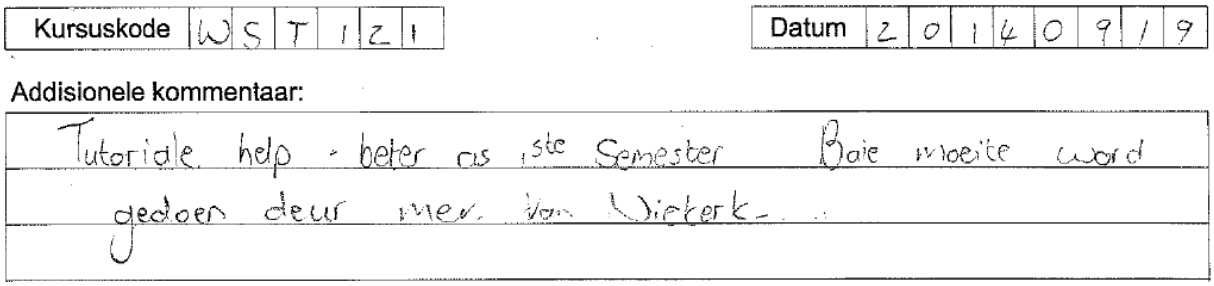


Figure 7: Qualitative feedback from a WST121 student regarding the change in the tutorials

v. Reflection

The initial implementation was quite daunting. The amount of effort that is needed to set up problems every week is quite large. The workload decreased as I got more experienced. In the first implementation, in 2014, we realized that students need a bit of guidance as to what extent we want them to participate. I realized that first year students still very much have the attitude towards learning that they are groomed to have through the school system. They are comfortable sitting and listening to someone in front of the classroom. For the following years, we told them in the first tutorial that we want them to talk and walk around and write on the board etc. After this "permission" they then start to engage more every week as they get comfortable to adopt and explore their own natural learning style (see Kolb and Kolb (2005)[25]) to which the tutors are sensitized. This system might work especially well for senior students who are more responsible. One of the challenges I encountered was that some students missed the tutorial sessions from the start since there is no assessment, so they do not lose marks if they miss a session. These students are in courses for marks, not necessarily learning. This is typical of a student who still needs some guidance towards self-discipline and time management. To counteract this, but still eliminate the voice of assessment, we introduced class attendance slips to be handed out in the tutorial sessions on random occasions. Attendance marks then form part of the semester mark composition. This idea works well especially since most first year students are not yet responsible enough to decide for themselves what they need. We are thus forcing them to some extent, using

[25] Kolb, A.Y. and Kolb, D.A., 2005. Learning styles and learning spaces: Enhancing experiential learning in higher education. *Academy of management learning & education*, *4*(2), pp.193-212.

marks but not assessment, to attend the tutorials. At some stage I was concerned that there would be students now attending to fill in the slip but still not participating. This concern however, was quickly abolished since the 90% of students who avidly attempt the set of problems actually attract the students who did not plan on working at all. The atmosphere, although chaotic at first glance, is enticing and exiting and allures otherwise passive students to become part of a group and be active in their own learning process (see Meyers and Jones (1993)[8]).

This system is still used currently and although it does take a lot of effort from the lecturer and tutors, I believe that it is beneficial to the students on more levels than just academically.

c. Industry-based project

i. Rationale

According to the National Development Plan for 2030 (see Chapter 9)[3] as well as the Medium-term Strategic Framework 2014-2019 (see Outcome 5 and Appendix 5)[26], work-readiness is a high priority within the higher education system. This is resonated in UP's graduate attributes as set out in Addendum D of UP Policy on Curriculum Design and Development: S4458/12[2].

Decision sciences and data-driven decisions are at the core of all advancements in the world today, as we know it. Mathematical subjects like Mathematical Statistics are often very complex and theoretical in the details. It is quite easy to get indulged by all the Mathematical details and lose tractability of reality and the real-world problems waiting to be solved. Introducing a project into the course, focusses the students' attention of the applicability of the very theoretical and mathematical subject to real-world data, but moreover the responsibility statisticians have towards advancing many aspects of the modern society. There is also a dire need for scientific writing ability amongst the students and this project will address that as well. One of the main aims of the inclusion of a project is to develop one of the graduate attributes (see UP, S4458/12[2]) namely work-readiness and subsequent aims are to develop reasoning skills (see Lawson (2001)[27]) and connect their new knowledge to real-life situations (see Blank (2000)[28]).

---

[26] South African Cabinet, 2013. Medium-term Strategic Framework 2014-2019. *Pretoria: South Africa*. Available at https://www.gov.za/sites/default/files/MTSF_2014-2019.pdf, accessed on 28 November 2017.

[27] Lawson, A.E., 2001. Using the learning cycle to teach biology concepts and reasoning patterns. *Journal of Biological Education*, *35*(4), pp.165-169.

[28] Blank, L.M., 2000. A metacognitive learning cycle: A better warranty for student understanding?. *Science Education*, *84*(4), pp.486-506.

ii. Planning phase

The idea of an industry-based project was very daunting to me. In the first year course there is in excess of five hundred students. I knew that in order to make the project a proper learning opportunity, each student cannot have the exact same project since there will be copying and then learning does not happen. On the other hand, administrating projects for this many students and then also evaluating the projects is quite a monumental task. The projects were first introduced in 2017 into the first and second semester. The students had two months to complete the project and the practical sessions were constructively aligned with the project.

A project consists of an assignment and a dataset. The assignment is the same for all students and merely poses a research question (see Annexure E). I created ten groups of randomly allocated students. The groups then received their unique dataset with the adaptive release function of ClickUP. Each student will have the assignment, as an Adobe file, and one of the ten datasets, as an Excel file, in their folder without knowing that different datasets exist. If they submit an answer that is not based on their given dataset, it is immediately clear that they have cheated and a valuable lesson about plagiarism and cheating is learned. The final report is then uploaded through Turnitin as individual reports, from where the lecturer can electronically mark them. This approach also teaches the students environmental responsibility since no hardcopy is handed in and the whole project is facilitated electronically.

iii. Implementation

1. Assignment

Students are used to answering questions, and not solving problems (see Singer (2003)[29]). The assignment thus has to take them out of this mentality and prompt them to develop problem-solving skills. To this end, the assignment poses a research question like “Do males have higher blood pressure than females?”. No sub questions or guidance towards answering the question is given. The students have to write a report in which they answer the research question, using evidence-based arguments.

2. Dataset

A large dataset, with thousands of records, is used as a basis on which the research question is answered. The dataset contains different variables, some are useful for the research and some not. Ten different datasets are distributed randomly amongst the students. The datasets are similar in architecture but different in values. I have a dual purpose with the different datasets. Firstly, the students should question and review their own conclusions and methodologies when they talk to their fellow students and learn that they have different values. This really enables higher level learning according to Bloom’s taxonomy (see Anderson et.al. (2001)[4]), since they have to review their own

[29] Singer, M., 2003. How Does Efficient Learning Occur–A Hypothesis. In *Proceedings of the 3rd Conference of the European Society for Research in Mathematics Education (CERME 3)* (pp. 1-11).

findings based on what they think the correct answers are. Secondly, students who often plagiarize are easily identified through this system.

3. Submission of report

The final report is submitted on Turnitin. Ten different Turnitin links are created so that each random group has their own link. From the students' perspective, they have an assignment, dataset and a Turnitin link. From my perspective, there is an assignment, ten datasets and ten Turnitin links. The use of Turnitin eases the burden of checking for plagiarism and students who plagiarize are easily identified since they usually copy from a friend (with most likely a different dataset) and they then submit a report based on the wrong dataset for the random group that they are in. Additionally, environmental consciousness is created through the electronic submission only, and no hardcopy submission.

iv. Evaluation

The evaluation of the impact of the project was done through an added question on the official UP student feedback instrument which was scored as 4.3/5, a hardcopy questionnaire (see Annexure F and Figure 8), as well as through subjective observation by me and my colleague. It is evident that the students feel like they really learnt a lot from the project in how to approach a real-life problem and also how to communicate their research through a report. We saw a major improvement in their reasoning and methodological skills while marking the exam papers.

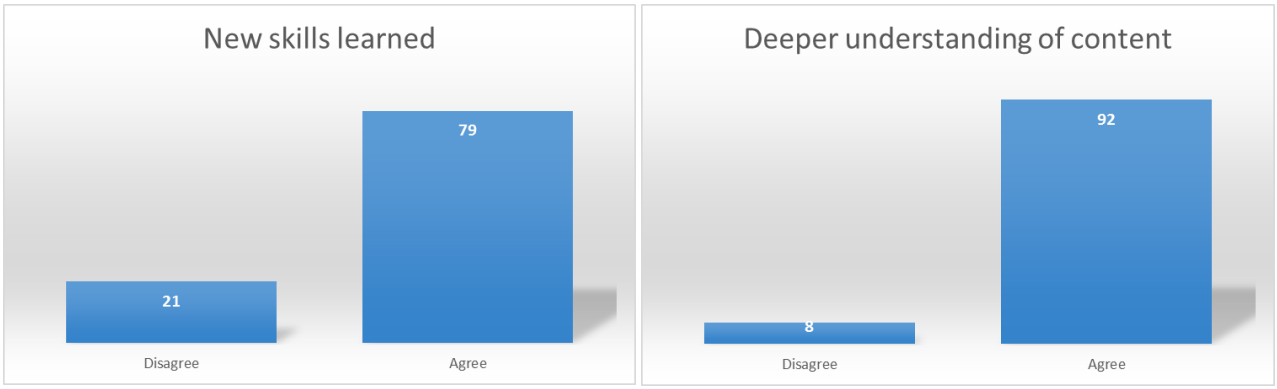


Figure 8: Summary of the evaluation of the project based on the questionnaire

v. Reflection

The inclusion of an industry-based project into a course with a large number of students is a lot of hard work and takes a lot of time. However, once it is done the system can be slightly adjusted each year. To get the system to efficiently work for me and the students took many attempts. A possibility for the future of such a project, is that the project can be made more substantial to replace all the individual practicals. Each practical sessions is then used to address one aspect of the project. This constructive alignment throughout the whole semester will be beneficial for the students, since they learn how to practically

solve a real-life problem while also learning programming from a less theoretical perspective. There were only two pairs of students who copied reports and they were easily identifiable through Turnitin. In the end, I am very proud of the system I developed to facilitate and administrate the project for a large group. I am currently employing the system for the second year group as well since we feel it is so important that students constantly practically apply all that they learn, to solve real-world problems.

5. Concluding remarks

The three innovations discussed in this portfolio (Section 4) namely, online lectures, assessment-free tutorials and industry-based project were all developed and successfully implemented in various Statistics courses during 2017. The student feedback adjudicates this as well as the peer feedback from various lecturers, Professors and Deputy Deans. I am very proud of what I have achieved through these innovations. At the heart of all these innovations, are the students and their learning.

My pursuit for excellence in teaching is supported by the student feedback instrument results and comments in Annexures A-D and also the peer review in Annexure H. It is evident from Annexure D, Questions 6 and 7 that I pride myself on being very knowledgeable in my field, but even more so on my character of empathy and genuine care for the students.

I am passionate about changing South Africa, one learner at a time, through catalyzing professional as well as personal development. This conveys my interpretation of the quote by Maya Angelou, and this is what I will continue to strive for in any, and all circumstances. I am a proud South African who wants to make a positive difference in my country and accept my responsibility, as a teacher of youth, to facilitate the achievement of the 2030 vision of the National Development Plan of South Africa[3] and the UP 2025 vision[2].

6.Annexures

a. Annexure A: Qualitative responses from students

Kursuskode	W	S	T	1	1	1

Datum	2	0	1	6	0	4	2	2

Addisionele kommentaar:

I have thoroughly enjoyed having you as a Statistics lecturer! You have a glow about you and invite personal growth through your lecture style ☺ Hope you keep lecturing us.

Goodluck with your growing family

Kursuskode						

Datum	2	0	1	6	0	4	2	2

Addisionele kommentaar:

Dear Janet

I would cordially like to thank you for the effort you put into this chapter. Your teaching skills are exemplary and you have excellent social skills and your communication skills are also of highest standard. We will miss you in stats.

Xander & Tayla (Love xoxo)

Course code	W	S	T	1	1	1

Date	2	0	1	6	0	4	2	2

Additional comments:

She goes at a really good pace. Not too fast but not too slow either! She is also extremely helpful in that she summarises all the learning work on 1 page so that one can see the bigger picture of all that we've learnt, and actually create a link and differentiate between the diff. sections and types of data! [shows she puts in effort into teaching us]

b. *Annexure B: Excerpt from focus group interview*

Abbreviated transcription of the two FGI for BME780

I: How did you experience BME as a "bootcamp"?
R: It was quite intense the 2 weeks – expected it to be more difficult than it really was. Liked the biological examples. It was more relevant than just numbers, more in context.
It was challenging to keep your brain active for an entire day. The pracs gave great experience, very helpful
WL It was stats on steroids. Not a common feeling, but true for some.

I: What about you No 21?
WL2: What's the question again? (I asked if he is still traumatized after the test and he just laughed. I repeated the question)
Ja, it was all right. I had stats before, but it was a while ago, so it was rusted.

I: If you can change 1 thing, what would it be?
R: The actual schedule from 8-16:00. The prac was ok, but to pay attention in lectures was tough. Maybe 10 min breaks more frequently.
Introduce a prior knowledge test. I was lucky, as I had previous experience with R, but some had none, not even another programme. Assess prior knowledge and offer a catch-up course.

I: Did you feel you lacked prior knowledge here and there?
R: Yes, for knowing which test to run, but not for the typing. In Zoology we used R but they told us do this test or that one, but not why.
Some of us didn't use stats in a couple of years, so we are unprepared after 4 years.

I: How should this catch-up course be structured?
R: A lecturer to explain the why is always best. It's the basics like what a statement means, how to interpret a statement into logical terms, communicating to a pc that was lacking. It would be difficult to do online.
21 Make the course longer, start with a refresher.
9 My knowledge was fresh so I was OK. I didn't need a refresher course.
11 We did revision as we went along. The work was better explained than in the 1st year. I also have no need for a refresher course.
7 My problem was that I only had stats in Y1 and now again in HON. We should have more years of stats as Zoology is all about stats.
16 I felt that it was the maths part of the stats that I struggled with. It was as if she went into too much detail with the math and then you say "what", but then you get it and you realise its actually not that difficult. That was confusing and not the main idea of the course.
5 In Y1 all tests were MCQs. Now you have to analyse and interpret and write it down, and you realise that you can't put it into words. In Y1 you could also guess and still pass. I think that is how most people passed.
9 More examples in class time can help. Not only at the pracs. Pracs would have been easier if there was a set way of doing things.

I: What about short video clips explaining basic concept?
R: Yes, that can work well. Things like how to set a working directory in the program. So you can have the basics: importing data (I have forgotten how).

I: When should this catch-up be done?
R: Just before the bootcamp as we don't know long in advance that we are accepted for Hons.

I: Did the course and value and how?

R: Yes, it made me think about my own data and how I would analyse it and sample for it. How to plan the whole project and how the sampling provides stats. The timing is perfect - must be before the fieldwork.

I: Who else can assist with stats?

Supervisor, Dr Grieve and Mark

I: What about the textbook?

R: It was very confusing as the screenshots are in minitab and not R. The textbook explains the stats and analysis well, but you need a very solid understanding to transform the minitab info into R.

One student admit that he never laid eyes on the text book.

11: Read it. She took some examples and explained it better than the book.

19: Self confession: I don't get much in a lecture. I must have a text book. It helped a lot.

I: Notes?

R: Lecture slides were brilliant and helpful. Screenshots were that of R and the lecturer used it well. BUT all the coding was not on the slides so you see the output but don't know how to get there. Some tutorials also had very simplified slides. Helped a lot.

I: What do you need before the exam?

R: Passed papers, but that doesn't exist, so sample questions. The exam is now set by stats and not plant science, so it will be a different format, also not open book or with a PC to run the analysis. We don't know what to expect. We need more exercises like the tutorials wit analysis.

18 A break down of all the tests to use. A summary of how to use it and how to interpret it. A cheat sheet with explanations. I was sick and missed a lot.

11 She gave us a mind map. Just sit down and study it. (Someone gave him a copy).

13 A revision session to go through one example of each type of analysis. Some examples could only be done partially as all the theory were not covered and then 2 days later we would return to complete that problem. It was kind of confusing. If we now can do them in one go to get a holistic picture.

I: What if this is done by video clips?

R Yes, that can work.

I: What do you need before the exam? (cont)

20 I like to have exam type questions/exercises.

9: The use of comprehensive examples – she can supply some and it will help a lot.

9: We've got theoretical component and pracs but they didn't give us any memos to see if our coding is ok. So we are never sure. We really need confirmation of the coding.

16: Some of us study better by doing examples and self-study and not lectures. During the test this morning I realised what I did wrong last time. Small tests with feedback can work well because you can see that you understand and move on.

11: We actually need a memo. In 1 prac I asked one tutor and he said my coding was all wrong. Then I asked my supervisor and he said: "yes that is exactly what you should do". So that is why we need memos.

13: To get an idea what an exam could look like, how long etc.

I: Message to lecturer

R: Thank you. You made it less intimidating to take as extra module. She did very well, very approachable. I appreciated that she didn't explain to us as if she is smarter than us.
She was great and an excellent presenter.

16 Pracs were great – one on one with the content, but more tutors could help. We had to generate code all on our own.
I liked the class examples with R at the end of lectures.

c. Annexure C: Appreciation email

Janet vanNiekerk - Wst 121 former student

From: Lesego Makgoba <u13049161@tuks.co.za>
To: Janet vanNiekerk <janet.vanNiekerk@up.ac.za>
Date: 2015/08/28 10:34 AM
Subject: Wst 121 former student

Good morning ma'am.

I dont know if you do remember me but i ALWAYS used to consult by you last year second semester. I had dreadlocks in the middle. I had said i would swing by this year and say hi. I havent had the chance.

Im sorry.

Anyway, i just wanted to say thank you for all the times you helped me last year. Your strong foundation has helped me cope with 211 and 221 is not going too bad. You are the best lecturer ive ever had. And i just wanted to let you know that you were and still are appreciated.

I havent forgotten of you.

Thank you.

Enjoy your day.

Lesego

This message and attachments are subject to a disclaimer. Please refer to http://www.it.up.ac.za/documentation/governance/disclaimer/ for full details.

d. Annexure D: Quantitative data from official forms

Dosent/Lecturer	Ms Janet van Niekerk
Module	NME 702
Datum/Date	2016/05/17
Aantal vorms/Number of forms	16
Gemiddelde/Average	4.7

Nota: Waar studente nie alle antwoorde voltooi het nie, tel die kolomme nie op na die aantal vorms nie.
Note: Where students did not answer all questions, columns did not add up to the number of forms.

		1	2	3	4	5	6	7	8	9	10	11	G/A	12	13	14	15	16	G/A
0	5	14	14	5	11	12	14	14	8	10	13	8	72%	0	0	0	0	0	0%
5	4	2	1	8	4	4	2	2	8	6	1	7	28%	0	0	0	0	0	0%
Respons(-e)	3	0	0	2	1	0	0	0	0	0	0	0	2%	0	0	0	0	0	0%
	2	0	0	1	0	0	0	0	0	0	0	0	1%	0	0	0	0	0	0%
	1	0	0	0	0	0	0	0	0	0	0	0	0%	0	0	0	0	0	0%
	GEM/ AVG	4.9	4.9	4.1	4.6	4.8	4.9	4.9	4.5	4.6	4.9	4.5	4.7	0.0	0.0	0.0	0.0	0.0	0.0
	TOT	16	15	16	16	16	16	16	16	16	14	15		0	0	0	0	0	
		Onderrig en assessering/Teaching and assessment												Add.Items					

Vraag / Question
1. Die dosent het studente met respek behandel / The lecturer treated students with respect.
2. Die dosent was toeganklik / The lecturer was approachable.
3. Die onderrigaktiwiteite het my gehelp om voor te berei vir assesserings / Teaching activities helped me to prepare for assessment.
4. Die onderrigaktiwiteite het ooreengestem met die genoemde uitkomste / Teaching activities were in line with the stated outcomes.
5. Die dosent het die leerinhoud verstaanbaar verduidelik / The lecturer explained the subject matter in a way that I can understand.
6. Ek het die dosent as 'n kundige op sy/haar gebied ervaar / I experienced the lecturer as knowledgeable in his/her subject.
7. Die dosent was goed voorberei / The lecturer was well prepared.
8. Die dosent het intellektuele uitdagings gestel / The lecturer challenged me intellectually.
9. Die onderrigbenadering het geleentheid gebied vir interaksie in die klas / The teaching approach provided opportunity for interaction in class.
10. Die dosent was entoesiasties / The lecturer was enthusiastic.
11. Die dosent het geleenthede vir onafhanklike studie geskep / The lecturer created opportunities for independent study.

Dosent/Lecturer	Dr Janet van Niekerk
Module	WST 111
Datum/Date	2017/05/24
Aantal vorms/Number of forms	185
Gemiddelde/Average	4.5

Nota: Waar studente nie alle antwoorde voltooi het nie, tel die kolomme nie op na die aantal vorms nie.
Note: Where students did not answer all questions, columns did not add up to the number of forms.

		1	2	3	4	5	6	7	8	9	10	11	G/A	12	13	14	15	16	G/A
0	5	148	126	103	121	106	141	139	110	91	103	108	64%	93	0	0	0	0	54%
4	4	32	49	61	50	58	34	39	57	60	57	58	27%	52	0	0	0	0	30%
Respons(-e)	3	4	8	15	10	16	7	3	12	28	17	12	6%	23	0	0	0	0	13%
	2	0	1	4	2	3	2	2	5	4	4	5	2%	1	0	0	0	0	1%
	1	1	1	2	2	2	1	2	1	1	3	1	1%	4	0	0	0	0	2%
	GEM/ AVG	4.8	4.6	4.4	4.5	4.4	4.7	4.7	4.5	4.3	4.4	4.5	4.5	4.3	0.0	0.0	0.0	0.0	4.3
	TOT	185	185	185	185	185	185	185	185	184	184	184		185	0	0	0	0	
		Onderrig en assessering/Teaching and assessment												Add.Items					

Dosent/Lecturer	Dr Jane van Niekerk
Module	WST 111
Datum/Date	2017/05/24
Aantal vorms/Number of forms	31
Gemiddelde/Average	4.6

Nota: Waar studente nie alle antwoorde voltooi het nie, tel die kolomme nie op na die aantal vorms nie.
Note: Where students did not answer all questions, columns did not add up to the number of forms.

		1	2	3	4	5	6	7	8	9	10	11	G/A	12	13	14	15	16	G/A
0	5	26	20	15	21	21	26	25	18	11	19	14	63%	7	0	0	0	0	25%
4	4	5	9	15	9	8	3	6	10	18	10	14	31%	14	0	0	0	0	50%
Respons(-e)	3	0	2	0	1	2	2	0	3	2	2	3	5%	5	0	0	0	0	18%
	2	0	0	1	0	0	0	0	0	0	0	0	0%	1	0	0	0	0	4%
	1	0	0	0	0	0	0	0	0	0	0	0	0%	1	0	0	0	0	4%
	GEM/ AVG	4.8	4.6	4.4	4.6	4.6	4.8	4.8	4.5	4.3	4.5	4.4	4.6	3.9	0.0	0.0	0.0	0.0	3.9
	TOT	31	31	31	31	31	31	31	31	31	31	31		28	0	0	0	0	
		Onderrig en assessering/Teaching and assessment												Add.Items					

Dosent/Lecturer	Dr Janet van Niekerk
Module	WST 121 (B)
Datum/Date	2017/10/13
Aantal vorms/Number of forms	197
Gemiddelde/Average	4.5

Nota: Waar studente nie alle antwoorde voltooi het nie, tel die kolomme nie op na die aantal vorms nie.
Note: Where students did not answer all questions, columns did not add up to the number of forms.

			1	2	3	4	5	6	7	8	9	10	11	G/A	12	13	14	15	16	G/A
0	Respons(-e)	5	150	129	107	102	99	140	132	111	97	103	114	60%	3	1	0	0	0	33%
3		4	40	53	57	69	66	45	52	59	58	60	60	29%	0	0	0	0	0	0%
		3	3	9	28	21	24	8	8	20	37	26	16	9%	1	0	0	0	0	8%
		2	0	2	2	2	3	1	2	2	2	5	2	1%	0	0	0	0	0	0%
		1	2	1	1	1	3	1	1	2	1	1	2	1%	4	3	0	0	0	58%
		GEM/ AVG	4.7	4.6	4.4	4.4	4.3	4.7	4.6	4.4	4.3	4.3	4.5	4.5	2.8	2.0	0.0	0.0	0.0	2.4
		TOT	195	194	195	195	195	195	195	194	195	195	194		8	4	0	0	0	
			Onderrig en assessering/Teaching and assessment												Add.Items					

Dosent/Lecturer	Dr Janet van Niekerk
Module	WST 121 (A)
Datum/Date	2017/10/13
Aantal vorms/Number of forms	41
Gemiddelde/Average	4.6

Nota: Waar studente nie alle antwoorde voltooi het nie, tel die kolomme nie op na die aantal vorms nie.
Note: Where students did not answer all questions, columns did not add up to the number of forms.

			1	2	3	4	5	6	7	8	9	10	11	G/A	12	13	14	15	16	G/A
0	Respons(-e)	5	32	30	21	24	23	34	34	28	22	22	24	65%	1	0	0	0	0	50%
4		4	8	9	17	14	12	6	5	12	12	14	13	27%	0	0	0	0	0	0%
		3	1	2	2	3	4	1	2	1	6	4	1	6%	0	0	0	0	0	0%
		2	0	0	1	0	2	0	0	0	1	1	1	1%	0	0	0	0	0	0%
		1	0	0	0	0	0	0	0	0	0	0	2	0%	1	0	0	0	0	50%
		GEM/ AVG	4.8	4.7	4.4	4.5	4.4	4.8	4.8	4.7	4.3	4.4	4.4	4.6	3.0	0.0	0.0	0.0	0.0	3.0
		TOT	41	41	41	41	41	41	41	41	41	41	41		2	0	0	0	0	
			Onderrig en assessering/Teaching and assessment												Add.Items					

Vraag / Question
1. Die dosent het studente met respek behandel / The lecturer treated students with respect.
2. Die dosent was toeganklik / The lecturer was approachable.
3. Die onderrigaktiwiteite het my gehelp om voor te berei vir assesserings / Teaching activities helped me to prepare for assessment.
4. Die onderrigaktiwiteite het ooreengestem met die genoemde uitkomste / Teaching activities were in line with the stated outcomes.
5. Die dosent het die leerinhoud verstaanbaar verduidelik / The lecturer explained the subject matter in a way that I can understand.
6. Ek het die dosent as 'n kundige op sy/haar gebied ervaar / I experienced the lecturer as knowledgeable in his/her subject.
7. Die dosent was goed voorberei / The lecturer was well prepared.
8. Die dosent het intellektuele uitdagings gestel / The lecturer challenged me intellectually.
9. Die onderrigbenadering het geleentheid gebied vir interaksie in die klas / The teaching approach provided opportunity for interaction in class.
10. Die dosent was entoesiasties / The lecturer was enthusiastic.
11. Die dosent het geleenthede vir onafhanklike studie geskep / The lecturer created opportunities for independent study.

e. Annexure E: Cover page of project

WST 121 Project

Do males have lower blood sugar levels than females?

Use the dataset “Sugar” and SAS only to answer the research question with supporting evidence from the data.

You should incorporate the following:

- Appropriate descriptive and graphical displays
- Appropriate hypotheses with assumptions
- Comparison of groups with regards to the research question.
- Answer the research question.

Your report should have titles, subtitles, page numbers etc.
Include your code and SAS output in your report.
Extra marks for extra work!

Please submit a pdf of your report to the Turnitin link on ClickUP.

The submission link closes on 1 October 20h00. (Absolutely NO late submissions or any excuses will be accepted).
You can upload multiple versions and only the last version will be taken into account – so upload as you progress every week.

f. Annexure F: Self-made instrument to collect data about online lectures

Questionnaire regarding online lectures

Please be completely honest so that we can make adjustments.

1. The videos work great as online lectures

Strongly disagree	Disagree	Agree	Strongly agree

2. Any feedback:

g. Annexure G: Self-made instrument to collect data about the project

Questionnaire regarding project

Please be completely honest so that we can make adjustments.

1. I learned new skills through the project.

Disagree	Agree

2. I have a deeper and more thorough understanding of the course content partly due to the project.

Disagree	Agree

h. Annexure H: Peer review summary and feedback

Appendix 2: Peer observation on class visit

Reviewee name	Janet van Niekerk	**Reviewer name**	Ina Louw
Date:	17/3/2017	**Relationship between reviewer and reviewee**	EC
Time/duration	11:30-12:20	**Module**	WTW111
Venue	Cent 6	**Level of study**	1st year
Approx. no of students	300	**Composition of the group**	Normal
Topic of session	CDF	**Type of session (Lecture, practical, seminar, other)**	Lecture

Outcomes of the session:
1) Not given on slides, but shared verbally

Criteria	**Scoring**			**Comments**
1 = Not yet competent 2 = Competent 3 = Exceeds competency expectations	1	2	3	
Elements of the lecture: **A: Introduction**				
Mood/ Motivate/Role clarification (Captured attention)			x	You asked them if you should ask about the thing of last night (test). You spend some moments asking and joking with them.
Activated prior knowledge			x	You referred them back to the previous lecture and explained where you will continue and your slide was open at that spot in their textbook. I agree that this style works well in the numerical subjects.
Placed topic in context of bigger picture			x	You explained how everything fits and what is still to come and motivate them by saying the most difficult chapter is now behind them.
Flipped classroom activities	Yes		No	You mentioned the JITT and referred to it.
Integration of pre-class activities (if applicable)				
B: Body				
B1: Pace, presentation, class management & communication				

Voice: quality, volume, language usage			x	You use the microphone well. You have good tone and fluctuation in your voice for the size of the venue. You are enthusiastic.
Eye contact (Yes or No?)	Yes	No		You even walked and assisted them at their desk when the entire class was calculating an answer.
Self-confidence, attitude, use of space			X	You are very confident, you fill the room with positive energy and knowledge and one student told me you climb into the content.
Use of equipment/media			x	You are very familiar with your equipment and move smoothly from the tablet to the PPT that is the notes in their books. It is important that you use the book, since then in looks exactly like their version and in year 1 they confuse too easily.
Engaging students			x	Excellently so. I was impressed that you allow time for them to solve a problem in class and could there and then solve misconceptions.
Relevance: Application/purpose			x	Due to your linking of topics in the beginning, the relevance was clear to them.
Differentiation with respect to learning styles			x	You included the auditory and visual learners by drawing number lines and graphs wherever possible to assist their understanding.
Sensitive handling of cultures, genders & races				N/a You were respectful to all.
4. Adapts to learning environment (Responsiveness to student needs, venue limitations, use of teaching technologies, etc.)			x	You use the tablet so well for that large venue.
Content reflect diversity of perspectives and contexts				N/a it is Stats.
Relevant to study year and NQF level			x	Your pace and approach was perfect.
Content was well prepared, organised and presented			x	Your tablet work is a good size and the book works well. The work is as structured as needed for the subject.
Questions & Answers constructively done			x	You asked and received questions and they were handled well. You keep them engaged by pausing for questions.
Clear explanations			x	I explain very well and the students shared that with me.

Students remained engaged			x	Because they have to calculate answers with you and copy, they stay engaged. You didn't once have to call them to silence.
Was opportunity for student feedback created			x	You asked after the activity who needs help and one asked a question, then you asked again if there were more questions with "All OK?"
Was learning monitored?			x	You asked throughout the lecture if they follow, if they are satisfied with the answer etc.
C: Conclusion				
Wrap up/Summarise		x		You didn't wrap up the session. I would have loved a concluding explanation (asked from the students) about the difference between x and y. (you know what I mean).
Move on (preview of next lecture)		x		You moved on in a bit of a rush, yet there was still time. I think the time on your tablet was incorrect. You gave them homework and that was great, you also reminded them about no pracs and tuts for next week. Then you invited them to write a muddiest point at the back of their attendance slip, but they have already passed it to the isle, so that should have been planned better. It is a great strategy!
Documentation				
Study guide (appropriateness & clarity)	The study guide is very well-structured and detailed. The only missing components are the new information about FLY and the information about student support. I have attached it.			
Assessment plan (fairness and transparency)	The plan is given in the study guide and is fair.			
Assessment tasks (fair, valid, reliable)	The assessment is constructively aligned and well-structured and presented.			
ClickUP presence (nature)	You use clickUP in a planned and constructive way with multiple activities such as JITT,			
5. Candidate's strengths	You are young, approachable, explains well and is patient (according to the students). All these qualities combined with your obvious love for stats and maths makes you a champion in the class.			
6. Candidate's areas for improvement	Only your conclusion section needs better planning. Announce that slips should be retained for a question that will follow, when the students hand			

	out the attendance slips. Then announce the muddiest point when the lecture is over.

Appendix 2: Peer observation on class visit

Reviewee name	Janet van Niekerk	**Reviewer name**	Nina Strydom
Date:	2017-03-22	**Relationship between reviewer and reviewee**	Colleagues presenting the same course
Time/duration	50 minutes	**Module**	WST111
Venue	Large Chemistry	**Level of study**	First year
Approx. no of students	340	**Composition of the group**	Very heterogeneous
Topic of session	The cumulative distribution function and expected value of a random variable	**Type of session (Lecture, practical, seminar, other)**	Lecture

Outcomes of the session:

1) obtain $P(a \leq X \leq b)$ from the distribution function $F(x)$
2) define the expected value of a discrete random variable
3) observe that the expected value is a weighted average of all possible values of the discrete random variable where the weights are the probabilities of those values

Criteria	**Scoring**			**Comments**
1 = Not yet competent 2 = Competent 3 = Exceeds competency expectations	1	2	3	
Elements of the lecture: **A: Introduction**				
Mood/ Motivate/Role clarification (Captured attention)			3	The candidate has a friendly, energetic, engaging, but relaxed approach to students. Her youth inspires students to follow her example.
Activated prior knowledge			3	A verbal summary of previous work and homework assignments are used to activate prior knowledge.
Placed topic in context of bigger picture			3	The candidate gives the bigger picture of the relevant material within the context of the course, but also in terms of practical application.
Flipped classroom activities	Yes		No	Students have to do Just In Time learning assignments prior to the lecture. The prior knowledge is invoked in discussion of new concepts.
Integration of pre-class activities (if applicable)			3	
B: Body				
B1: Pace, presentation, class management & communication				
Voice: quality, volume, language usage			3	The candidate communicates clearly in a language the students relate to.
Eye contact (Yes or No?)	Yes		No	
Self-confidence, attitude, use of space			3	The candidate shows the necessary self-confidence, reflects an openness

				to students and interacts with students (also by walking around in class) as part of the learning session.
Use of equipment/media			3	The candidate combines old and new technology very effectively: from text book referrals to interactive emphasis and explanation with colour and sketches.
Engaging students			3	Students participate by attempting exercises based on new concepts throughout the contact session.
Relevance: Application/purpose			3	The candidate is very good at focusing on the essence of a topic.
Differentiation with respect to learning styles			3	The candidate is in touch with the way that students approach problems and give them clues how to remember key aspects and rules of the topic being considered. She takes cognisance of students' different learning styles by inviting them for consultation if they have need for a different explanation of concepts covered.
Sensitive handling of cultures, genders & races			3	Questions from students are treated with patience and careful consideration. Students are accommodated (amongst others) when they have problems with obtaining the text book, late registrations and referral to student advisors in case of personal problems. (I have seen her walk the extra mile with students disabled in one sense or another).
4. Adapts to learning environment (Responsiveness to student needs, venue limitations, use of teaching technologies, etc.)			3	Interaction with students motivate them to engage with learning material.
B2: Content				
Content reflect diversity of perspectives and contexts			3	Examples relevant to students' frame of reference are employed as far as possible.
Relevant to study year and NQF level			3	The course serves partly as exemption from certain Actuarial exams. As such the content is evaluated regularly in terms of relevance and level.
Content was well prepared, organised and presented			3	The candidate is very able, well-prepared, and logical in her presentation of content.
B3: Methods, activities and student engagement				
Questions & Answers constructively done			3	Students participate in applying newly acquired concepts.

Clear explanations			3	Explanations are clear and well annotated with colour and graphics.
Students remained engaged			3	Students have to participate in doing exercises and remain engaged due to the way content is presented.
B4: Monitoring of student learning/understanding				
Was opportunity for student feedback created			3	Opportunity for questions in class are given, but also via email, practical and tutorial sessions and ample consultation time.
Was learning monitored?			3	Learning is monitored continuously using different methods: questions in class, homework, quizzes, tests on ClickUp.
C: Conclusion				
Wrap up/Summarise			3	The lecture starts and ends with a wrap-up of concepts: existing and newly acquired.
Move on (preview of next lecture)			3	Clear exposition of what is expected for and from the next lecture is given.
Documentation				
Study guide (appropriateness & clarity)	Study guide contains all information needed by a student for successful completion of the course. In each lecture, students are referred to the relevant section and goals in the study guide. A detailed calendar with content, assignments and assessment for each week is provided.			
Assessment plan (fairness and transparency)	The assessment plan is set out clearly in the study guide with the weight of each assessment activity. Continuous assessment (not for marks) takes place in class through homework and small class tests and quizzes on ClickUp. The purpose of each assessment activity is clearly communicated to students. Students have many opportunities to consult with lecturers/assistant lecturers/tutors to discuss any problems. Students can direct specific queries to specific e-mail addresses.			
Assessment tasks (fair, valid, reliable)	Students do a project in descriptive statistics with the purpose of engaging them in practical problems. Just In Time Learning activities are evaluated with ClickUp tests. Tutorials present an opportunity where students learn to apply the theory and prepare for semester tests. Two class tests are written. Practicals are integrated with theory and a weekly assignment is submitted on ClickUp. Memos to tests and additional exercises are provided on clickUp. Online quizzes serve as self-evaluation tool.			
ClickUP presence (nature)	Lecture, tutorials and practicals are integrated: JITs as preparation, quizzes for self-evaluation, videos for better understanding and added value, selected			

	online lectures are available on ClickUp. Also some assessment activities as indicated above.
Overall comments	
5. Candidate's strengths	I have witnessed how the candidate has grown since her first year as junior lecturer. She is incredibly effective and hard-working. She really is an exceptional individual who fully comprehends her responsibilities and faces any task head-on. She is not afraid to tackle new challenges. She is innovative in her teaching practices. Her approach and hard work are appreciated by students and colleagues alike.
6. Candidate's areas for improvement	To engage students in a very large group, remains a work in progress. With limited resources, it represents a continuing challenge for any lecturer.

i. Annexure I: Harvard Teaching qualification

HARVARD | THE DEREK BOK CENTER FOR TEACHING AND LEARNING

Certifies that

Janet Van Niekerk

successfully completed all requirements for the

Higher Education Teaching Certificate

Through Harvard's Derek Bok Center for Teaching and Learning
in association with

HarvardX

June - August 2022
Issued on: 5 October 2022

Bharat Anand

Bharat N. Anand
Vice Provost for Advances in Learning