From the editorial team
Rory and Ina

With the third issue of the bulletin in your inbox, we are excited about the mix of stories on offer. We've welcomed contributions from other faculties, since this publication is serving the entire UP community. In this issue we are proud to boast contributions from EMS, Education, Education Innovation (& EBIT), and of course several pieces from NAS. Take a moment to kick back, relax, and dig into the wide array of inspiring projects and innovations of our UP colleagues.

We are planning a special issue devoted to support structures for the next bulletin. We hope to exhibit some of the ongoing projects as well as the specific support services on offer, with an eye on how—and typically in what kinds of situations—faculty can access these services. If you have any suggestions on who and what we should feature, please drop us an email (ina.louw@up.ac.za). Regular contributions are still very welcome; we will keep them for the fifth issue.

Finally, don't forget to check out the updated T&L@NAS Resource List for all our favourite tools and apps.

Immediate Feedback Assessment Technique *# trying out # food for thought*
Victoria Rautenbach (Department of Geography, Geoinformatics and Meteorology)

The Immediate Feedback Assessment Technique, also known as the IF-AT, is an interactive method of conducting a (most commonly) multiple choice that provides the students with immediate feedback about the accuracy of their answers to each question. IF-AT tests are generally conducted in groups where students need to work together to answer the questions and learn from each other.

In 2018, I conducted an IF-AT test as part of a final year geoinformatics module. We used an online application, GRAT (http://grat.me/home), to create and conduct the test with a paper answer sheet as a backup. Unfortunately, between the scalability of GRAT and some internet issues on the day, we experienced some technical difficulties. Thus, we relied heavily on the paper answer sheet.

To collect the students' feedback after the test, a short survey was conducted. Below is some of the significant feedback received from the 42 students that completed the survey. The majority of the students (93%) indicated that they enjoyed opportunity to discuss the questions with their classmates, and that they (96%) learned

The T&L@NAS Bulletin aims to be a forum for sharing thoughts, ideas, and stories on teaching and learning across NAS (and UP). In doing so, we hope to help foster a supportive and collaborative community where we can be inspired by the experiences and innovations, no matter how minor, of all our colleagues.

something new during the test. 37% Disagreed when asked if all members contributed equally during the test, but only 18% of the students felt that only one member, incl. themselves, answered most the questions.

The students were also asked an open-ended question about their overall impression of the IF-AT test, and the following feedback stood out:

> "Being able to hear each team member's answer and their explanation for their chosen answer provided us all with more perspective and we all had those `ah ha! I finally understand!' moments."

> "I actually enjoyed it. I felt less stressed out knowing I will be able to discuss the questions with the members in my group."

There was of course also negative feedback, for example, "My group was awful" or "It was stressful because of group dynamics."

To summarize, these types of tests take a lot of effort to setup as the questions need to be challenging and allow for discussion in the groups. Even though technology can be an issue, this is a great learning experience for the students.

Teaching of animal anatomy and physiology *# plastinated models*
Este van Marle-Köster, Ayanda Maqashu, and Amelia du Preez (Animal & Wildlife Sciences)

For more than three decades animal anatomy and physiology was taught using cadaver material. Over the years, video material has been introduced, but without the possibility to handle the organs it limited 3-Dimensional understanding. It was therefore decided to investigate alternative methods for practical teaching of animal anatomy.

Since 1977, "plastinated" organ specimens and even complete cadavers have become common place in Human and Veterinary Faculties. Plastination is a method used to replace fat and water in tissue with silicone or polyester; the smallest details on the organs are thus perfectly preserved. These specimens are currently used to augment—and even replace—the learning experience of anatomy students that was traditionally based on the dissection of formaldehyde preserved cadavers. There are several advantages in using plastinated models, which include more effective teaching, reducing costs for anatomy practicals, and removing health risks for students and lecturers. Less labour is required and no cleaning of hazardous materials after each practical. From an animal welfare point of view, unnecessary slaughtering and wastage is avoided. If carefully managed these models offer robust specimens and a long-term investment in teaching of animal anatomy.

Wildlife Sciences commenced with the first teaching sessions using newly acquired plastinated models this year. This first session was a big success. The students were brimming with questions and an eagerness to know more—their enthusiasm and excitement were apparent (second only to the excitement which the lecturers expressed). Students from any year can use the models to revise their work, and lecturers can use these models to make their classes more comprehensive. This is only the first step in using new, innovative technology to teach Animal Anatomy at the Department of Animal and Wildlife Sciences.

Click here for a more detailed account.

The LLITUP Collaboratorium *# hybrid learning*
[Ronel Callaghan (Education: Department of Science, Mathematics & Technology Education)](#)

The [Living Lab for Innovative Teaching](#) research unit's Collaboratorium is a physical lab-space in the Natural Sciences Building on Groenkloof Campus. A variety of education technology, apps and software is available in this space for lecturers, post graduate students and teachers to investigate. We host sessions throughout the year, aiming to bring the LLITUP stakeholders together to experiment with, learn from and research technology in education in an open, collaborative and interdisciplinary environment.

During 2018 a total of 1415 people were involved in 79 different activities such as workshops, sharing sessions, and on ad hoc basis. We also evaluated and implemented a variety of apps and other open education resources, tested a variety of devices and printed educational 3D prints.

The activities in the lab included the following types of interactions in 2018. **Dream2Play:** There were 13 Dream2Play sessions throughout the year. During these sessions participants were introduced to hardware and software in informal settings. **Dream2Learn:** There were 16 Dream2Learn sessions. These sessions were structured like workshops. **Dream2Research:** The 13 Dream2Research sessions created opportunities for researchers to collaborate within the field of ICT in education. **Dream2Teach:** During these sessions the focus

were on planning for teaching with technology. **Consulting:** Different types of consulting occurred during 12 scheduled and many more ad hoc sessions. **Explore:** On 13 scheduled occasions the LLITUP team explored different possibilities for research and collaboration opportunities

Lecturers are welcome to contact and visit us to explore the possibilities of collaboration and interdisciplinary research on the use of technology in education.

LLITUP Manager: ronel.callaghan@up.ac.za
Collaboratorium manager: jody.joubert@up.ac.za

The online revolution—tapping into the video market *# trying out*
[Christel Hansen (Department of Geography, Geoinformatics and Meteorology)](#)

Teaching practical concepts can be challenging. Linking theoretical concepts to practical concepts even more so. Throw in new software and the challenge can be insurmountable. 3rd year students in GIS 310 have to do practical exercises where they solve various geospatial problems using two GIS products (ArcMap and QGIS). This year I moved away from detailed written instructions and made videos instead using [Snagit](#). While the product is not free, the academic license only costs about R 500. I also tried the combination of [Apowersoft](#) and [Blender](#) (both are free), but then making the videos becomes a much longer process. Videos are uploaded to an unlisted YouTube account and then linked directly in clickUP.

The videos target one or two concepts at a time, are short and to the point. Each video is made twice—once for each GIS product. Students are encouraged to watch the videos during their practicals. Video memos are made available after each practical has been marked. One advantage is that students can revisit videos and go through specific concepts again, as often as they like, at their own pace. YouTube also allows you to extract some analytics and gives me an idea of what students struggle with, assuming those videos are the most watched. The feedback received from the class has been very positive, and I have had to make many more videos that I had originally intended to make. If you are interested, you can also have a look at the videos for [ArcMap](#), [QGIS](#), or the [practical memos](#).

[HowTo@NAS guide](#)

Zoosh up your class participation with Zeetings! *# tried and tested*
[Marina Kirstein and Rolien Kunz (EMS: Department of Auditing)](#)

We are promotors of active learning and have been struggling to get students to actively participate in our formal lectures. We came across the software programme Zeetings at a conference that we attended in New Zealand and were immediately hooked on it. We've been using Zeetings for a while now in the subject of Auditing on third year as well as honours levels.
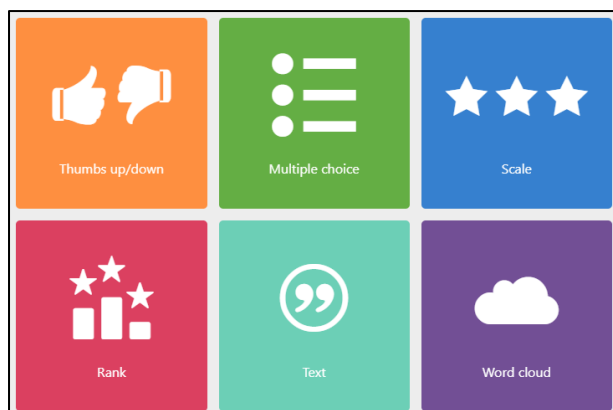
[Zeetings](#) is a web-based platform that enables students in your classes to actively participate from their own electronic devices. [The education & non-profits version is free, has unlimited presentations and a limit of 500 participants per presentation.] It is very user friendly and it only takes us about 30 minutes extra to create polls after importing a PowerPoint presentation. The number of questions/polls you add to your live presentation will all depend on the topic and the level of participation you want in your class. Zeetings has different types of activities you can use and we encourage you to give them all a try and to use a mixture of them in your classes. The different types of activities include thumbs up/down, rank polls, multiple choice, discussion boards, etc.

We experienced that at least 80% and more of the students in the class actively participate on Zeetings as the shy and introvert students are also given a voice now. The atmosphere in class has become much more participative and students are excited to read and see what the other students have written or polled. It has become a lot of fun! We have expanded the use of Zeetings to the discussion forums hosted by our honours lecturers and in our undergrad tutor classes. Zeetings is zuper!

The EBIT iPeer project *# teamwork # real-time assessment*
[Adriana Botha (Department for Education Innovation)](#)

The competency gap between teamwork skills and that which is required by industry and professional accreditation bodies motivated eight lecturers and their education consultant to revisit the learning outcomes and assessment blueprint of teamwork in eighteen pilot modules. In pursuit of enhancing the hybrid drive in the Faculty of Engineering, Built Environment and Information Technology (EBIT), an online tool was identified for formative and real-time assessment. Lecturers who opted to be part of the project are from the departments of Industrial and Systems Engineering (Saija Bezuidenhout), Mechanical and Aeronautical Engineering (Lukas du Plessis), Informatics (Lizette Weilbach & Riana Steyn), the Engineering Augmented Degree Program (Erika Müller), Construction Economics (Riaan Jansen), and Mining Engineering (Jannie Maritz & Wolter de Graaf).

The iPeer Tool is a building block in clickUP (the official Learning Management System of UP). The tool affords group members to anonymously evaluate each other's participation and contributions and receive feedback in real-time from their team members. The initial implementation of the tool in EBIT caused wariness due to potential server challenges if being used on a large scale. However—despite the initial administrative burden and effort needed that related to setting it up—managing the tool and establishing quality assessment processes has become much easier over each implementation round. The feedback received from students proved to be positive; the tool was found to be easy to use and enabled honest and efficient peer assessment along with a fair allocation of marks within teams.

The EBIT iPeer Project initiated in 2017/2018 and expanded into 2019 through the support of a Scholarship of Teaching and Learning Grant. The objectives envisaged for this project are (1) to develop a self-regulated online resource for all students in the EBIT undergraduate module in clickUP, which will create a "teamwork fundamentals" learning opportunity and (2) to design and develop a generic rubric for assessment of student

learning which is in alignment with accreditation criteria and programme learning outcomes. We propose to further develop this initiative into a systematic approach applied throughout the EBIT curriculum that could also be shared with other faculties in UP and elsewhere.

Further info here.

Exposing students to rocks *# rocks and selfies*
Louis van Rooy (Department of Geology)

The introduction of new, applied content at third year level, when students assume they know all about it, is sometimes challenging. Students tend to regard rocks as a geological material with specific mineral compositions and features that are related to the historic geological processes.

In Rock Mechanics they need to apply their pre-knowledge from petrology to understand and explain the behaviour of rock and rock masses under changed stress conditions, e.g. excavating a mine shaft in rock or building a large dam on rock. It is very difficult to get the concept of a rock mass across in the laboratory where only small rock specimens are available.

On all field excursions it is evident that the present day student is the most photographed individual ever. I decided to use the selfie to get the students to photograph themselves but not as the centerpiece. The class was required to visit any publicly accessible area where a natural rock outcrop occurs and to take a selfie of themselves next to the rock, name the rock, describe the rock mass and how much the rock surface is weathered. For the submission a Blog was created and was open for fellow students to look at all the submissions.

The submission date for the assignment was set at the end of a recess. The rubric included the clarity of the picture with regards the rock as well as their face and for me to be able to identify the features of the outcrop they had to describe in the field. Submissions not being a selfie were also penalized.

The pictures shown here are examples of the amazing interpretation of the assignment; it was still impossible to get some individuals to focus on the academic merit rather than their own appearance.

Raising future mathematicians *# undergraduate seminar series*
Eder Kikianty (Department of Mathematics and Applied Mathematics)

I taught multivariable calculus in 2018, for the 3rd time in a row. The content might not change much from year to year, but the audience is never the same. That year I had the pleasure of teaching an especially bright student, Adriaan de Clercq, a 2nd year BSc Mathematics student. After he worked through everything in the syllabus, he found himself hungry for more mathematics. I offered him my guidance and we worked on challenging problems and discussed mathematical topics outside the scope of the class. Under my supervision, Adriaan presented four lectures in the second semester of 2018

"We promise to devote our knowledge to the world."
—excerpt from my graduation vow at Bandung Institute of Technology

on the book "An Introduction to the Theory of Numbers" by GH Hardy and EM Wright. His series of lectures, formalised as the "Undergraduate Seminar Series", were attended by undergraduate students, postgraduate students, and staff members in the department.

After a successful year of working with Adriaan on subjects outside of the curriculum, I asked myself, how do I identify and support more students like him? After all, they are the future of mathematics, and it is our duty to raise, train, and support them.

In 2019, I initiated the "Calculus Workshop," a weekly enrichment activity to supplement the second-year multivariable calculus syllabus. This workshop is a way for me to not only to identify and support the second-year students, but also to train Adriaan, now a 3rd year, to be a mentor to his juniors. With Adriaan as my

assistant, we studied advanced topics and challenging questions with students who are interested and passionate about mathematics.

For the second semester of 2019, we plan to resume the "Undergraduate Seminar Series" with Adriaan and two second year students as presenters. The workshop will continue to serve as an enrichment activity for the second-year analysis subject, and will be renamed as the "Analysis Workshop."

It is our duty, as academics, to impart our knowledge to the younger generations, teaching and raising them to become valuable members of society.

Website complementing lectures and practicals *# hybrid learning*
Peter C. le Roux and Michelle Greve (Department of Plant and Soil Sciences)

BOT251 (South African Flora and Vegetation) is a service level course offered by the Department of Plant and Soil Sciences. It aims to introduce students to the major biomes (i.e. vegetation types) of South Africa, ecosystem processes, and some basic ecological theory in a South African context. Due to the class's large size, possibilities for taking the students into the field to view the biomes and see examples of the ecological processes are limited. Additionally, the exposure of many students to the greater South African landscape is restricted; therefore, the context for the material being taught in class is often lacking.
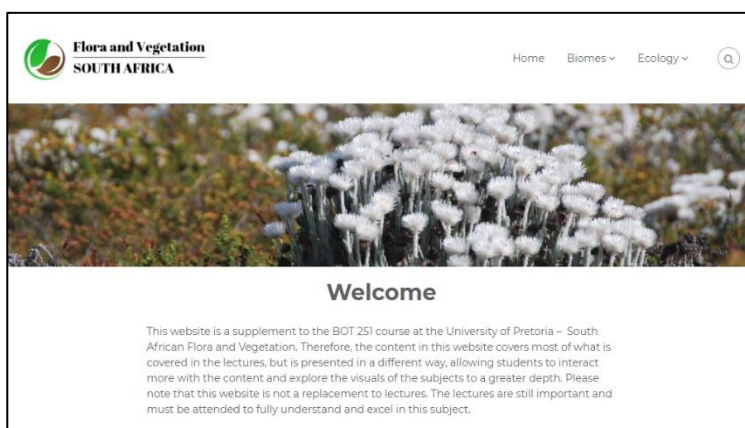
To address this issue, an intervention in the form of a website with a visual emphasis (i.e. maps, photos, links to videos) was created (http://www.sabiomes.co.za/). The website contains essential information on each of the biomes, e.g. vegetation structure, conservation status and climate, as well as on other theory covered in class. This resource is provided as a complement to lectures and practicals—it aims to reinforce the lecture material, generate wider interest in the subject matter and cater to different learning styles.

The website was developed in WordPress, which allows easy updating. (However, the backbone of the website was designed in such a way that it will remain relevant for an extended period of time, minimising the time investment required over the long-term.)

The website was launched in 2019. A poll conducted towards the end of the module indicated that approximately 65% of the class had accessed the website. Of these, approximately 80% indicated that the website was interesting and/or useful.

Invitation to contribute *# dare to share*

Do you have a new teaching innovation you are trying out? Have you been doing something tried and tested for years to engage with students? Has some issue been on your mind of late? Perhaps you have found a way to streamline some aspect of your course saving you valuable time? Please share your thoughts with our teaching and learning community through this bulletin; we welcome contributions from all faculties.

Kindly keep the style of this bulletin (and intended audience) in mind, aiming for a short piece (150-300 words). Find our guidelines [here](). Submissions can be emailed to Ina Louw ([ina.louw@up.ac.za]()); your piece will be (lightly) edited for inclusion in the next bulletin.

General queries or comments regarding this bulletin can also be directed to Ina Louw. Technical queries or questions regarding formatting, file formats, links, etc. can be directed to Rory Biggs ([rory.biggs@up.ac.za]()).

All bulletins will be archived [here](), on the [NAS faculty website](), and on the [Fly@NAS clickUP site]().