# 2015

# BLENDED LEARNING CASE STUDIES

Sentrum vir Leertegnologieë │ Centre for Learning Technologies │ iZiko lokuFunda ezobuGcisa

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# BLENDED LEARNING CASE STUDIES 2015
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# #audit_sexy: Increasing student engagement using social media
## Faculty of Economic and Management Sciences | School of Accountancy

**Module:** Auditing 288 & Auditing 388
**Lecturer:** Prof Riaan Rudman rjrudman@sun.ac.za & Ms Natasha Sexton nsexton@sun.ac.za
**Blended Learning Coordinator:** Ms Magda Barnard magdabarnard@sun.ac.za

**Learning activity:**
Student engagement enhancement

**Learning technology:**
Facebook

## Context
### Background
Auditing 288 and Auditing 388 are modules presented within the School of Accountancy to approximately 750 students a year. These students are working towards registering as chartered accountants in South Africa. Most of them are academically strong but have very little practical exposure to the real world and almost no working experience.

Auditing is, by nature, a practical application subject that requires students to be able to conceptualise abstract processes and concepts and contextualise theory. Given the constraints of teaching large groups of approximately 300 students in a lecture room environment, however, the modules are often taught on a theoretical basis according to a fixed syllabus, supplemented by short theoretical class examples, homework questions, tutorials and assignments.

### Subject area
The subject area is an auditing course in the undergraduate Bachelor of Accounting programme in the School of Accountancy.

### Intended learning outcomes
The overall objectives of the assignment were to:

- encourage the students to engage outside of the classroom in order to contribute to a change in mindset about auditing;

- change the students' understanding (and conceptualisation) of auditing;

- get the students outside into the real world and perform a function (such as identify internal control weaknesses) that would be expected from them as future auditors; and

- expose the students to a different and practical interpretation of the same subject matter.

### Established practice and the challenge
Internationally, there have been calls for change in the presentation of accountancy programmes. Many have argued that accountancy students are graduating without developing the skills required to cope in the business world. The roles of accountants and auditors have changed; chartered accountancy, for example, has become a business designation that no longer entails only accounting. There is therefore a need for greater focus on subject-specific knowledge, on the management of decision making, on pervasive skills (business ethics and professionalism, management, leadership and personal attributes), on a general business awareness, on skills in the conceptualisation and contextualisation of theory and on implementing the theory practically.

Firms are often required to provide graduates with additional professional training. At the same time, universities are constrained by resources (financial, time, opportunity etc.) and by the numbers of students that require exposure and practical challenges. Universities have been criticised that too much lecturing is done and that teaching is geared only towards enabling students to pass exams. Students are taught and assessed in the same manner, graduating with a strong theoretical base but lacking practical experience (and the necessary skills) to use the knowledge. They are not able to apply the techniques that they have learned at university to real-world issues. Market needs include graduates being able to solve unstructured problems and consider a variety of perspectives that are not restricted to the classroom. A shift in focus from numerical problem solving to strategic and business matters is therefore needed. Many argue that conceptual thinking rather than the memorisation of theory should be highlighted.

Student needs have also changed and students now require more real-world interaction and connectedness (whether or not through social media) in all spheres of their lives, including higher education.

### Other relevant role-players
The assignment was run over more than one module. Various undergraduate auditing lecturers were therefore involved, each with a different skill set: student engagement, social media knowledge and technical support.

Business partners also contributed to the practical implementation of the assignment. PriceWaterhouseCoopers, a leading professional services firm, was the main sponsor for the assignment. It sponsored three tablets for the best video clips, gift vouchers for the best photos and several other category prizes. The South African Institute for Chartered Accountants

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(SAICA) also sponsored some category prizes.

## Learning and assessment activities
### Educational approach
Prior research has highlighted the importance of experiential learning for accountancy students through the use of simulations (De Wet & Van Niekerk, 2001; Lightbody, 1997; Massey, Poli & Proctor, 2002; Rudman & Terblanche, 2011). This addresses the obvious lack of graduates applying their theoretical knowledge in practice (Wessels & Steenkamp, 2007, 2009).

### Learning activities
A key part of an auditor's job entails identifying weaknesses in a business and recommending internal controls to mitigate any consequences or risks arising from the weaknesses. In 2015, the undergraduate auditing lecturers at Stellenbosch University challenged their students to take their learning out of the classroom and to search for internal control weaknesses in their everyday lives and in businesses around town. The students were tasked to take a photo or video clip of any weakness in internal control that they identified in their surroundings and to link this to the applicable mitigating control to address the weakness; they had to include a selfie and the hashtag #audit_sexy in their submission. These were posted to a #audit_sexy Facebook group to allow the students to share, like and comment on these real-life examples of internal control weaknesses, thereby allowing more students to share in the learning experiences and learn from other students.

The assignment was commercialised with elements of game shows and gamification. It adhered to the following timeline:
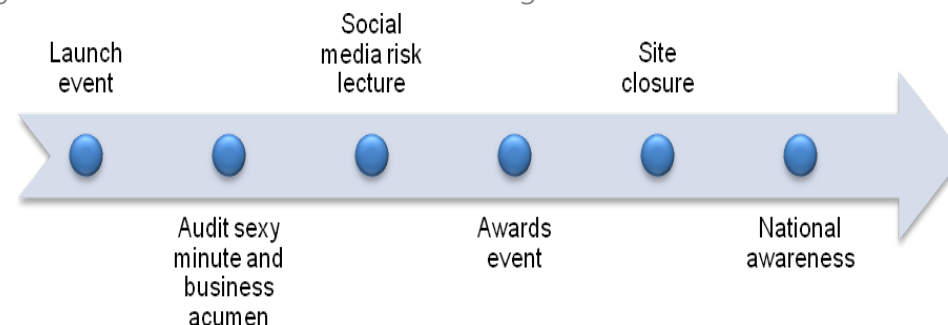


Figure 1: Timeline for the assignment

**Launch event:** The assignment was introduced in the same way as a commercial marketing launch event with a product launch and fanfare.



Figure 2: Lecturers taking selfie to post onto the Facebook group at the launch event

**Audit sexy minute and business acumen:** Throughout the assignment period of approximately three weeks, the lecturers kept the site active with fun posts, such as discussion posts on topical business acumen and posts to promote discussion. They monitored the site throughout the assignment, removing unsuitable posts and advising the students on creating more suitable posts.

**Social media risk lecture:** Censored posts, topical aspects of posts and business acumen brought about the creation of the audit_sexy minute in class, where the lecturers discussed issues in submissions made during the assignment and covered topics such as legal liability, business impact, copyright and reputation risk. The 10 most significant social media risks and related implications were discussed in class.

**Awards event:** An awards event was held in the same way as a grand prize giving like the Oscars. Prizes were awarded to the best videos and best photos; other categories included the post that received the most likes, best dramatic interpretation, most likable character in a post and others.

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**National awareness:** Based on the awareness by accountancy and by non-accountancy students created by the #audit_sexy assignment, a national awareness campaign was rolled out to several other universities across South Africa, encouraging students to be proud of being aspiring chartered accountants. The campaign encouraged students to change their social media profile pictures to include an image containing #audit_sexy or aspiring CA(SA) for a week. The students were challenged by the lecturers to use this as a starting point for discussions to educate people in their community about the accountancy profession, auditing and career prospects for chartered accountants. There was large-scale participation by students from the University of Pretoria, the University of Cape Town, the University of the Western Cape, Rhodes University, the University of the Free State, the University of Johannesburg, Nelson Mandela Metropolitan University, North-West University, Walter Sisulu University and Stellenbosch University. SAICA and even some qualified chartered accountants also took part in the initiative.

**Site closure:** At the end of the assignment, the Facebook group was shut down and all posts were removed from the internet. This was done to clean the internet and to protect the students' and companies' reputations.

## Assessment activities
The assignment counted as one of seven assignments that the students completed in the year and contributed to a percentage of their year mark for Auditing.

## Feedback practices
The students received a mark of satisfactory or unsatisfactory for their submission.

Feedback was given to the students throughout the assignment in the audit sexy minute and at the awards ceremony, where the best assignments were awarded prizes. The justifications behind the selection of the best submissions as category winners were discussed.

## Student self-regulation
The students were able to comment on, like and share each other's posts in the Facebook group. This enabled them to learn from each other.

## Examples
The winning video identified a weakness in internal controls as a result of load shedding, when credit card machines are offline and credit card sales are accounted for with the use of manual ZipZap machines. Sales could then be made to customers who do not have cash in their bank accounts to pay for the sales. The compensating control that was identified was the use of battery-powered wireless credit card machines during load shedding.

The winning photo identified the risk of parking documents blowing away in the wind in a parking lot and the risk of not every driver receiving a receipt when paying for parking. This could result in the theft of cash by the parking attendant when not issuing receipts or when receipts are lost. It was recommended that the attendant sit in a booth and issue each driver with a receipt upon leaving the parking lot.



Figure 2: Winning video submission

## Learning environment
### Learning setting
A closed Facebook group was chosen to limit any risks involved, since the students made videos of real places and situations, which might be problematic if shared openly on social media. Facebook was selected as

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Learning activity:
Student engagement enhancement

Learning technology:
Facebook

the tool for the assignment for the following reasons:

- The ease of use of and the familiarity of the students with Facebook.

- The ability to create a private group with a monitoring function.

- The ability to comment, share and like posts, the students thus collaborating in the learning.

- The limited amount of data required when visiting or uploading to the site.

- The ease of uploading videos and photos.

- The learning that takes place any time of the day.



Figure 4: Lecturer monitoring the Facebook group

## Collaborative setting
The students worked in groups. The social medium allowed them to see multiple examples of real-world internal control weaknesses and they were able to comment on, like and share each other's posts on the Facebook group.

### Support challenges
All the technical support queries were handled by the lecturers. Overall, there were not too many issues, barring the 24-hour-a-day nature of the activity. The students could access all the necessary tools on their mobile phones or in the computer labs at the Faculty.

## Student experience
### Student feedback on the learning experience
The undergraduate Auditing students gave positive feedback in respect of having improved their understanding of and seeing the real-life application of internal controls and realising their professional and ethical responsibilities and social media risks. They were also appreciative of the fact that experiential teaching approaches were used rather than traditional teaching and learning approaches.

### Assessment impact
The assignment assisted the students in understanding auditing better in relation to where it fits in and how to place theory into context. It also assisted them in visualising the controls that are around them, contextualising and conceptualising the auditing concepts.

The students furthermore became aware of the impact of their online posts on people, the sponsors, the University etc. Engaging in discussions during the #audit_sexy minute and business acumen posts raised issues that they had not considered in the past.

There was a definite increase in class interaction.

## General
### Challenges
The assignment was accepted by the students but it was not initially considered as a learning opportunity and therefore not taken seriously by all the students.

The assignment needs to be adapted to stay innovative in the following years.

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A big constraint was a lack of resources. It was time-consuming to create the needed hype regarding #audit_sexy and to maintain a fun atmosphere in class and on the Facebook group, and the lecturers had to interact continually to sustain interest. The sponsors also had a certain level of expectation from the assignment.

Running the assignment on Facebook required a level of technical skill in the finer intricacies of Facebook. The large student numbers entailed 24-hour-a-day monitoring of the Facebook page for non-course related student posting, posts that could be misinterpreted etc.

Pioneering in social media on a large scale exposed the Institution, participating companies, sponsors and lecturers to risks that needed to be considered and addressed. Obtaining approval for the assignment with a large-scale social media impact and with potential risk exposures was a time-consuming process and placed limitations on the assignment.

### Other concluding thoughts
The lecturers and students would like to thank PriceWaterhouseCoopers for its sponsorship and participation in the assignment, making it more engaging and relevant to the students' careers.

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#audit_sexy
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# Blending a Postgraduate Diploma in Business Management Administration
## Faculty of Economic and Management Sciences | University of Stellenbosch Business School

**Programme:** Postgraduate Diploma (PGDip) in Business Management and Administration
**Coordinator:** Mr Martin Butler mbutler@sun.ac.za
**E-Learning Activities Manager:** Ms Marsunet Horn marsunet@sun.ac.za

**Learning activity:**
Student engagement
enhancement

**Learning technology:**
Adobe Connect
Google Hangouts on air

## Context
### Background
The Postgraduate Diploma in Business Management and Administration was presented to 72 students in a blended approach. The programme consisted of 15 modules: 12 core modules and 3 choice modules). The students spent two block weeks on campus: one at the start of the programme and one towards the end.

The programme was developed to address the need to produce graduates for employment at a general management level and higher. It allows graduates admission to the MBA programme and it caters for a broader target audience both from outside the Western Cape and from outside South Africa due to the blended nature of the programme.

### Subject area
The subject area focuses on Business Management Administration. The University of Stellenbosch Business School (USB) forms part of the Faculty of Economic and Management Sciences and focuses on postgraduate programmes and diplomas. It is situated on the Bellville campus.

### Intended learning outcomes
The programme level outcomes are defined as given below.

On completion of the programme, successful participants will:

- understand general business areas in context;

- have basic theoretical knowledge about the various management disciplines in the business environment;

- be able to define and develop an enterprise's value proposition in an increasingly competitive and volatile environment;

- have critical insight into the operating model of organisations and be able to articulate the value of innovation and technology in changing operating models;

- be able to use analytical skills to deal with business problems;

- be able to relate their knowledge to a particular business context through work-based assignments within the particular social system within which the enterprise operates;

- be able to demonstrate self-direction and originality in tackling and solving problems, act autonomously in planning and implementing tasks and continue to advance their knowledge, understanding and skills relevant to the business environment; and

- be able to undertake development through a systematic survey of current thinking and practice and continue to learn through application in their work environment.

### Challenges and advantages associated with the integration of technology
The USB identified the need for a programme with low opportunity cost to participants. The best working students have the highest opportunity costs, since they usually have higher job titles. These are the students that the USB wants to recruit. It is also very expensive to travel to Stellenbosch from various African locations. The flexible mode of delivery mentioned previously allowed participants to choose between residence learning and blended learning for each module.

The USB actively wants to target Africa, wishing to do business in Africa with support structures in Africa and therefore teaching content devised for Africa. This can be achieved by enrolling students from various African destinations. Diversity in the student population also leads to a better learning experience for the students.

### Student overview
Two thirds of the 72 students were off-campus and resided in South Africa, Mozambique, Namibia, Angola and the United Arab Emirates. There was wide diversity in terms of student demographics, with ages ranging from 26 to 55 years and work experience ranging from recognition of prior learning students with a minimum of 3 years' experience to managers with 10 years' experience.

The USB focuses on a specific target market when enrolling students. This includes students wishing to complete an MBA who do not qualify for direct admission to a master's degree programme (according to 2016 regulations). It also includes students wishing to broaden their management skills but not necessarily through an MBA with its significant research component (the MBA research assignment). Lastly, it includes students who cannot

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complete lengthy residency periods at the USB, preferring to do the majority of their learning off-campus, and who therefore have a lower opportunity cost to complete the programme.

## Other relevant role-players

As is the practice at the USB, the best experts in the field were engaged as lecturers for the various modules in this programme. Many lecturers were recruited from outside Stellenbosch University (SU) but most were already involved in USB activities. The Blended Learning Coordinator, who bore a great deal of responsibility, played a major part in the success of the programme.

## Learning and assessment activities
### Educational approach

People, by their very nature, are inquisitive and the business school's postgraduate students probably more so, having made the decision to extend their functional knowledge to general management. The goal of education should thus be to encourage the seeking of answers, as it is in this way that people advance both themselves and society. The USB believes that students value learning and that a stimulating and relevant learning environment requires less governance and fewer regulations, as students then assume responsibility for their own learning.

For students to embed learning and expand their tacit knowledge, they need to be able to make discoveries for themselves and apply their skills in real-world situations, mostly in their own work environments. Providing the students with the opportunity to apply theory and observe the impact of their application, reinforcing the module outcomes, creates such a space for individual discovery and the expansion of knowledge. Practical application that requires the implementation but also the critique of theoretical models in the work environments of the students should be incorporated into every module.

In spite of the (potential) limited traditional face-to-face contact in this programme, the richness of synchronous interaction over the internet provided unique opportunities for learning to be facilitated in a very stimulating manner through the appropriate use of technology. In addition, the ability to consume module content on demand (asynchronous delivery)

also provided the opportunity for learning to take place at the pace of the individual learner.

### Learning activities

There were two different modes of delivery – residential and blended – but the students could customise their own mode of delivery by mixing the two modes. The duration of the programme was one year for all the possible modes of delivery.
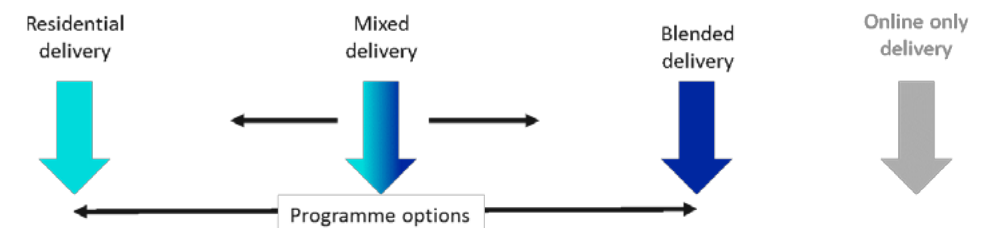


Figure 1: Possible programme modes of delivery

Figure 1 indicates the two extremes: full residence, with all classes on campus, and fully blended, with the maximum number of modules taken online only. For this programme, however, a pure online mode of delivery was not an option. As indicated, the students could otherwise mix their consumption of modules by selecting a combination of modes of delivery. For all the modes of delivery, initial contact, orientation, final contact and the elective modules were resident on campus, as indicated in Figure 2.

Table 1: Programme modes and residence or online options

|  | **Initial block (6 days)** | **Wednesday evening classes from 16:00–22:00** | **Elective block (6 days)** |
|---|---|---|---|
| **Residence** | On-campus | On-campus | On-campus |
| **Mixed** | On-campus | Selection of on-campus and online learning | On-campus |
| **Blended** | On-campus | Online learning only | On-campus |

All the modes of delivery required an on-campus residence period (initial block), during which induction took place and some of the initial modules started. All the modes of delivery also concluded with a final compulsory campus period (elective block), during which the electives were presented.

• The residence mode of delivery entailed lectures on Wednesday evenings in a classroom on campus from 16:00 to 20:00.

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- The blended mode of delivery entailed lectures on Wednesday evenings via broadband internet connection to a device of the students' choice (browser-based delivery).

- The mixed mode of delivery was a selection by the students between the two modes of delivery.

Although the students could attend classes online and classes were available for offline consumption, class attendance remained compulsory and was tracked as "attend online" via the chosen platform.

## Assessment activities and feedback practices

All the modules were assessed by a written assessment on the Monday following the final scheduled session. A final assignment had to be submitted three weeks later. No assessment of a module's work was done within current or subsequent weeks, with the exception of Entrepreneurship, which, as the capstone course, needed to show the integration of the different modules and could require the presentation of a business plan during the final block.
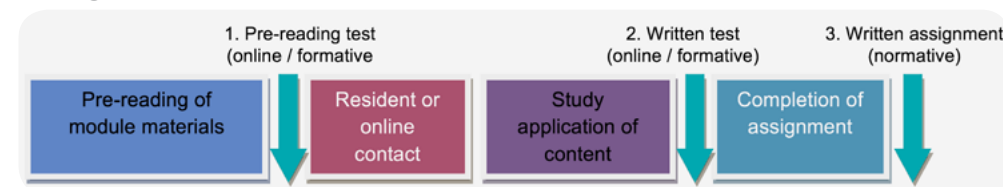


Figure 2: Module assessment

The following three assessments were done for each module:

- **Online formative assessment (pre-module, textbook theory)**: Self-tuition components done online tested the pre-reading of compulsory reading material. (Online assessments by the textbook authors could be used.) Concepts to be discussed in class were tested online to ensure sufficient preparation. **The online formative assessments took the form of multiple-choice questions**. The students had one attempt at completing the quiz within a time limit. After the quiz was completed, the students received a mark but not the correct answers. This counted as 20% of the module's assessment.

- **Online formative assessment (post-module, learning outcomes)**: The application of concepts discussed in class leading to the specific learning outcomes defined for each module was tested online. These online tests are also used to test MBA learning assumed to be in place for students admitted to MBA studies. The tests were not limited to multiple choice and the lecturer had the option of designing a final assessment to contain a written component as well. A critical enabler of this assessment model was the ability for tests to be written and verified on location. This counted as 40% of the module's assessment.

- **Normative assessment (post-module)**: This entailed the submission of a single assignment for the module according to the discretion of the individual facilitator. The assignments were marked online and the students received feedback. This counted as 40% of the module's assessment.

Students had to obtain at least 50% for each core module (96 credits) and 50% for 24 credits through elective modules to graduate.

## Student self-regulation

Dealing with adult learners places special emphasis on content that is meaningful and relevant. Developing a curriculum around student interests and modern business challenges fosters motivation and stimulates the passion to learn. The value of student dialogue and the opportunity for students to generate ideas and set goals furthermore allow for a richer learning experience. Graduate students who have ownership of their curriculum of relevant material are motivated to work hard and master the skills necessary to reach their goals.

## Learning environment
### Learning setting

Learning took place both online and face-to-face in the USB lecture halls. For the online streaming of lecturers, Adobe Connect was used. Other streaming software was also explored but the biggest challenge was the time delay between the action and it being streamed to the students. In the experience of the coordinators, Google Hangouts on Air had a delay of five seconds. This short delay made a huge difference when a student asked a question and it arrived only five seconds later when the lecturer

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had already moved on to another section.

With Adobe Connect, the students received a link for their online classroom, also referred to as a Glocal classroom. In 2015, the USB had three of these Glocal classrooms available (therefore three links). In the same way that a student physically attends a class in a specific lecture hall, the online learners attended a lecture in a specific Glocal classroom by clicking on the link provided.

For the online student, the Glocal classroom consisted of what was shared on screen, a video of the front of the class and the lecturer, and a chat box to engage in discussion (Figure 4).
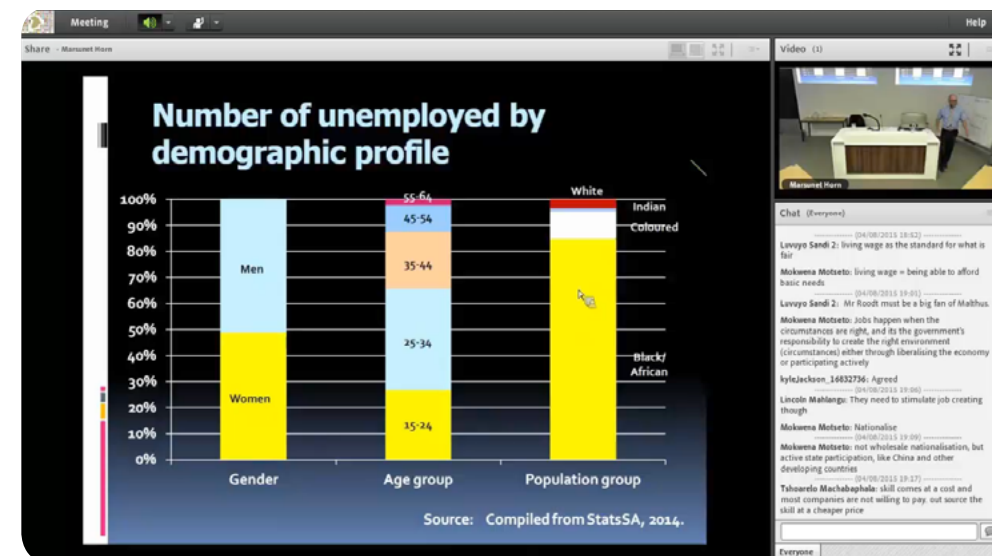


Figure 3: The online student's view of the Glocal classroom

### Collaborative setting
No group work was done during the first year of this module. This decision, although not ideal, allowed for flexibility for both assessment and delivery. It made it easier for content to be delivered online and for students to repeat a module if not successful. Group work could furthermore be an entrance barrier to some candidates and makes scheduling more complex, since time should be allowed for group work to be completed.

Students did form informal groups and then used Google Hangouts on Air as a discussion platform.

### Content resources
All content was available in the form of e-textbooks. Students were required to purchase the books themselves and then had the choice between either an electronic format or a hard copy. This lowered administrative costs and the perceived costs of the programme.

### Technology resources
Since the programme relied heavily on technology, requirements were set before the students were allowed to enrol for the programme. All the students were required to have access to a computer with broadband internet access, the relevant software (Microsoft Office or a compatible product, a web browser that supporters HTML5 and a PDF reader) and the USB's platform of choice for the use of e-textbooks.

During the first block, all the students were introduced to the USB systems and processes to ensure seamless online delivery. This introductory session included information on the following:

- SU and USB systems (e.g. the Learning Hub and Call Desk)

- Adobe Connect as the platform for delivery

- The library, with emphasis on online research and academic articles

- Plagiarism, Turnitin and the acknowledgement of others' work and one's own prior work

- Online interaction, internet research, social media usage and online collaboration tools

From the instructional side, various technological resources were employed to deliver a blended mode programme. As discussed previously, Adobe Connect was used as a streaming service for the online students. The USB learning management system, Learning Hub (Moodle), was used as a platform for learning activities, lectures and block sessions. The lecturers also used microphones, video cameras installed in the lecture halls and digitised whiteboards.

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### Support challenges

A technical support officer was available during the lectures. A special arrangement was made with the USB service desk to stay open later on the nights that lectures were presented for this programme. The biggest concern was challenges with bandwidth. Since the lecturers were streamed between 16:00 and 20:00, some areas experienced a peak in bandwidth use by 18:00, which meant that the quality of the streaming went down.

Sound was also a consideration. The lecturers had to be recorded but the microphones also had to be sensitive enough to detect a student's voice when there was a question but not to the extent that it disturbed the online students. The microphone settings also had to be adjusted for individual voices. Various microphones were therefore used to remedy these issues. The lecturers wore portable microphones to enable them to walk around in the lecture halls; there were also five microphones in the first row of chairs and a roaming microphone. When a student asked a question that none of the microphones picked up, the lecturers repeated the question.

### Student experience
#### Student feedback on the learning experience

Twitter was used as a backchannel for immediate student feedback. It was agreed that #PGDipBMA would be used as a twitter hashtag for the programme. The most positive feedback was received from the students who were located far away from the business school.





Figure 4: Informal student feedback on Twitter

### General
#### Opportunities

Although the programme functioned well with the Blended Learning Coordinator functioning as the main e-learning advisor, it was not sustainable from a capacity point of view. An opportunity was therefore identified to employ a graduate teaching assistant. The assistant's work would include ensuring that both the physical classrooms and the Glocal classrooms were set up, the hardware was working, the online learning tools were ready and more.

Although there was initial scepticism about group work for the first

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implementation of the programme, this was identified as an opportunity for the future. Making use of Google Hangouts on Air was a suitable platform for this.

From the beginning, it was expected that ongoing learning would also be required from the programme lecturers. The use of technology to create a rich learning environment that differs from what most faculties use also required continuous learning from the Faculty. In this respect, sharing best practices among faculties and conducting student feedback sessions were not viewed as a secondary activity but as part of the core activities of the learning and teaching of this programme. As the programme continues to evolve to make the maximum use of technological capabilities, the Faculty's ability to evolve with the changing environment is critical to its success.

All the lecturers who taught in this programme were required to complete a condensed Blended Teaching and Learning short course (similar to that presented by the Centre for Learning Technologies). Dr JP Bosman, Head of the Centre for Learning Technologies, worked with the coordinator of the programme to develop this structured training session. Before presenting their first classes, the lecturers were also asked to arrive 15 minutes early. This provided the opportunity for in-time teaching as a form of refresher to make the lecturers more comfortable with the technology that they were required to use during their classes.

### Advice
When it comes to preparing participants for taking part in a blended learning course, one should focus more on lecturer preparation than on student preparation. One should not forget about the in-time teaching just before a lecture; this puts lecturers who are unfamiliar or unsure of the technology to be used more at ease.

In a programme as reliant on the use of technology as this one, it is important not only to focus on the things that can go wrong. Everyone knows that a lot of things can go wrong with technology behind the scenes and it is therefore important to recognise what goes right as well. Giving the people who make things go right positive support and recognition is crucial. The coordinator of the programme believes that the negative

narrative will become the main narrative if the positive narrative is not reinforced.

### Other concluding thoughts
Never tell yourself that something is not possible. What is not possible today will be possible tomorrow.

Keep pushing the boundaries in education with technology.

# Flipping Economics with Extended Degree Programme students
## Faculty of Economic and Management Sciences | Extended Degree Programme

**Module:** Introduction to Economics 141 (Extended Degree Programme)
**Lecturer:** Dr Sharon Malan sbmalan@sun.ac.za
**Blended Learning Coordinator:** Ms Magda Barnard magdabarnard@sun.ac.za

**Learning activity:**
Flipped classroom approach

**Learning technology:**
SUNLearn

## Context
### Subject area
The programme focuses on microeconomics in the real world. There are three main themes: what economics is all about, demand and supply, and market structures.

### Challenges and advantages associated with the integration of technology
The lecturer has been presenting the Introduction to Economics 141 module for the past seven years. She has been working with active learning for a while and her PhD topic focused on problem-based learning.

During a performance appraisal, the Vice-Dean (Teaching) of the Faculty of Economic and Management Sciences, Prof Ronel du Preez, suggested a flipped classroom approach (Schell & Mazur, 2015) for the module. The lecturer had long admired colleagues who had already implemented this approach in other Economics modules and had been taking an interest in it, especially since attending a workshop on it by Harvard University's Prof Eric Mazur, a champion of the flipped classroom approach. The discussions that she subsequently engaged in and the support of the Vice-Dean motivated the lecturer to redesign her module.

The lecturer believes that lecturers have to ask themselves the question, "How can I use the contact time with my students as meaningfully as possible?" The flipped classroom approach seemed appropriate. During the July holidays, the lecturer therefore worked on changing the methodology of her module in preparation for implementation during the second semester.

During the planning of a flipped classroom approach, the reality of the context has to be taken into consideration. Lecturers are required to move continuously among lecture venues, for example, and not all halls are geared for this approach. Lecturers therefore have to have a Plan B or a low-tech option for times that the required technology is not available.

Keeping this in mind, the lecturer made use of a whiteboard, PowerPoint slides, SUNLearn clickers, low-tech clickers, quizzes, in-class tests and white A4 paper as a type of clicker for graphs.


Figure 1: Students answering questions with low-tech clickers

### Student overview
The students enrolled in this module were first-year, extended degree programme students. The number of students totalled 130 – fewer students than usual in a first-year course – divided into two groups. It was important for these students to engage in deep learning of the most important concepts, which the flipped classroom approach facilitates. This approach also empowers students to learn on their own.
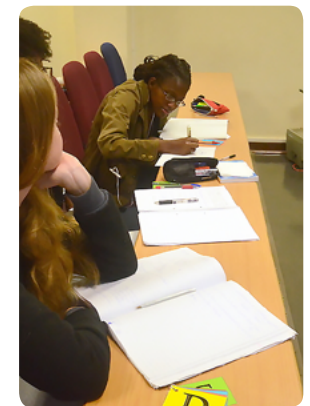

Figure 2: Students drawing graphs in their groups

### Other relevant role-players
Both the Vice-Dean (Teaching) and the Faculty's Centre for Teaching and Learning advisor played important roles in the planning stages of this module. The lecturer did not make use of any assistants, since she felt that it was important for her to be hands-on and mark the assessment activities herself. This enabled her to know exactly what was going on in the tests and what the students were struggling with.

## Learning and assessment activities
### Educational approach
The philosophy of this approach is having a classroom that is set up to maximise student learning. The goal is to present students with activities

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# Flipping Economics with Extended Degree Programme students

Faculty of Economic and Management Sciences | Extended Degree Programme

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Flipped classroom approach

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SUNLearn

during the class that encourage them to think about and process the information that is given. The flipped classroom approach relies heavily on student preparation.

The first lecture of the semester was used to explain to the students the teaching philosophy and format of the learning opportunities. The students were shown research that details the influence of the flipped classroom approach on learning and marks. Emphasis was also placed on the fact that, if the students did not attend lectures, they would not reap the benefits. At the beginning, there was resistance from the students and they were therefore given the space to air their feelings in a discussion, which was kept light. This introductory lecture allowed the students to commit to the mode of teaching and learning.

Before working on a chapter during the contact sessions, the students were required to prepare the chapter by reading a section or viewing a video and then answering a quiz. Students are often overloaded with activities and resources on SUNLearn, however, and lecturers should always bear this in mind. To prevent overload, lecturers should get into a habit-forming exercise when posting resources, quizzes and activities on SUNLearn. For example, if there is a weekly preparation quiz, lecturers should always open and close the quizzes on the same weekdays and at the same times. The lecturers should also provide the students with general guidelines on timelines, the structure of the online module and other information that they may need to navigate SUNLearn.

Throughout all the teaching and learning activities, the lecturer of this module worked on the 70:30 principle. If she saw that 70% of the students grasped the concept, she moved on. If she saw that only 30% of the students grasped the concept, she spent more time on it. It was therefore the students who determined the curriculum and the time that was spent on specific content.

A common misconception is that it takes longer to cover content in a flipped classroom approach. When planning the curriculum, the lecturer therefore decided on a few cardinal principles that the students had to understand to be able to grasp microeconomics. She then focused on the students' grasping of the concepts and empowered them to learn the

other content on their own.



Figure 3: Students showing their answers to the lecturer

### Learning and assessment activities

The module had a continuous assessment format. For students to obtain marks, they had to do pre-reading and write online quizzes before the classes, attend all the classes, complete the class assignments and write the tests.

To motivate student preparation, quizzes on the particular content to be discussed in class the next week made available on SUNLearn. These quizzes could be completed any time from Monday to Sunday. The lecturer welcomed group work in the completion of the quizzes but every student also had to submit her or his quiz individually. The quizzes worked with rotating questions from a question bank and no two quizzes were therefore alike. The quizzes usually consisted of only five questions, two of which were difficult. While it was important not to demotivate the students by making the quizzes too difficult, the quizzes did have to be challenging. It was also impressed upon the students that their pre-reading did matter through the following question being posed in class: "How will we make use of your pre-reading this week?" The lecturer looked at the quiz results on a Sunday night and then decided on her teaching for the following week.

Lecturers should not follow a surface approach when teaching during

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# Flipping Economics with Extended Degree Programme students
## Faculty of Economic and Management Sciences | Extended Degree Programme

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**Module:** Introduction to Economics 141 (Extended Degree Programme)
**Lecturer:** Dr Sharon Malan sbmalan@sun.ac.za
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contact sessions. They should plan their lecture time, breaking chapters down into objectives and covering only the most important objectives during the lecture. Grasping the important objectives enables the students to understand the rest of the content. This approach requires a lot of preparation from the lecturers, involving thinking about the best use of lecture time for specific content and objectives. The lecturer of the module followed a sequence of recap, student questions, problem solving, discussions, just-in-time teaching and reflection.

During the contact sessions, the students continuously engaged in group work. They chose their own groups and changed groups as they wished. There was usually a mini-lecture or the students were shown a video. They were then presented with two or three questions about the content that they had to discuss and answer. These questions were quality questions that required the students to engage with the content and think critically and deeply about their answers. The students then submitted their individual written answers, which enabled the lecturer to gauge who was struggling with the concepts. The marked assessments were returned to the students at the next session. These assessment activities counted towards the students' final marks.

Before engaging in peer assessment, the students were taught how to assess. Rubrics were used but, at the start of the session, the lecturer guided the students through the marking and then checked the marking afterwards. The groups therefore marked and assessed each other's class activities.

Students also had to complete an assignment during group work. In 2015, this assignment took the form of a rap song about microeconomics that the students then performed in class. The lyrics were assessed by the lecturer.

The students usually wrote class tests on Fridays. On the following Mondays, the students rewrote the tests – but this time in groups. They could then make use of the internet and their textbooks but the questions were set in such a way that the answers could not easily be found in the textbooks. The group work allowed the students to reflect on their own answers

and understand their mistakes. The test marks were made up of 20% for the group tests and 80% for the individual tests. On the Tuesdays that followed, the lecturer focused on the concepts that the students struggled with in the tests.

### Feedback practices
The lecturer feels that it is important to provide students with feedback in good time, as assessment motivates learning.

### Student self-regulation
The students had to take ownership of their learning from the start. It helped to lessen the exam-type feeling that is often created by time limits on quizzes and individual assignments. The lecturer also negotiated with the students on the dates of their tests. This gave the students the responsibility of preparing properly for their tests, since they could not use other tests as a reason for under-preparation.

## Learning environment
### Learning setting
Although learning took place during the students' preparation for their lectures, the bulk of learning took place during face-to-face time, which was when the students engaged in active learning activities. It was during these contact sessions that the students were presented with learning opportunities that they could not afford to miss. The lecturer believes that, when class attendance is low, it is not just students who may be at fault but that lecturers may also be at fault and that they must ask themselves why students feel that they can miss class.

To motivate class attendance in another way, a record was taken during every contact session of the students who were present. This allowed the lecturer to see who was attending class and to look at the students' marks in that context. Recording the students who attended class also fostered a habit of class attendance in these young students and thus helped them to form a routine.

### Collaborative settings
The students constantly worked in groups during the contact sessions. They also engaged in peer assessment.

# Flipping Economics with Extended Degree Programme students
## Faculty of Economic and Management Sciences | Extended Degree Programme

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**Module:** Introduction to Economics 141 (Extended Degree Programme)
**Lecturer:** Dr Sharon Malan sbmalan@sun.ac.za
**Blended Learning Coordinator:** Ms Magda Barnard magdabarnard@sun.ac.za

## Content resources

The textbook was the main content resource, since the subject type allows it to rely heavily on a good textbook. The textbook provided the preparatory reading. It is important that students read, especially in Economics, where they have to understand the concepts, together with their contexts and examples.

The lecturer also made videos available as content resources. She did not record her own videos but preferred to recommend specific videos that were already available online.

When specific content called for lecturing, the face-to-face lecture time was never longer than 10 minutes. The students themselves also lectured on certain topics. They first explained the content to each other in small groups and, when the lecturer saw that a specific group was grasping a specific concept, she asked that group to explain it to the rest of the class. The lecturer then added any other information that the students may have missed.

The PowerPoint slides that were used during the lectures were also loaded onto SUNLearn. These documents served as a summary or refresher for the students that attended class. Those who did not attend class were not able to use the slides to study or catch up. This motivated the students to attend class.

## Student experience
### Student feedback on the learning experience

The students gave short, informal feedback every week according to the following grouping: thumbs up, thumbs down, and questions, comments and concerns. The lecturer then went through the feedback and made a summary of it. During the first lecture of the following week, she addressed the feedback and gave solutions or advice to remedy any problems or challenges. For example, if the students mentioned too much reading in the thumbs down section, she gave them strategies for reading the textbook.

Overall, the lecturer received good feedback on her teaching approach. Some students mentioned that they never wanted to attend a traditional approach classroom again. (As part of the Academic Skills module, students are taught to accommodate all types of lectures and lecturers.)

### Assessment impact

It is difficult to determine the assessment impact of the flipped classroom approach, since the content changed in the same year. No pre or post-tests were done either. The lecturer did, however, notice that the students were grasping the more difficult concepts. She also made her examination papers more challenging and the students did well and were able to answer more higher-order questions.

## General
### Opportunities

In the future, quizzes will be adapted. Instead of asking only a few content-specific questions, the lecturer will also ask more general questions about the reading. These questions will include the following five questions: "Which one question would you want us to answer this week?", "What would you like to discuss in class?", "What was the focus of this chapter?", "What were the most important points of this chapter?", "What was new and interesting to you?" These same five questions will be added to each quiz and graded. They can teach students skills in reading academic texts and motivate them to reflect and think about what they have read.

Having the support of the Teaching Hub at the University made a big difference. The lecturer worked closely with the Vice-Dean (Teaching) and the Faculty's Centre for Teaching and Learning advisor. Having this support made her feel safe to experiment. It gave her the knowledge that she had somewhere to go to if something were to go wrong.

The students were motivated to give answers and explanations during lecture time. For this to be possible, an atmosphere should be created where wrong answers are accepted and addressed in a relaxed and non-judgmental manner. This motivates students to take part in class discussions and speak up during lectures.

### Challenges

Challenges that were experienced were not necessarily linked to the teaching philosophy but rather to uncontrolled external influences. Test

# Flipping Economics with Extended Degree Programme students
Faculty of Economic and Management Sciences | Extended Degree Programme

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**Lecturer:** Dr Sharon Malan sbmalan@sun.ac.za
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week, for example, caused a massive decrease in class attendance. The classes unfortunately had to continue during that time and the curriculum could not be adapted to fit it. The students who did not attend class in order to prepare for other tests therefore fell behind.

## Advice
The lecturer's advice to other colleagues who may be considering the flipped classroom is to go ahead. If they are not well versed in the education and technology of the approach, they can still start in a small way. They should not, however, integrate technology simply for the sake of doing so.

The lecturer also recommends that people read case studies and newsletters about learning technologies and innovative educational approaches. Educators have to learn from one another; they do not need to reinvent the wheel every time. Lecturers can also contact their Blended Learning Coordinator and SUNLearn team when starting out – there is no need to fear learning technologies when this type of support is available.

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UNIVERSITEIT STELLENBOSCH UNIVERSITY

# Connecting content and real life with authentic learning opportunities in Psychometrics

## Faculty of Economic and Management Sciences | Department of Industrial Psychology

1

**Programme:** Industrial Psychology 214 (Psychometrics)
**Lecturers:** Mr Francois van der Bank fvdb@sun.ac.za & Ms Samantha Adams adamss@sun.ac.za
**Blended Learning Coordinator:** Ms Magda Barnard magdabarnard@sun.ac.za

**Learning activity:**
Authentic assessment

**Learning technology:**
Turnitin Grademark

## Context
### Background
Determining the abilities, thoughts, feelings, perceptions and states of people in the workplace is probably one of the most difficult things that one might come across in one's career. Psychometric testing plays an important role in the modern world of work, since we make crucial decisions based on psychological measurements, such as interviews, psychological tests, assessment centre exercises and other assessments.

The objectives of the module in Psychometrics are to explain the function of Psychometrics in Industrial Psychology, the essence of measurement, measuring instruments, measuring procedures, the application of measuring procedures, the statistical analysis of measurements and decision making based on measurements. Another objective is to equip students with basic skills in the application of measurement procedures and the statistical analysis of measurements. A further objective is to enable students to make meaningful and respected contributions to the psychometric debate and practice in South Africa. The module furthermore aims to lay a solid foundation for more advanced postgraduate modules in Psychometrics normally followed in Industrial Psychology programmes. The underlying rationale for the course content lies in the theoretical knowledge and basic skills required to make a significant contribution via measurement to the effective utilisation and management of personnel.

### Subject area
Industrial Psychology 214 is an introductory Psychometrics module. During the module, students are exposed to basic research methodology and statistics. Initially, the module focuses on what scientific research is, why it is done and how it fits into the field of industrial psychology.

The first section focuses mostly on why it is important for industrial psychologists to follow a scientific approach. Students are usually also required to put together a research proposal. This includes all the skills that this entails, such as developing research questions, theorising, applying methodology and formulating a hypothesis.

The second section focuses more on statistics and psychometric tests. Students are taught how to evaluate tests statistically; the link between psychometric tests and Industrial Psychology is also addressed. A large part of the content deals with the characteristics of good psychometric tests.

This module is an important one, since assessments play a big role in the work of industrial psychologists in the industry.

### Established practice and challenges
The module makes use of continuous assessment. Previously, students were required to write three tests and complete four practical sessions throughout the semester. Additional tutorial sessions were also presented by previous students.

Students generally struggle with this module. Even though they have done Introductory Statistics, they find it difficult to make the connection between the two modules. They also complain about the slides, the content and the type of language used in the module. In the module feedback, many students furthermore ask for opportunities to practice the content. Some also argue that they cannot see how the module applies to them and their future work.

### Challenges and advantages associated with the integration of technology
An assignment that created an opportunity for authentic learning was therefore developed. In the new assignment, students would have the opportunity to apply every aspect of the module content. A platform for the students to be scaffolded through every phase of the assignment was provided by SUNLearn.

### Student overview
The students enrolled in this module are second-year Industrial Psychology and Human Resource Management students. The class under discussion consisted of 120 students.

## Learning and assessment activities
### Educational approach
The lecturers wanted to create an authentic learning (Ozcerir, Herrington & Osam, 2016) opportunity for the students. They scaffolded (Hogan & Pressley, 1997) this learning through each phase of the assignment as they

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worked through the content.

### Learning and assessment activities
Academic performance was chosen as the topic for the assignment and the students had to answer the question, "Why do different students perform differently?" This was explored through three phases during the authentic assessment activity.

During the first phase, the students theorised in terms of academic performance. This meant that they read up on issues that influence academic performance, identifying three factors and writing a brief paragraph in which they argued how the literature supported these. They then shared their findings with their group members in the following contact sessions. The group members discussed the findings and argued which factor was most significant and relevant. Using their conclusions, the groups then put together small research proposals.



Figure 1: Students working in groups

During the second phase, the students developed samples of academic performance. Once the groups decided on the factor that they would look at, each group developed questions related to that factor's influence on academic performance and compiled a short questionnaire. The students

also provided their own academic marks from their first year to serve as data input for use at a later stage.

During the third phase, the students evaluated the psychometric properties of the questionnaires. All the students submitted their questionnaires and completed the questionnaires created by the other groups. This resulted in a data set for each group. The lecturers made podcasts available on SUNLearn that showed the students how to evaluate the data: how to use Microsoft Excel formulas, clean data sheets and run the equations taught in class to calculate the reliability and validity of the results. The students completed this phase in groups.



Figure 2: Students develop short questionnaires

The tests that were psychometrically the strongest were then identified. The whole class did that test again to create one big data set. Individually, each student interpreted the results and drew conclusions based on her or his own academic results and on the results of the test. This was submitted as a report.

### Feedback practices
After each phase of the assignment, the students received feedback on their work: the lecturers marked each phase and provided constructive

# Connecting content and real life with authentic learning opportunities in Psychometrics

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feedback to enable the students to improve their work. The lecturers marked the work with great care, since this was the first time that the assignment was implemented and they wanted to be aware of any issues and any possible changes that had to be made for the following years. Since the assignment also stretched over a long period, the lecturers used the opportunity to identify any areas in which the students might be struggling.

## Learning environment
### Learning setting
Learning took place during the contact sessions, online and off-campus during the group work. One contact session was devoted exclusively to explaining the assessment activity to the students. Throughout the semester, time was spent during the lectures to inform the students of what exactly was expected of them for each phase, what content they should look at and how they should submit their work.



Figure 3: Screenshot of a podcast that was made available to the students

### Content resources
The main form of content was the PowerPoint slides created by the lecturer. The recommended textbook was not compulsory. The lecturer also made podcasts for students to consult during the phase that they had to use Excel. Additional resources in the library could be referred to and the students were advised to look up specific content online.

### Technology resources
The students submitted their assignments through the Turnitin assignment instrument on SUNLearn. When the phases were completed in groups, each group leader submitted the group's assignment on behalf of the group and made sure that everyone received the feedback. The SUNLearn quiz instrument was used as the data collection tool for the questionnaires.
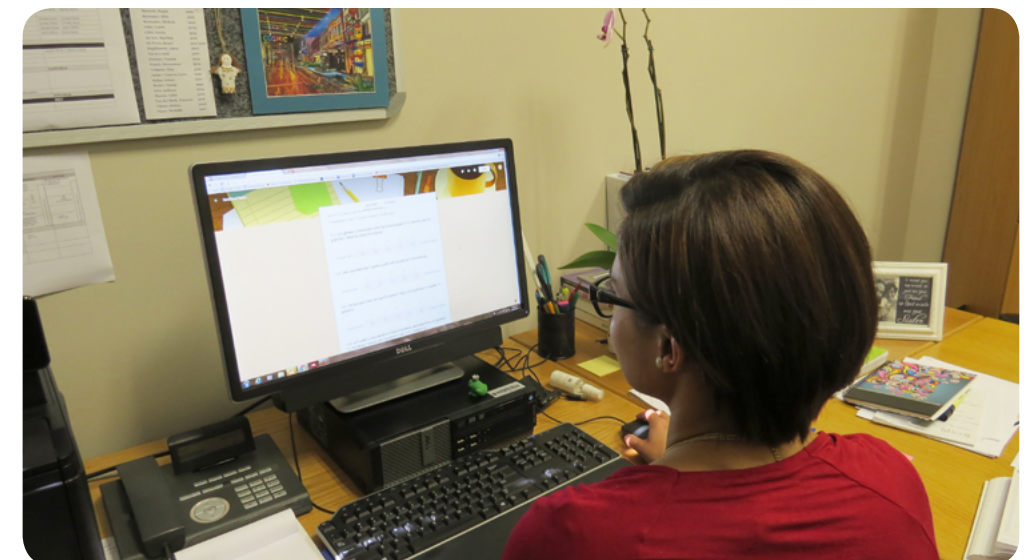


Figure 4: Lecturer working on questionnaire

## Student experience
### Student feedback on the learning experience
The students had an overall good experience of the authentic learning assessment activity. Most of the students (80%) felt that what they learned in the assignment could be applied to real life situations. The main concern was that the students did not like working in groups, since they felt that not all the group members contributed. The lecturers did notice that the

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students did better in the tests. There was an overall 9% increase in the number of students who passed the course. This was attributed to the fact that the authentic learning assessment motivated deeper learning.

## General
### Opportunities
When implementing any new assessment opportunity, it is important to take away other work in order not to over-assess. When this new authentic assessment activity was added, students wrote one test less.

Google Forms was identified as a way of collecting data for future questionnaires. SUNLearn Quiz posed problems in terms of the setting up of questions and the making available of results to the students. With Google Platform, however, each group can set up its own quiz and has immediate access to its data.

The comprehensive slides will be changed into a guide format and the slides will be adapted. The students will then be able to use the guide as a sort of mini-textbook.

### Challenges
Quite a lot of marking was involved, which required a lot of lecturer resources. This was justifiable, since this was the first time that the assignment was implemented and it was important for the lecturers to be hands-on with all the aspects of the assessment activity. In the future, student assistants or postgraduate students could be called on to assist with the marking.

### Advice
Lecturers should make their assessment activities as authentic as possible. When doing something similar to this assignment, a topic should be chosen that is relevant and interesting to the students. When students set up their own tests, for example, it gives them the opportunity to apply the content of the module and it opens their eyes to the work that they will be doing in practice.

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UNIVERSITEIT STELLENBOSCH UNIVERSITY

# Developing student digital literacies: A pilot course for pre-service teachers
## Faculty of Education

1

**Voluntary short course:** Digital Literacy Short Course
**Facilitator:** Ms Lizette Visser (Practicing teacher) lizettevisser@yahoo.co.uk
**Blended Learning Advisor:** Dr Sonja Strydom sonjas@sun.ac.za

**Learning activity:**
Develop student digital
literacies

**Learning technology:**
Google Suite

## Context
### Background
The Faculty of Education has prioritised the integration of learning technologies into the curriculum as part of its strategic vision. Both lecturers and teachers are therefore expected to model and apply digital literacy skills within various classroom and educational settings. Often, however, teachers still lack the necessary competencies in terms of the use and integration of learning technologies into the curriculum (Mishra & Koehler, 2009). It is evident that not only lecturers in the Faculty but also pre-service teacher students should be better equipped with the appropriate skills for the world of work. In 2014, it was therefore decided to develop a digital literacy short course in which students could participate voluntarily to further their current skills.

### Subject area
The use of learning technologies forms part of all the different subjects that students at the Faculty of Education enrol for. Preparing students for the demands and challenges of the world of work (working in schools in the majority of cases) provided the opportunity for the conceptualisation of a short course through which interested students could start to prepare themselves for the challenges of the 21st century classroom in terms of the integration of technology. The focus therefore remains on the preparation of students for the world of work but also encompasses a contribution to lifelong learning.

### Established practice
Despite the emphasis placed on the integration of learning technologies and the redesign of Education programmes into a blended mode of delivery, uptake remains patchy and a number of students do not have sufficient exposure to the use of learning technologies and how such technologies may be integrated into the curriculum within their course delivery.

### The challenge
Preparing students for the world of work and developing graduate attributes remain the principal focus of the Faculty of Education. The integration of information and communication technologies and the resultant ability to observe modelled behaviour in terms of the effective, appropriate and sustainable integration of learning technologies into the curriculum, however, are still areas of development within the Faculty. An alternative interim measure was therefore conceptualised to provide students with the necessary skills and attributes to integrate a blended mode of delivery seamlessly into their various curricula when entering the world of work.

### Advantages associated with the integration of technology
The advantages of integrating learning technologies into learning and teaching go without saying. Evidence of such advantages, however, includes an enriched learning experience, a decrease in the administrative duties of teachers and an improvement in opportunities for student engagement. The challenge was to determine the basic skills necessary for a newly qualified teacher to be able to function optimally in the workplace in terms of learning technologies. By means of prioritising, synthesising and developing deep understanding of the expectations regarding current practices in local schools, a curriculum was conceptualised to empower pre-service teachers not only to obtain basic digital literacy skills but also to develop attributes that would lead them to learn continuously, assess different tools and learning opportunities and have a well-rounded and developed sense of the affordances of particular learning technologies.

### Student overview
The six-credit short course is voluntary for Education students. The course comprises five modules (Going Digital, Going Google, Technology Resources, Presentations, and Reflection and Application) and associated assignments. Since 2014, approximately 60 students have successfully completed the course. This includes students from the foundation, intermediate and senior phases.

## Learning and assessment activities
### Educational approach and learning activities
The aim of the short course is to provide pre-service teachers with the appropriate digital skills to be able to function optimally within the classroom and integrate learning technologies confidently into the various curricula of the different key stages. Framed within an authentic learning paradigm, students attend three Saturday sessions at the Faculty of Education during which they are introduced to different topics highlighted by appropriate learning technologies. The aim of the course is not to train

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students to use particular tools (they are expected to have a basic skills set in terms of technology) but, as mentioned, rather to help them to develop the ability to approach the digital world with confidence and knowledge by knowing which tools and approaches are appropriate for particular learning opportunities.

Emphasis is placed on the role of the facilitator – not trainer, guide or teacher – who engages with the students in the context of the realm of possibilities in the digital world, and collaboration is strongly encouraged. Access to experts and knowledgeable others play an essential role in the course. The facilitator takes the lead in terms of knowledge transfer only rarely.

Authentic learning opportunities are created continuously and students are encouraged to transfer their newly acquired knowledge and understanding to the world of work. Case studies, specific scenarios and opportunities for innovation and creativity are the building blocks of the curriculum of this short course.

## Assessment activities
All assessment opportunities are geared towards a final assignment that is authentic in nature. Students are required to create a teaching and learning blog that is appropriate for their particular discipline, interest or responsibility. Peers are encouraged to view each other's blogs and to comment on them, thereby providing valuable formative feedback.

## Learning environment
### Learning setting
Learning takes place through a blended mode of delivery. This comprises Google Suite (Drive and Docs) as the learning platform and resource repository for online learning and three face-to-face Saturday sessions.

## Student experience
### Student feedback on the learning experience
Three semi-structured focus group interviews provide feedback on the student experience of the short course.

In terms of similarities, the students in the first course responded favourably

to the nature of the assignments and the opportunities for knowledge creation.
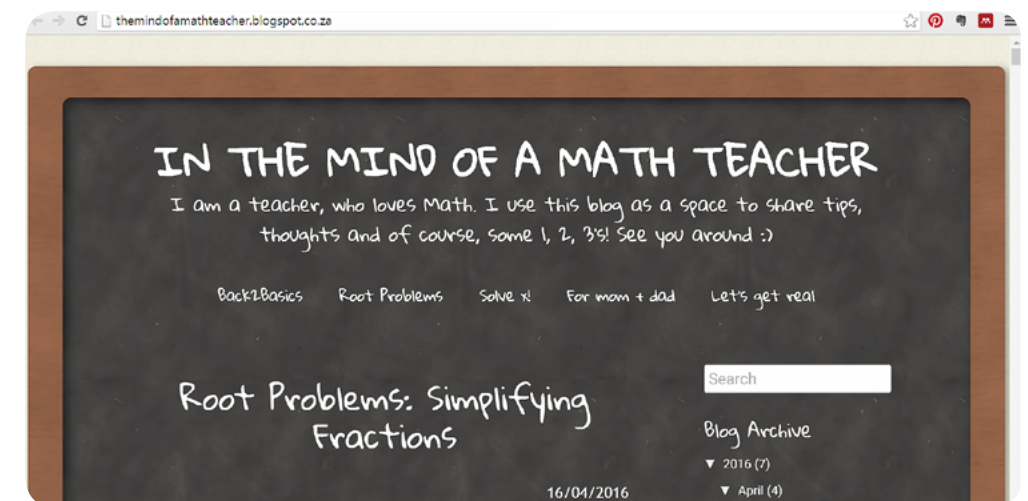


Figure 1: Screenshot of student, Emma Oosthuizen's, blog

They viewed the assignments as applicable within their current context as pre-service teachers and as preparing them both for 21st century learning and for the world of work. This speaks directly to the notion of authentic learning (Herrington & Oliver, 2000) and, specifically, authentic tasks and assignments (Herrington, 2006):

"*One of our assignments was to create a lesson plan and use technology in that lesson plan . . . I think that's also just kind of forcing us again to do it practically and then . . . once we were able to . . . this is actually what I can do in my classroom . . .*"

In terms of knowledge creation, the students referred to opportunities for cumulative and collaborative knowledge building:

"*And it's good for yourself because you consolidate . . . you learn . . . even though it's painful but learning and constructing knowledge is painful. It's when things don't connect and you have to make them connect and that's when you learn and that's good . . .*"

"*. . . it is a collaborative effort between the teacher and the learners . . .*"

# Developing student digital literacies: A pilot course for pre-service teachers
## Faculty of Education

3

**Voluntary short course:** Digital Literacy Short Course
**Facilitator:** Ms Lizette Visser (Practicing teacher) lizettevisser@yahoo.co.uk
**Blended Learning Advisor:** Dr Sonja Strydom sonjas@sun.ac.za

*so that the teacher can learn as much from the learners especially in the world of technology . . ."*

## General
### Opportunities
The students develop blogs as a valuable resource for all Faculty of Education students, which was further promoted in 2016 as a collaborative resource and repository to be accessed by the Education students.

### Challenges
In terms of the sustainability of such a short course, it does remain a challenge for the future. Currently, we are privileged to have the course funded by the Teaching Development Grant, which means that students can attend the course free of charge.

An alternative model is being considered and planned for the near future.

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# MobiLex: The use of LSP dictionaries on mobile phones in higher education
## Faculty of Education | Department of Curriculum Studies

**Target Group:** BEd First-Year Students
**Lecturer:** Dr Michele van der Merwe michelevdm@sun.ac.za
**Blended Learning Coordinator:** Mr Gavin van Niekerk gavinvn@sun.ac.za

**Learning activity:**
Online dictionary

**Learning technology:**
MobiLex

## Context
### Background
Mobile technologies have become worldwide phenomena, opening up new opportunities for language teaching and learning. Mobile-assisted language learning is employed all over the world as technology advances.

As opposed to other types of computers, smartphones require only one hand to operate and therefore have an immediacy of use that other minicomputers, such as tablets, have yet to attain. The possibilities of using mobile devices for learning are endless. The number of smartphone users has increased dramatically since the mass introduction of smartphones in 2007 by Apple Inc. In 2013, the number of smartphone users was 1,31 billion; in 2014, this increased to 1,64 billion. By 2016, the number is predicted to exceed 2 billion. Teenagers and young adults aged between 16 and 24 are the group with the highest rate of smartphone use, namely 88% (www.zeendo.com).

In South Africa, the use of mobile phones has increased dramatically and most university students are equipped with mobile phones. It is estimated that smartphones will make up 30% of all connected devices in the country in 2019 (Alfreds, 2015).

The Faculty of Education has approximately 250 first-year students enrolled in a BEd degree from various linguistic backgrounds. Of the 2016 undergraduate cohort at Stellenbosch University, 46,1% of the total undergraduate cohort indicated their home language as English, 44,6% indicated their home language as Afrikaans and 2,6% indicated their home language as isiXhosa. In the Faculty of Education, English and Afrikaans are used as languages of instruction, although these languages are not necessarily the home languages of all the students. Many of these students therefore need extra learning support in language to be able to understand concepts explained in class and in the learning material.

### Subject area
The framework of multilingualism is used in the Language Plan of the University. To justify the development of a dictionary for first years in the Faculty, however, research on the perceptions of students on the use of a dictionary was needed. MobiLex (mobile lexicon) was therefore employed

in a pilot project in the Department of Curriculum Studies. The target group of this project was BEd first-year students.

### Intended learning outcome
The intended outcome was to offer language learning support to English, Afrikaans and IsiXhosa students through their modules via the use of a language for specific purposes (LSP) dictionary on a mobile phone.

### Established practice
Lecturers in the Department of Curriculum Studies had identified the need for linguistic support and the development of academic concepts with regard to subject-specific knowledge. Both within the Department and the linguistic context, strong motivation therefore existed for an LSP dictionary to enhance academic literacy and fulfil the linguistic needs of first-year students in particular.

During the development stage of the project to meet this need, it was necessary to research the students' perceptions of such a dictionary and to find out if they would make use of such a dictionary on a mobile phone. Perceptions were researched by means of a questionnaire, with the students having access to History terms on MobiLex. Ethical clearance was given to do the research with the first-year students. Most of the students had relied on internet searches to define and translate terms and concepts but this had not always been reliable.

Implementing the dictionary with specific terms usually available only in one language of instruction can improve the adaptation of new theoretical concepts within the higher education arena. The use of the dictionary can also improve students' understanding of certain concepts and therefore make studying easier. The dictionary furthermore narrows down useful vocabulary, cutting through a major amount of the content allocated to first-year students.

### Advantages associated with the integration of technology
The perceptions of the students regarding MobiLex were overwhelmingly positive, as indicated by their response to the questionnaire. The fact that they had immediate access to subject concepts with a short explanation and to translations of the concepts proved to be very attractive and useful

# MobiLex: The use of LSP dictionaries on mobile phones in higher education
## Faculty of Education | Department of Curriculum Studies

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**Target Group:** BEd First-Year Students
**Lecturer:** Dr Michele van der Merwe michelevdm@sun.ac.za
**Blended Learning Coordinator:** Mr Gavin van Niekerk gavinvn@sun.ac.za

to them. One of the advantages was the clarification of language and word concepts during class for the three different languages used by the students.

Regarding the convenience of the technology, they had this to say:

"*It would be easier than to look up a term in your textbook.*"

"*Sometimes I do not understand the lecturers and I'm too shy to ask in class, so it would be easier to look it up on my cell.*"

## Student overview
The group consisted of 120 BEd first-year students.

The students take a number of modules during their first year, some of which, such as Educational Psychology and Philosophy, are especially unfamiliar to the students. The difficult terminology along with poor academic writing skills can create challenging learning experiences for the students.

## Other relevant role-players
Various lecturers were involved in collecting, defining and translating the terminology: Karen Horn (History), Helena Wessels (Mathematics – Foundation Phase), Carina America (Economic and Management Sciences) and Gerjo Cloete (Geography). The translators of the Language Centre also assisted, as did BEd honours language students, who analysed the questionnaires as part of their research projects.

## Learning and assessment activities
### Educational approach
According to Naismith, Lonsdale, Vavoula and Sharples (2004), mobile technologies can be used in the design of six different types of learning or categories of activity:

- **Behaviourist learning**: When quick feedback or reinforcement is facilitated by mobile devices because they are at hand. For example, during class, students can look up the meanings of terms used by their lecturers.

- **Constructivist learning**: When students build up new concepts, perhaps engaging with their physical and social environments, and are responsible for their own learning. An example of independent learning is students studying and referring to MobiLex when they do not remember the meaning of certain concepts.

- **Situated learning**: When students take mobile devices into educationally relevant real-world locations and learn from those settings.

- **Collaborative learning**: When mobile devices are an essential means of communication and electronic information sharing for students in groups outside their educational institutions.

- **Informal and lifelong learning**: When possibly unconstructed or opportunistic learning takes place, driven by personal curiosity, chance encounters or the stimulus of the environment. For example, students use their mobile devices wherever they are to become convenient sources of information that assist with learning or recording learning experiences for future consultation and reviews.

- **Supported learning**: When mobile devices monitor progress, check schedules and dates, and review and manage progress.

According to Traxler (2009), mobile devices are involved in the wider social transformation of how people in general – not just students – acquire and distribute information, images, ideas and opinions and of how learning is being redefined.

### Learning activities
The students were asked to search for particular subject-specific terms on the mobile application while completing the questionnaire. The application provided the English, Afrikaans and isiXhosa translation equivalents (depending on the language selected).

## Learning environment
### Learning setting
Learning activities took place both in class and out of class because of the mobile access of the application. All students and staff at the University have

# MobiLex: The use of LSP dictionaries on mobile phones in higher education
## Faculty of Education | Department of Curriculum Studies

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**Target Group:** BEd First-Year Students
**Lecturer:** Dr Michele van der Merwe michelevdm@sun.ac.za
**Blended Learning Coordinator:** Mr Gavin van Niekerk gavinvn@sun.ac.za

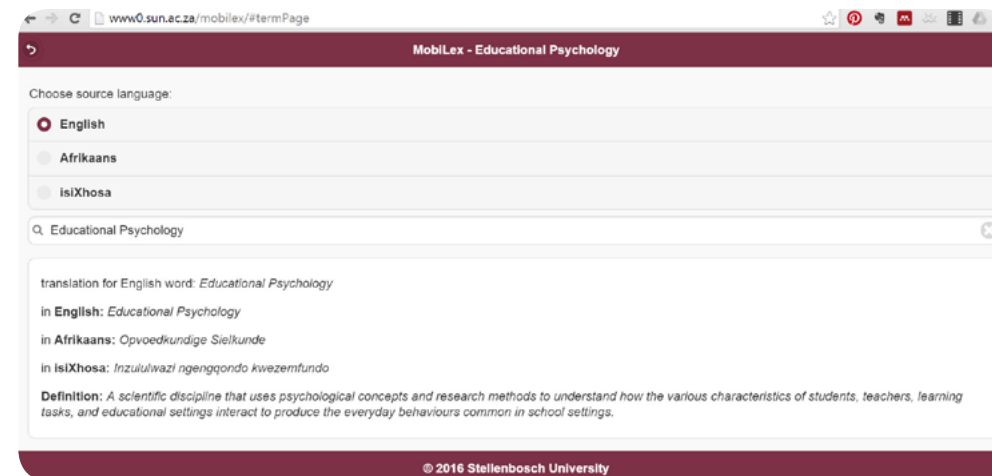access to MobiLex at http://www0.sun.ac.za/mobilex.



Figure 1: Screenshot of a phrase searched on MobiLex

## Collaborative setting

According to Kukulska-Hulme and Traxler (2005), designing content for MALL can include a variety of content. The interactivity afforded by mobile technologies creates a teaching and learning environment more suited to a constructivist approach, where the device is a tool for information and direction. Content is specified with the author's reference to MobiLex. MobiLex is a trilingual dictionary featuring the languages English, Afrikaans and isiXhosa. The following aspects are important to consider:

- **Learner-centred content**: If students are expected to construct some of the content as part of their learning, this can be done in various locations, which mobile devices facilitate. This is personal and specific to context and usually to time and place. For example, when lecturers mention terms in class in languages of teaching and learning, such as English or Afrikaans, that students do not understand, the students can use the MobiLex dictionary to translate the terms. IsiXhosa students can look up the isiXhosa translations of the English or Afrikaans terms and the definitions of the terms in isiXhosa can elucidate the concepts to the students.

- **Personalised content**: Students can receive, assemble, share and carry around personally useful and appropriate resources. For example,

when the Curriculum Studies lecturer instructs the class to draw up a lesson plan and a student is unsure of the content of such a plan, the student can find a description of such a lesson plan in MobiLex.

- **Updated content**: Updates can be delivered to mobile devices when students are highly mobile and cannot access desktop computers regularly. MobiLex is a web-based application and can be updated as new terms are added to the dictionary.

- **Timed or scheduled content**: Students can engage with content frequently, repetitively or periodically using a mobile device without overhead costs or inconvenience. For example, they can look up difficult terms while studying for tests or working on assignments.

- **Prioritised content**: Content can be made available on mobile devices in such a way as to prioritise it over other content. This can be a useful deliberate-teaching strategy. For example, when students are frequent users of MobiLex, their search histories are stored on their smartphones and they can easily access these whenever they need them.

- **Flexible content**: Students may appreciate having the option of mobile access to learning material and resources as an alternative to desktop content. MobiLex is always available: during class, for group discussions or when otherwise needed.

## Support challenges

Not all the students had access to mobile phones and could therefore not access the online dictionary. They could still, however, gain access via the browser webpage on the campus computers.

## Student experience
### Student feedback on the learning experience

The students reported that the app allowed convenient and fast access to terms and definitions. They could use the digital dictionary effectively, which improved their learning opportunity. It saved them time and it did not add to the number of books and physical material that they had to carry around. They were, however, concerned about data usage. Three of the students preferred hard copy digital dictionaries instead of a dictionary

# MobiLex: The use of LSP dictionaries on mobile phones in higher education
## Faculty of Education | Department of Curriculum Studies

4

**Target Group:** BEd First-Year Students
**Lecturer:** Dr Michele van der Merwe michelevdm@sun.ac.za
**Blended Learning Coordinator:** Mr Gavin van Niekerk gavinvn@sun.ac.za

Learning activity:
Online dictionary

Learning technology:
MobiLex

on their mobile phones.



Figure 2: Students using MobiLex on their mobile phones

## General
### Opportunities
MobiLex can be used in more faculties on campus for language support within the framework of multilingualism and the advancement of academic and concept literacy. As MobiLex is web-based, it can also be used to create an application for mobile phones.

### Challenges
There is no wireless internet access in the building where the Faculty of Education is housed. Since the students relied heavily on their smartphones and other mobile devices for access, it proved difficult to use Mobilex without internet access.

### Advice
Students have to be prepared for using the digital dictionary. It has to be confirmed beforehand that they have access to data or are registered on the campus WiFi.

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# Initial reflections on the use of tablets in a SUNCEP Teacher Professional Learning Programme
## Faculty of Education | Centre for Pedagogy (SUNCEP)

**Programme:** SUNCEP Short courses
**Lecturers:** Mrs Pauline W Hanekom pwh@sun.ac.za & Mr Ramesh Jeram ramesh@sun.ac.za
**Blended Learning Coordinator:** Mr Gavin van Niekerk gavinvn@sun.ac.za

**Learning activity:**
Practice based learning

**Learning technology:**
Windows tablets

## Context
### Background
The Stellenbosch University Centre for Pedagogy (SUNCEP) was established with the purpose of adding value to the educational challenges currently experienced in the educational diaspora in South Africa. In existence since 2013, SUNCEP's main focus is and always will be to address the myriad of challenges relating to teacher professional learning and improved access for learners to institutions of higher learning. Coupled with research, focus is also on recording and sharing best practices. SUNCEP aims to make a difference by addressing these challenges in an integrated, holistic, systemic, synchronised and sustained approach.

In the Teacher Professional Learning (TPL) component, teachers and/or management teams in schools and education districts have the opportunity to enrol in two kinds of formal professional teacher qualifications: either a full qualification or a short course. Both qualifications are either content specific or management related. Since SUNCEP's inception in 2013, more than 1 000 teachers have attended short courses in Mathematics, the Natural, Life and Physical Sciences, and School Management and Leadership, while more than 350 school managers from the Western and Northern Cape have been enrolled in the two-year Advanced Certificate in Education in School Management and Leadership courses.

The modes of delivery of the short and part-time courses, as defined by the Stellenbosch University Institutional Intent and Strategy (2013–2018), are blended and virtual learning models. The Western Cape Education Department's vision for e-education, in turn, calls for the use of mobile devices in all classrooms by 2020. In light of all this, a blended practice-based TPL model, incorporating Windows PC tablets, was developed and piloted by SUNCEP. The pilot group consisted of 113 Senior Phase Mathematics teachers in the Eden Karoo District of South Africa.

### Subject area
SUNCEP offered two short courses to 113 Senior Phase Mathematics teachers in the Eden Karoo education district of the Western Cape. The modules were named Teaching Space and Shape, and Teaching Patterns, Functions and Algebra. Both modules focused on improving the efficacy of teachers, thus empowering them with the skills to improve their teaching practice in delivering these sections of the Senior Phase Mathematics curriculum. The skills are embedded and further elaborated in the intended learning outcomes stated below.

### Intended learning outcomes

After completing the short courses, the teachers had:

• improved pedagogical content knowledge within this specific content area;

• improved ability to plan and implement quality learning activities and assessments to improve teaching and learning;

• improved ability to monitor and evaluate their teaching and learning to ensure quality learning;

• improved ability to reflect on and explore a variety of strategies to teach this topic more effectively and efficiently; and

• the pedagogical ability to use e-hardware models in a classroom that empowered them for a future where e-hardware will be part of their classroom resources (National Development Plan, White paper on e-Education 2004, WCED e-Vision).

### Challenges and advantages associated with the integration of technology
Globally, governments and authorities are troubled by the slow adoption of mobile learning technologies by teachers. Mobile learning appears to be ideally suited to teachers to assist in addressing their particular barriers to lifelong learning, such as working environments that inhibit connectedness, unpredictable places and times for learning opportunities, and the itinerant nature of their working day.

All the teachers who participated in the SUNCEP short courses received a Windows PC tablet with preloaded course material and 100 MB of data. Due to most Western Cape teachers having received some training on Windows platform computers, the decision was made to stay with a Windows platform when choosing the tablet. The course material was

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# Initial reflections on the use of tablets in a SUNCEP Teacher Professional Learning Programme
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**Lecturers:** Mrs Pauline W Hanekom pwh@sun.ac.za & Mr Ramesh Jeram ramesh@sun.ac.za
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**Learning activity:**
Practice based learning

**Learning technology:**
Windows tablets

developed utilising the authoring software Articulate Storyline 2™. This software allowed for the creation of interactive material with features such as drag-and-drop interactions, quizzes and self-assessments. The course material was developed for three different purposes: for use within the face-to-face contact sessions, for use by the teachers to complete their assignments between the contact sessions and for use within the teachers' classrooms with their learners. Two face-to-face contact sessions were held: over four days during the March/April 2015 teacher holidays and over five days during the June teacher holidays.



Figure 1: Pictures of the Windows Tablet that the participants received

### Student overview
All the 113 TPL students on the short courses were in-service teachers who should theoretically have had some computer and internet competencies. A survey done at the end of another course showed that 83% of teachers owned their own computer, 76% had regular access to broadband internet and 82% had access to mobile internet. At the same time, 20% described themselves as total novices when it came to computers and the internet.

### Other relevant role-players
SUNCEP facilitators facilitated the courses, assisted by ad hoc mentors who supported the teachers within their schools. Even though the mentors played a supportive role only, they still needed to understand the complexities of this role. This went beyond individuals who were pedagogically sound and had high content knowledge. They not only had to pass on the required cognitive and pedagogical skills to the teachers but they also had to be able to contribute to building the affective components of the teachers, namely the teachers' dedication and commitment to their tasks.

The lecturers therefore sought out individuals who were experts in their field of teaching, preferably retired. Through networks, the lecturers were able to source possible mentors and invited them to an orientation session. This session was crucial, as many of the possible mentors were not au fait with the practice-based approach to teacher professional learning. The orientation process was both academic, highlighting the epistemological dimensions of the practice-based approach to teacher professional learning, and highly practical, facilitating how the process works in practice by drawing on the experiences and functioning of the mentoring process in the Educational Leadership and Management Programme.

After the orientation session, the filtering process took on an organic nature in that those who understood what was expected took up the challenge and those who still held onto the old-world notion of this process being a hierarchical one did not. Other reasons for some people not becoming mentors were more explicit, for example they did not have the time because they were involved in other professional or personal activities, and travelling vast distances was not an option because many of the teachers were situated in deep rural education districts.



Pauline Hanekom, the facilitator for the first session of the workshop, smiles broadly as Nosipho Mawanga (Imizamo Yethu High), Nomacebiso Jacobs (Tyholora Primary), Bongiwe Bidi (Thembalethu High) and Thabisa Saleni (Imikhaya Primary) successfully switch on their Tablets for the first time.

Figure 2: A photo as it appeared in the George Herald, 9 April 2015

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# Initial reflections on the use of tablets in a SUNCEP Teacher Professional Learning Programme
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**Blended Learning Coordinator:** Mr Gavin van Niekerk gavinvn@sun.ac.za

## Learning and assessment activities
### Educational approach
All SUNCEP courses follow a practice-based approach, which means that the facilitators do not focus only on the knowledge of the content but equally on developing and applying professional knowledge so that teachers become experts within their own context and within other contexts.

### Learning activities
Some activities were paper-based, with a PDF version of the activity loaded on the tablets for reuse in the teachers' classrooms. Other activities were interactive problems that the teachers had to complete during the contact sessions as formative assessments and that they could use in their classrooms. The participants also engaged in online research activities, which lead to critically reflective essays.

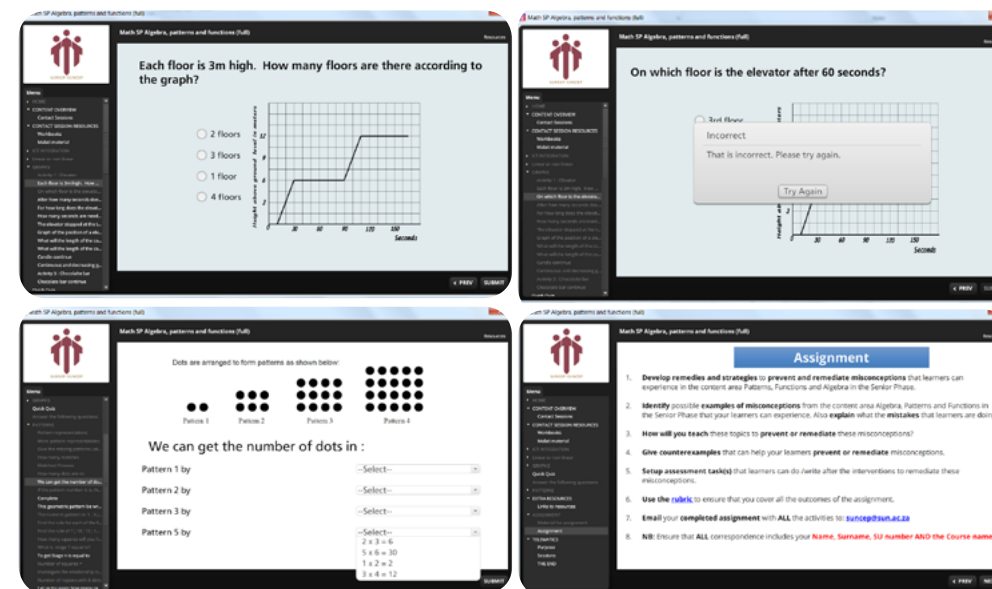### Assessment activities and feedback practices



Figure 3: An example of the content

The formative assessment activities were interactive and provided the teachers with feedback as they were completed. The facilitators were at hand during the contact sessions in case of any problems arising. The summative assessment essays were reflective essays on the teachers' current practices in their classrooms. The teachers were requested to implement the theory that they had learned during the contact sessions and reflect on their practices by providing evidence of their learners' work and answering questions relating to their practices while teaching the required content. The assignments were either handed in as hard copy at the end of the contact sessions or submitted electronically via email. Feedback was essentially given to the teachers via the mentors during the cluster sessions, where best practices were shared and new knowledge was created with regard to the teachers' practices.

## Learning environment
### Learning setting
The mode of delivery was a blended learning approach that combined face-to-face contact sessions, interactive telematics broadcast sessions and practice-based e-lesson content on the tablets. The teachers were supported through on-site mentoring to uptake knowledge and skills acquired during the contact sessions.

### Collaborative setting
All the teachers were part of a WhatsApp group (Community of Practice) where they could share best practice ideas, ask questions related to the course structure and support one another.

### Support challenges
The biggest challenge was getting the participants to create their own Microsoft ID accounts during the first face-to-face session. This was important because it enabled the participants to use their tablets. SUNCEP did not support students with issues such as broken or stolen tablets but did refer them to the relevant support structures. Some of the students accidentally deleted the supplied material from their tablets but were then supplied with a memory stick with the material to reload their tablets.

## Student/participant experience
### Student feedback on the learning experience
After the short course, 70% of the participants felt confident in their ability to use a tablet to learn. Furthermore, most felt that it was easy to learn to use the tablet. More than half the participants indicated that they would

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# Initial reflections on the use of tablets in a SUNCEP Teacher Professional Learning Programme
## Faculty of Education | Centre for Pedagogy (SUNCEP)

4

**Programme:** SUNCEP Short courses
**Lecturers:** Mrs Pauline W Hanekom pwh@sun.ac.za & Mr Ramesh Jeram ramesh@sun.ac.za
**Blended Learning Coordinator:** Mr Gavin van Niekerk gavinvn@sun.ac.za

**Learning activity:**
Practice based learning

**Learning technology:**
Windows tablets

prefer their course material to be provided on a compact disk and more than 30% preferred receiving their course material in hard copy format. Despite this, 84% of the students thought that the tablet had a positive impact on their learning experience.
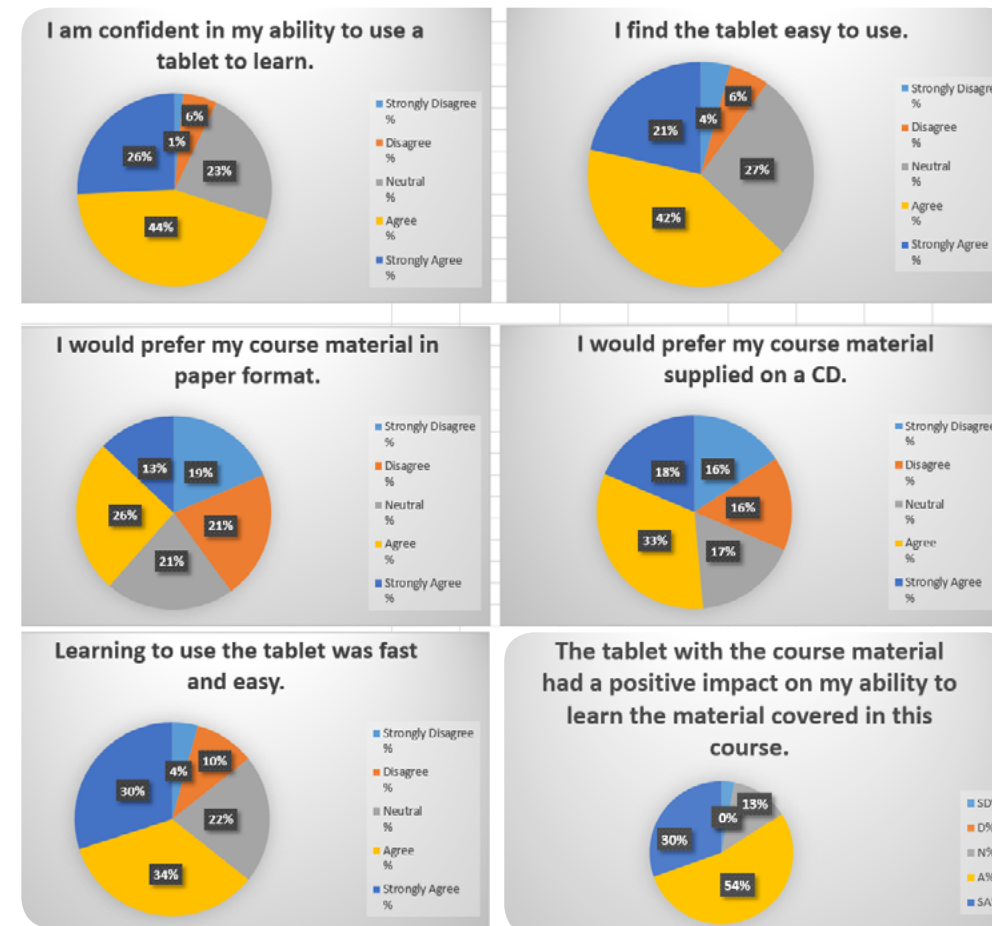


Figure 4: Student feedback

## General
### Opportunities
In subsequent courses, a podcast was made of how to set up the Microsoft ID so that the students could have them ready for their first face-to-face session. This saved a lot of time and effort. There were still a few students who came without their Microsoft ID but they could be assisted quickly during the first administration session. Time should be allocated in the first contact session to orientate the students around the workings of the tablet.

### Other concluding thoughts
Many teachers welcomed the use of the new learning technologies used in the training course, especially those who had already started integrating these new technologies into their teaching. Some of the teachers were, however, put off by the use of the new learning technologies due to their inability to integrate technology into their teaching.

Even though SUNCEP offered the teachers data during their first contact session, they had to purchase their own data during the next contact session because it would have been too expensive for SUNCEP to supply data to the teachers continuously. Many of the teachers did complain that this was expensive but they needed to take responsibility for their tablets and for such purchases themselves.

Some of the teachers experienced technical challenges, as they had never worked with a tablet, not realising that it was similar to using a smart phone. Despite some challenges, however, the teachers used the tablets interactively within the training sessions and were not averse to trying out the new technology.

Much still needs to be done to get the course fully interactive but, since the teachers come from a purely paper-based training mode into this interactive environment, SUNCEP realises that small steps should be taken to get teacher training fully interactive, even though this adds a whole new dimension to the mode of training.

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# Podcasting in legal education
## Faculty of Law | Departments of Public Law & Mercantile Law

1

**Programme:** Criminal Law 171, Administrative Law 411 & Mercantile Law 471
**Lecturer:** Prof Geo Quinot gquinot@sun.ac.za
**Blended Learning Coordinator:** Ms Alma Coertzen almac@sun.ac.za

**Learning activity:**
Podcasting

**Learning technology:**
PowerPoint, Prezi

## Context
### Background
The lecturer conducted a study in which he tracked the use of podcasts as a teaching/learning tool in three modules in the Faculty of Law between 2012 and 2014.

### Intended learning outcomes
The aim in all the modules was to shift basic explanations with a high knowledge transfer objective to the podcast and out of the contact session so that the contact session could be utilised largely for teaching/learning activities aimed at the development of higher-order competence. In the context of legal education, this essentially meant that explanations of key concepts were done via podcasts and that contact sessions were used to engage in active problem solving activities and advanced theoretical questions. The design was thus premised on the basis that students had to engage with the podcasts before attending class.

### The challenge
The reasons for adopting a different approach in the form of adding podcasts differed somewhat for the various modules but, in all three instances, the lecturers' main aim was to free up more time during the contact sessions for engagement aimed at the development of higher-order thinking skills, such as problem solving. Other reasons included that this would allow more time during the contact sessions to focus on the most difficult questions as opposed to issues that students could master by way of guided self-study and that it would create a permanent learning resource for key concepts that the students could refer back to throughout the course.

### Advantages associated with the integration of technology
The basic principle underlying the use of podcasts in the three modules was the same. In all the instances, the podcasts constituted learning activities additional to the contact sessions. The podcasts were thus not simply recordings of classes made available to the students after the contact sessions. The use of podcasts was thus aimed at a blended learning design, which combined in and out of classroom activities to form a coherent whole and which relied strongly on information and communications technology in doing so.

### Student overview
The three modules included in the study were Criminal Law 171 (offered to first and second-year law students in all the Law programmes), Administrative Law 411 and Mercantile Law 471 (both offered to fourth and fifth-year LLB students). In total, about 1 440 students were exposed to these podcasts over the three-year period.

## Learning and assessment activities
### Educational approach
The study of these practices used a combination of questionnaires completed by the students and interviews with the relevant lecturers. The aim of the study was primarily to test the perceptions of both the students and the lecturers of the use of podcasts in the manner outlined above. This aim was premised on the findings of the meta-study by Baeten, Kyndt, Struyven and Dochy (2010), which concluded that perceived contextual factors were key in promoting deep learning.

### Learning activities
In most instances, the students were required to view or listen to a podcast before a contact session. The learning activities in the relevant contact session consequently relied on the work covered in the podcast. For example, a problem would be discussed in class, the resolution of which relied on the work dealt with in the podcast. In Criminal Law, the students were routinely required to complete an online quiz following the podcast.

## Learning environment
### Learning setting
Podcasts were uploaded on SUNLearn, where the students could access them directly, mostly in the form of mp3 or mp4 files.

### Technology resources
Despite the similarities in the aim and approach of the uses of the podcasts in the three modules, the actual designs of the podcasts differed significantly for the three modules. Different software was used to create the three podcasts; only audio was used for one of the podcasts, whereas video was also used for the other two. The two with video used either PowerPoint slides or Prezi presentations combined with audio or concept maps with audio. In all the cases, however, the lecturers created the

# Podcasting in legal education
## Faculty of Law | Departments of Public Law & Mercantile Law

2

**Programme:** Criminal Law 171, Administrative Law 411 & Mercantile Law 471
**Lecturer:** Prof Geo Quinot gquinot@sun.ac.za
**Blended Learning Coordinator:** Ms Alma Coertzen almac@sun.ac.za

podcasts themselves with the use of the basic technology available (PC and voice recording) and thus without reliance on any professional video or audio production services.

### Support challenges
Support was not considered a major issue for the students. While some of the students (14% of the respondents) noted that they experienced difficulties in accessing the podcasts, they mostly noted that they could easily resolve the particular problem, often with the help of a friend (40% of those who noted support challenges).



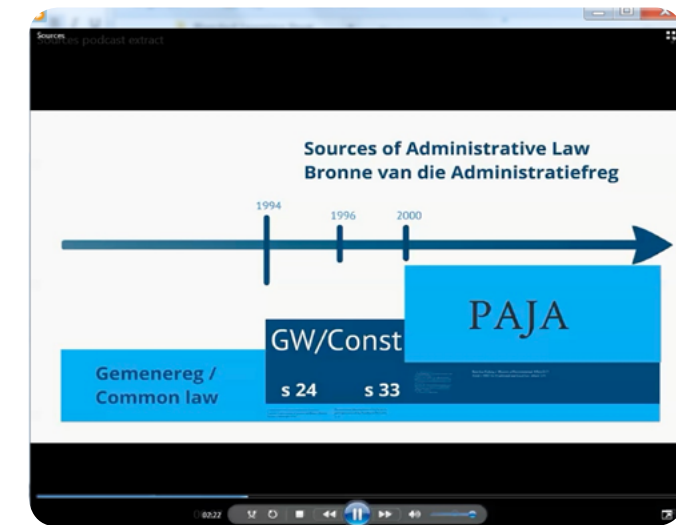Figure 1: Screenshot of SUNLearn that shows the overall online design of the module



Figure 2: Screenshot of a podcast

### Student experience
#### Student feedback on the learning experience
Student perceptions were largely positive. The overall response to the question about the value that podcasts added to their studies was overwhelmingly positive, with 63.6% indicating above average value or higher and another 26.4% indicating average value. This is reflected in the chart below.
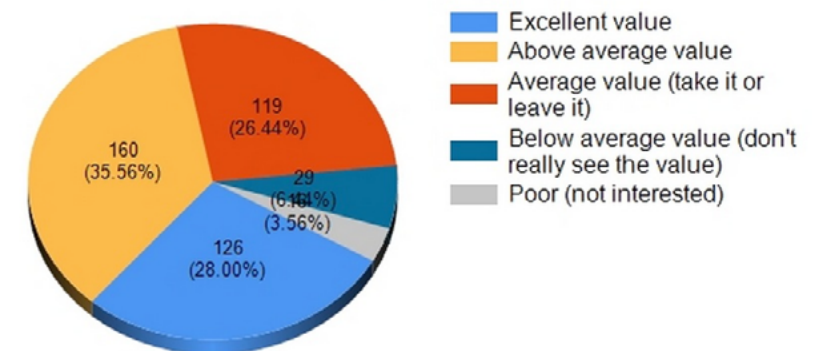


Figure 3: Student feedback

# Podcasting in legal education
## Faculty of Law | Departments of Public Law & Mercantile Law

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The written feedback typically included the following comments:

"*I prefer the podcasts especially with regard to the more difficult concepts. It allows me to pause and rewind and listen again to what was said and in that way I can grasp concepts in my own time and not feel lost as I would if it was merely said in class.*"

"*You can listen to it repeatedly & go back to things you would have missed in formal lectures. You can also listen to it at a time that suits you & plan it around other obligations & responsibilities you have.*"

Some of the key benefits that the students indicated included the control that the podcasts gave them in adjusting the speed of their own learning and the flexibility to engage in learning activities at a time and space that suited them best. One of the most interesting remarks in this regard in response to the question, "What are the main advantages of podcasting from your perspective?" was the following:

"*Being able to pause and rewind & listen when I am in the best mood.*"

## General
### Opportunities
Common lecturer perspectives included the turning to podcasts as a way to "get students to work", to "shift the least interactive parts out of contact time" and to flip the classroom. The lecturers experienced their experimentation with the podcasts to achieve a blended learning design as largely positive. Although all noted that the creation of the podcasts was extremely time consuming, all indicated that they intended to continue using podcasts. One useful approach that emerged from the interviews was the suggestion to transition to the use of podcasts over a number of years by recording explanations given in class in a given year and using that recording in subsequent years as the out-of-classroom podcast. This would reduce production time and an effective library of podcasts could also be created over time.

### Challenges
One of the lessons that emerged from the survey is that the students may spend too much time on transcribing the podcasts so that the podcasts simply become another text rather than an engagement with the primary study material. Some of the students complained about the large amount of time that it took to transcribe the podcasts fully, although other students noted that the podcasts helped them to create accurate and complete study notes and to grapple more thoroughly with the material over an extended period of time, resulting in better learning. A typical comment in this respect was the following:
"Takes time but allows you to make better notes and while taking notes [it] already assists in learning as you [have] already gone through [and] understand work so [it] assists learning. Studying is almost revision then."
These experiences (and others) highlighted the need for lecturers using podcasts to spend some time "training" their students on how to use the podcasts as a learning tool. As with all forms of teaching/learning activities, it should not be assumed that students will instinctively and automatically know what to do and how best to utilise the resource. Some guidance from the lecturer is essential.
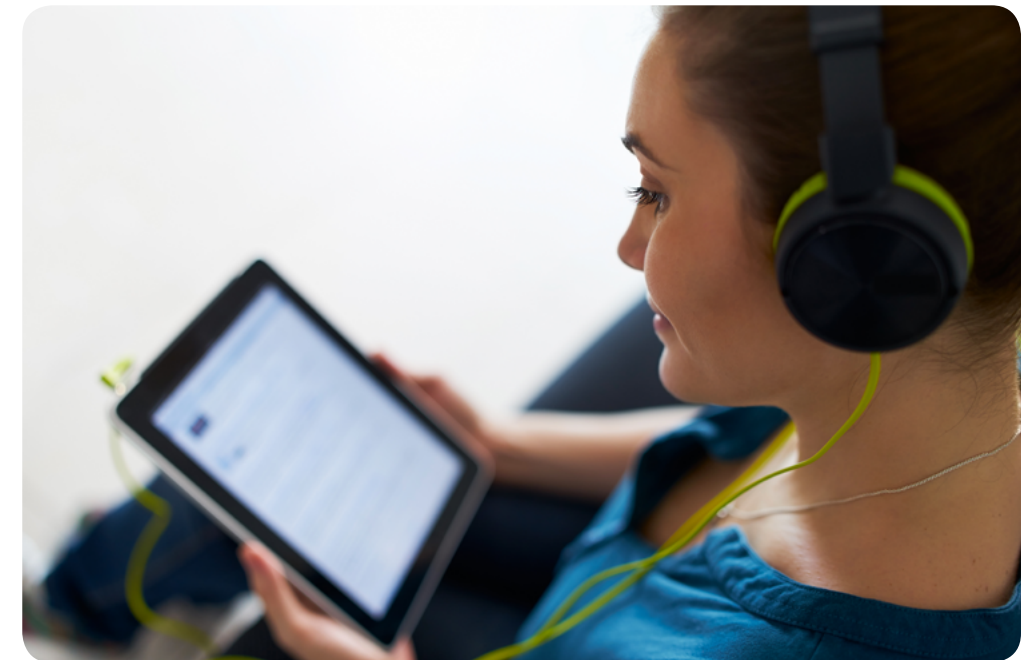


### Advice
The lecturer's advice would be not to overthink it – just to start somewhere and experiment. This will, in time, bring lecturers to a practice that is optimal

# Podcasting in legal education
## Faculty of Law | Departments of Public Law & Mercantile Law

4

**Programme:** Criminal Law 171, Administrative Law 411 & Mercantile Law 471
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for them and for their students. In particular, lecturers should not be intimidated by technology. There is no need to use advanced software or any special hardware when just setting out. Starting with what is available and keeping it simple would be advisable.

The following are some general points that the lecturer has learned over the years in using podcasts:

• Keep the podcasts very short and to the point – it does not work to place full 50-minute lectures in single podcasts.

• Integrate the podcasts with all the other activities in your module and explicitly show your students the added value that they will derive from the podcasts.

• If you use a lot of podcasts, take this into account when you assign your students other work, such as readings and exercises. Remember that listening to podcasts is an additional activity and you cannot simply add this to your modules without allowing time for it in the overall design in terms of the relevant number of credit hours available within the module.

• Explicitly teach your students how to use podcasts in your modules. This includes telling them what you expect them to get out of the podcasts and how they should approach them. Do not assume that all students will instinctively know what to do with podcasts.

• Avoid creating large file sizes when recording podcasts. Remember that students may not have the best (or fast) internet access and that huge files could be a stumbling block for them. Keeping podcasts short and avoiding many large, high-definition images help to keep file sizes down.

• Build up a library of podcasts over time that you can use repeatedly. This makes the investment in time creating them more than worthwhile.

## Other concluding thoughts
The overall conclusion of the study is that the use of podcasts in the

targeted modules in the Law programmes seems worthwhile in that it creates a positive perspective on the part of both students and lecturers about the overall teaching/learning environment. The carefully and deliberately designed use of podcasts seems an effective way to assist in flipping the classroom and promoting more active and deeper learning in legal education.

# Managing timeous quality feedback with large groups
## Faculty of Science | Department of Mathematical Sciences: Division Computer Science

1

**Modules:** Computer Skills 171 & Computer Skills 176
**Lecturer:** Ms Hanlie Haroldt hharoldt@sun.ac.za
**Blended Learning Coordinator:** Dr Ilse Rootman-Le Grange ilser@sun.ac.za

Learning activity:
Timeous feedback

Learning technology:
SUNLearn quizzes and
workshop tool

## Context
### Background
The Computer Skills (CS) modules fall under the auspices of the Department of Mathematical Sciences: Division Computer Science. The first-year modules had been compulsory for all students in both the Faculty of Science and the Faculty of AgriSciences but, in 2015, the Extended Degree Programme (EDP) students were also included. (EDP students comprise students from the Faculty of Engineering, the Faculty of Science and the Faculty of AgriSciences.)

This therefore became an extremely large group of students; in June of that year, there were 1 117 registered mainstream students and 151 registered EDP students. Ways then had to be found to give timeous feedback to this group without compromising the quality or standard of assessment.

The lectures are conducted in computer user areas (CUAs). The venues where the mainstream students have their lectures already had touch screen monitors; the other venues have been incrementally upgraded and all the venues now have touch screen monitors.



Figure 1: NARGA G, one of the CUAs of the Faculty of Science, where students work on their own or together (Courtesy NARGA, 26 January 2016)

## Subject area and intended learning outcomes
Upon completion of the modules, students should be comfortable in navigating software applications, specifically text editors, spreadsheets and presentation applications. The goal is to train them to use software applications to enhance their academic capabilities, so that they are able to:

- gather, tabulate, analyse and chart data using spreadsheet applications;

- report results using text editors; and

- present findings using presentation applications.

As computer technology is a dynamic field, students are also encouraged to explore beyond what is being done within the classroom. Self-learning is therefore assessed as part of the modules.

The Microsoft (MS) Office 2013 suite is used to develop skills in working with a text editor (Word), a spreadsheet (Excel) and a presentation package (PowerPoint). Although the Apple and Android platforms differ from the Windows environment, the basic principles and context remain the same. Windows is the platform currently used due to licensing agreements.

### Established practice
In the CS modules, all assessments are open book, i.e. students are allowed to use resources available on SUNLearn during any assessments, including tests, and the continuous assessment model is employed.

The mainstream students have a total of 26 allocated periods divided into 4 for a project, 4 for tutorials and the remainder for lectures. The lectures are less theoretical and more focused on the practical application of text editors, spreadsheets and presentation packages. Two lectures per fortnight are spread across the year.

The EDP students have two lecture periods and one two-hour-long practical assessment session every week throughout the year. One of the lecture periods is used for feedback and, later in the year, as a remedial session.

# Managing timeous quality feedback with large groups
## Faculty of Science | Department of Mathematical Sciences: Division Computer Science

2

**Modules:** Computer Skills 171 & Computer Skills 176
**Lecturer:** Ms Hanlie Haroldt hharoldt@sun.ac.za
**Blended Learning Coordinator:** Dr Ilse Rootman-Le Grange ilser@sun.ac.za

## The challenge
The challenge was to find ways to give timeous and quality feedback, either formative or summative, without compromising the standard of assessment within this large group of students. Due to the size of the group, feedback (in the form of grades) had previously been available only about three weeks after an assessment took place, which led most students not to regard the feedback as important as it distracted from the current material being focused on. Valuable learning opportunities were being missed.

## Advantages associated with the integration of technology
The advantage of using SUNLearn quizzes is that it facilitates automated marking. As a result, less time is spent by lecturers marking and feedback can go out much faster. The SUNLearn workshop tool also allows for peer assessment. This provides an additional learning opportunity and students can receive more individual feedback than is possible when all marking is done by one person. Both these tools also have the option for the lecturer to include general or specific feedback.

## Student overview
CS is compulsory for all registered first-year students from Faculty of Science and the Faculty of AgriSciences, regardless of level of skill. It is a very diverse group of students with huge numbers. Some of the students have had access to computers from a young age, some have had access intermittently and some have never had access, these modules being their first experience with a computer. In most cases, students have used PCs only for social or limited academic purposes. This creates an additional challenge during lectures, as some students need far more time than others to complete the practical assignments. The lecturer therefore also wanted to build some flexibility into the assignments.

## Other relevant role-players
The blended learning coordinator, the SUNLearn technical support team and the technicians at the CUAs in the Faculty are valued allies.

## Intervention
Different types of assessment and feedback strategies using the SUNLearn Quiz and Workshop tools were explored and trial runs were done with one of the three class groups of EDP students before being rolling out to the rest of the students.

## Assessment activities
### Assessment activities
Students are individuals and each has a unique learning style. Individual testing is therefore regarded as very important. Students also need to be prepared to work collaboratively, however, and peer assessment and group work therefore formed part of the learning and assessment activities.

All the resources, i.e. notes, videos etc., were available on SUNLearn from course commencement until completion. The learning activities, the majority of which took the form of formative assessment (providing feedback and not simply grades), were also available throughout the duration of the course. The students were thus able to complete the activities either during class or in their own time and even repeat them to practice the concepts that they struggled with. This built some flexibility into the relevant module, which helped to accommodate the varying skill levels in the group.

The first tutorial assessments were marked by the lecturer. This was followed by quizzes, which were marked automatically. Peer-assessed assignments were then introduced. Finally, to explore the viability of the process, a self-assessment activity was also included. The assessment strategy thus started with what the students were familiar with and built on that in stages to give them more responsibility as the year progressed. All the assignments were done on SUNLearn.

The assessment activities consisted mostly of web-based assessment, i.e. automated marking was done through SUNLearn quizzes, of peer assessment through SUNLearn Workshop and of traditionally assessed assignments.

During the first term, practical assessments consisted of SUNLearn quizzes (Figure 2) that were marked automatically and an evening test (summative assessment) that was marked by the lecturer.

# Managing timeous quality feedback with large groups
## Faculty of Science | Department of Mathematical Sciences: Division Computer Science

3

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Quiz 2

Hierdie quiz vorm deel van tut 2 vir die Word komponent. U het 60 minute om dit te voltooi. Let op dat vraag 5 meer as een antwoord het.

This quiz is part of tut 2 for the Word component. You have 60 minutes to complete it. Note that question 5 has more than one answer.

Figure 2: Example of a SUNLearn quiz with the instruction as displayed in SUNLearn.

During the second term, peer assessment was introduced using SUNLearn Workshop. This consisted of the students working in groups on a presentation that was then assessed by the rest of the class. Random allocation was used to assign the students automatically to the various groups. Clear assessment criteria were given and discussed with the students beforehand (Figure 3). The students also assessed each other's contributions to the assignment and how well they worked together.

Aspect 3

Skyfie / Slide 2

Uitleg / Layout : Two Content / Comparison [1]. Geen punt vir ander uitleg. No mark for any other layout.

Korrekte bullets en indentering. Correct bullets and indents [1]

Verander kleur van parallelogram. Change colour of parallelogram. [1

Grade  Choose... ▼

        Choose...
        3 / 3
        2 / 3
        1 / 3
        0 / 3

Comment

Figure 3: Example of assessment criteria for one of the aspects evaluated as part of a PowerPoint assignment

## Feedback practices
For the SUNLearn quizzes, the lecturer used multiple-choice questions that were marked automatically. The students thus received their grades immediately after submitting their answers. They were allowed only one submission per quiz but they could revisit the quizzes and view their answers at any time.

For the peer-assessed assignments, the students were given a week to assess each other's work after the submission deadline. Here, feedback was thus available within one week. Also, since the students were provided with the assessment criteria beforehand, the grades that they received also enabled them to identify more specifically where they went wrong or needed to seek help. This type of assessment thus gave the students much faster but also more detailed feedback than had previously been available.

For the final tutorial of the module, the students were asked to assess their own assignments through SUNLearn Workshop. Again they were given set criteria against which to assess their work. This tutorial contributed a very small portion of their overall mark, as the purpose was to trial the strategy without penalising the students.

## Learning environment
### Technology resources
Only SUNLearn instruments were used for assessment and improved feedback practices. This ensured that the students were familiar with the platform and it kept all the grades together.

### Support challenges
The technical side of the module was fully supported, with hardly any challenges. During lectures, the lecturer communicated with the computer lab technical support teams, the SUNLearn platform and the blended learning coordinator using Lync, the MS Office chat tool. The computer lab also had a backup generator that activates during times of load shedding; the students thus rarely noticed the difference, as loss of network connection is approximately only five minutes.

## Student experience
### Student feedback on the learning experience
When asked during sessions how they experienced the learning and assessment activities, most of the students expressed a positive experience. They said that the peer assessments added value to their learning experience and created an opportunity to learn differently, as they were exposed to other students' approaches.

# Managing timeous quality feedback with large groups
Faculty of Science | Department of Mathematical Sciences: Division Computer Science

4

**Modules:** Computer Skills 171 & Computer Skills 176
**Lecturer:** Ms Hanlie Haroldt hharoldt@sun.ac.za
**Blended Learning Coordinator:** Dr Ilse Rootman-Le Grange ilser@sun.ac.za

No formal feedback on the assessment practices was conducted. Compared to previous cohorts, the lecturer did, however, experience the mainstream group as more mature and eager to learn than previous years, which greatly facilitated the process. Keeping this in mind, this group had an overall better performance compared to previous years. Not only did more students pass their module but they passed it with higher grades than before.

## Assessment impact
The lecturer observed a number of positive and interesting changes when she adjusted the approach to formative assessment in CS. With the first traditional assessment, when the lecturer had marked the test, the students were much more eager to argue and state their cases for higher marks compared to the case of the quiz or peer-assessed assignments. With the peer assessment, the quality of the students' work improved markedly by the second and third assignments. The lecturer observed that the students were more mindful of and paid more attention to the feedback provided by their peers. More of the students were also successful with the section of work that was peer assessed.

In general, there was more timeous feedback than in the past, as long as the responsibility of peer assessment was clearly communicated to the students. This can be aided by making use of the grading system in SUNLearn Workshop, which allows the lecturer to contribute a set percentage of the students' final grade to how well they assessed their peers' assignments.

## General
### Opportunities
In the following year, a progress bar will be added to the SUNLearn module to illustrate activity completion, as this communicates submission dates and helps students with their time management.

### Challenges
As CS is a service department for the Faculty, the true measure of success is to observe the application of the skills and knowledge in other subject areas. This does, however, make it more difficult to monitor. The next challenge is thus to devise a method of evaluating whether true learning

or skill acquisition really has improved.

Finally, self-assessment requires a level of maturity and the lecturer decided not to employ this method again with first-year students. Interestingly, when it came to assessing themselves, some of the students were harsher than the lecturer or even their peers. Self-assessment is a valuable, even crucial, skill, which takes time to develop and it might therefore be more effective to employ it with more mature and experienced students.

## Other concluding thoughts
A changing world requires an assessment framework that changes as technology and access to technology increase. Outdated forms of assessment born during the Industrial Revolution are not aligned with the needs of the Information Age. When or where learning occurs cannot be accurately measured nor can it be assumed that it occurs only between 08:00 and 17:00 within a classroom setting. Using blended learning and a platform that is accessible any time, anywhere, allows students the freedom to complete assignments in their own time using the resources that are at their disposal.

Along with this, increasing student numbers with limited staff makes it increasingly challenging to provide timeous and quality feedback, which is a crucial part of the learning process. Implementation of the quiz and peer assessment opportunities definitely succeeded in giving the students more timeous feedback. It does, however, require careful planning and very clear communication and guidance to the students.

There are two sides to peer assessment as a learning opportunity. Firstly, students have the opportunity to see each other's work, which exposes them to different approaches and which they experience as contributing to their learning. Secondly, students are provided with faster and more personalised feedback. In order for this to work, however, all the students need to do their part and know how to do the assessment, otherwise some of them will not gain value from this activity. Lecturers should thus communicate the process and the purpose very clearly with their students. SUNLearn Workshop furthermore allows lecturers to allocate a percentage of their students' final grades to how well they assessed their peers' assignments.

# Managing timeous quality feedback with large groups
Faculty of Science | Department of Mathematical Sciences: Division Computer Science

5

**Modules:** Computer Skills 171 & Computer Skills 176
**Lecturer:** Ms Hanlie Haroldt hharoldt@sun.ac.za
**Blended Learning Coordinator:** Dr Ilse Rootman-Le Grange ilser@sun.ac.za

It can be concluded that SUNLearn tools make it possible to provide timeous feedback to large classes if planning is done carefully and the tools are implemented effectively.

# Combining videos and quizzes to provide additional support and enhance learning in Mathematics

## Faculty of Science | Department of Mathematical Sciences

# 1

**Modules:** Mathematics (Bio) 124, Mathematics 176 & Mathematics 171
**Lecturer:** Ms Bessie Burger ejburger@sun.ac.za
**Blended Learning Coordinator:** Dr Ilse Rootman-Le Grange ilser@sun.ac.za

## Context

### Background

At Stellenbosch University, numerous Mathematics programmes are offered to first-year students, prospective students and provisionally accepted students.

The Department of Mathematical Sciences offers various mainstream first-year Mathematics modules, including Mathematics (Bio) 124, which has 800 to 900 students. The BSc Extended Degree Programme (EDP) also offers Mathematics 176 to about 70 students who did not meet the minimum requirements for admission to their preferred programme in the Faculty of Science. (The purpose of the EDP is to broaden access to students from disadvantaged educational backgrounds, the additional year preceding the standard mainstream programme.) Finally, SciMathUS offers a year-long bridging programme to about 100 students to improve their Grade 12 marks to enable them to reapply for tertiary studies.

During 2015, Ms Bessie Burger lectured in Mathematics (Bio) 124 and Mathematics 176. She also presented a two-week course to 30 SciMathUS students (Mathematics 171) to assist them with their preparation for Mathematics 124 the following year.

### Intended learning outcome and established practice

The lecturer's objective for all three modules was to support students to develop a greater understanding and ability to apply relevant mathematical concepts. She used a blended learning approach in support of this. Online activities included video material and quizzes and classroom activities consisted mainly of problem solving opportunities and group discussions.

In 2015, she explored different ways of using videos to teach mathematics, using existing video material from various sources, which she made available to her students via the specific modules' SUNLearn pages. It is important to mention that the online material was integrated with the face-to-face sessions and not designed only as supplementary content to the modules.

### The challenge

The reason for the intervention was to provide the Mathematics (Bio)

124 students with additional support. These students have a very full curriculum, however, and using a blended learning approach with videos linked to quizzes provided a way to give them this extra support with more regular formative feedback outside of formal contact time. Since some of the concepts covered in Mathematics (Bio) 124 are also covered in Mathematics 176, the lecturer used the material in that module as well. The 176 module, however, has a far lighter curriculum, which allowed the lecturer to include the videos during the contact sessions.
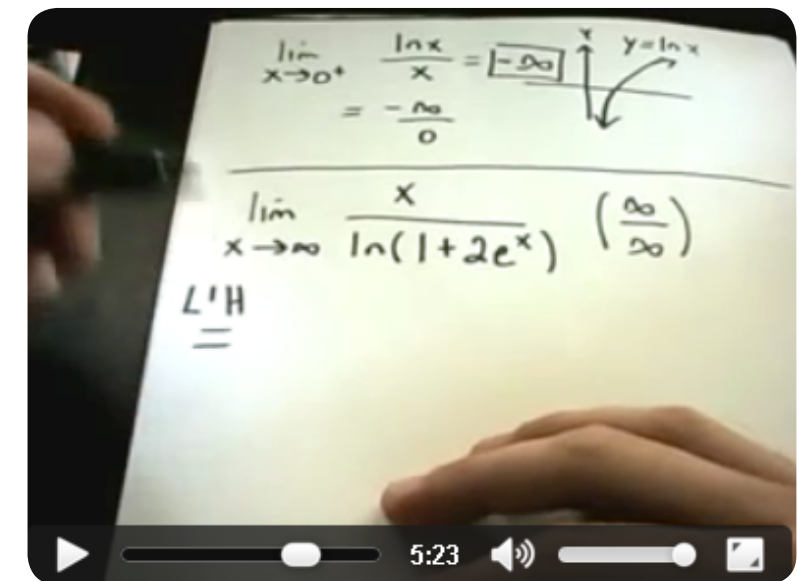


A3:L'Hopital's Rule

Video: L'Hopital's Rule ☑

Quiz on Video L Hopital ☐

Not available unless: The activity **Video: L'Hopital's Rule** is marked complete

Figure 1: Example of a video with accompanying notes in PDF format and a quiz on L'Hopital's Rule

# Combining videos and quizzes to provide additional support and enhance learning in Mathematics
## Faculty of Science | Department of Mathematical Sciences

**Modules:** Mathematics (Bio) 124, Mathematics 176 & Mathematics 171
**Lecturer:** Ms Bessie Burger ejburger@sun.ac.za
**Blended Learning Coordinator:** Dr Ilse Rootman-Le Grange ilser@sun.ac.za

**Learning activity:**
Out-of-class learning

**Learning technology:**
Videos & quizzes

## Learning and assessment activities
### Learning and assessment activities

Videos were used in two different ways: they were uploaded on SUNLearn, accompanied by quizzes specifically for formative assessment, and they were used during face-to-face sessions.

The videos that the students accessed through SUNLearn outside of class were used for four different purposes:

- To provide an introduction to a new topic. A quiz consisting of three or four questions on the video content was also available to help the students assess their comprehension of the content before the contact session.

- To provide confirmation of content covered in face-to-face lectures, with additional examples and an accompanying quiz consisting of 10 to 12 questions on the content.

- To provide more difficult and complicated examples, followed by group discussions during face-to-face sessions.

- To provide immediate formative feedback. Students completed a quiz on SUNLearn as self-assessment and, once the quiz was closed, they could view a video explaining the correct solutions.

The videos that were used during face-to-face sessions were used in three different ways:

- At the end of a lecture to introduce a new topic for the next day.

- To introduce a specific mathematical challenge, followed by group discussions to analyse the approach.

- To share real-life mathematical applications with the students, followed by group discussions.

### Feedback practices
The SUNLearn quizzes were made available for one to two weeks, depending on the topic and the time spent on the topic in the lectures. The students were allowed two attempts per quiz and there was no time limit on their individual attempts.

Immediately after completion of an attempt, the students were able to see their grades and which questions they had answered correctly and which incorrectly. Only after the quizzes officially closed were the students able to see the correct answers to all the questions. At this stage, no specific detailed feedback was included in the quizzes.

### Student self-regulation
The lecturer did not use any conditional availability settings for the quizzes and there were thus no prerequisites that the students had to adhere to before they were able to attempt a specific quiz. This may be considered for the future to enable the creation of a more adaptive learning environment where students have more control over the pace of their learning. This would have to be managed very carefully, especially with first-year students, who depend very strongly on their lecturers to set the pace for their learning.

## Learning environment
### Learning setting
Learning took place both inside and outside of the classroom. All the learning activities (the videos and the quizzes) were loaded onto SUNLearn.

### Technology resources
Since the lecturer used existing video material from online sources, no additional technology resources were required.

### Support challenges
No issues were experienced with student access or support. The only obstacle was for those students who wanted to access videos off campus, as some of the videos were very slow to download and they were unhappy with the amount of data that the videos used. It is thus crucial for lecturers to ensure that the videos that they require their students to watch are not too long and that they give the students enough time to watch the videos on campus where they have access to the computer user areas and Maties Wi-Fi.

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# Combining videos and quizzes to provide additional support and enhance learning in Mathematics
## Faculty of Science | Department of Mathematical Sciences

3

**Modules:** Mathematics (Bio) 124, Mathematics 176 & Mathematics 171
**Lecturer:** Ms Bessie Burger ejburger@sun.ac.za
**Blended Learning Coordinator:** Dr Ilse Rootman-Le Grange ilser@sun.ac.za

## STUDENT EXPERIENCE
### Student feedback on the learning experience

At the end of each module, the students were asked to complete an electronic survey to give their feedback on how they experienced the use of the videos and quizzes in the modules. For Mathematics 124, there were 193 respondents and, for Mathematics 176, there were 42 respondents. From the SciMathUS students, 29 responses were received.

The students were asked to indicate on a given scale to what extent the videos and quizzes improved their understanding of the mathematical concepts. The majority of the respondents experienced the intervention as positive. The results are summarised in Tables 1 and 2 below.

Table 1: Summary of the Mathematics 176 and 171 students' perceptions of the extent to which the videos and quizzes improved their understanding of mathematical concepts

| | Not at all | Little | Quite a lot | To a great extent |
|---|---|---|---|---|
| **Mathematics 176** | 1 | 1 | 17 | 25 |
| **Mathematics 171** | 0 | 2 | 13 | 14 |

Table 2: Summary of the Mathematics (Bio) 124 students' perceptions of the extent to which the videos and quizzes, separately, improved their understanding of mathematical concepts

| | Not at all | Little | Quite a lot | To a great extent |
|---|---|---|---|---|
| **Videos** | 5 | 21 | 106 | 21 |
| **Quizzes** | 21 | 51 | 77 | 44 |

Feedback from an open-ended question in the survey supported this feedback, the students from all the groups being overwhelmingly positive. The students were asked for their opinions on the use of the videos and quizzes in the modules. From the feedback, four themes were identified. The first theme was around understanding concepts better. The students referred to how the videos and quizzes gave them the opportunity to revisit concepts that they had not grasped during the lectures.

"*Dit help om weer deur die werk te gaan indien jy dit nogsteeds na klas nie verstaan nie.*"["*It helps to go through the work again if you still don't*

*understand it after class.*"] (p. 17)

The second theme, which is linked to the first, is how the videos and quizzes helped the students to keep up to date with work and to prepare for lectures in advance. This was stressed more by the Mathematics 124 respondents than the 176 respondents, although both groups referred to this aspect.

"*Dit het ook baie gehelp omdat die module baie inhoud het wat in net 6 maande gedek moet word en dit het effektiewe hulp gebied buite klastyd.*" ["*It also helped because there is a lot of content in the module that has to be done in only 6 months and it provided effective help outside of class time.*"] (p. 37)

"*The videos helped me prepare for a lecture for the following day . . .*" (p. 225)

The third theme that the students referred to was around problem solving approaches. The videos introduced them to different approaches that could be used to solve the same problem, which the lecturer did not necessarily have time to explore during contact time. Also, when they struggled to solve a particular problem out of class time, they could watch a video on that concept and get an idea of how to approach the problem.

"*It is extremely helpful as it gives you another person's take on how to approach the concepts.*" (p. 66)

"*Dit help baie as 'n mens hersiening doen en nie seker is hoe om die som te doen nie en dan weer stapsgewys te sien wat om te doen.*" ["*It helps a lot when you're doing revision and aren't sure how to do the calculation and then to see again what to do step by step.*"] (p. 69)

The final theme that the students identified was around test and exam preparation. They said that the videos, but especially the quizzes, were a valuable revision tool that supplemented their class notes very effectively and gave them valuable feedback.

"*The quizzes are by far the best help that can be offered, because the*

# Combining videos and quizzes to provide additional support and enhance learning in Mathematics
## Faculty of Science | Department of Mathematical Sciences

4

**Modules:** Mathematics (Bio) 124, Mathematics 176 & Mathematics 171
**Lecturer:** Ms Bessie Burger ejburger@sun.ac.za
**Blended Learning Coordinator:** Dr Ilse Rootman-Le Grange ilser@sun.ac.za

*mistakes can be viewed afterwards. Notes can then be made further by the student. I also think that the quizzes and the videos go hand in hand."* (p. 4)

"*It gives a view of how questions could be asked.*" (p. 20)

"*Die videos help ongelooflik baie as jy dit reg gebruik . . . ek sou graag na ek geleer het vir 'n toets my boek vat en deur videos gaan wat oor alle werk handel [daarmee saam]*" ["*The videos help a tremendous amount if used correctly . . . after studying for a test I would like to take my book and go through videos that deal with all work*"] (p. 88)

## General
### Other concluding thoughts
Finding appropriate videos and creating videos that give students hints on how to approach problems rather than comprehensive solutions proved challenging. With regard to optimising contact time with the students, the videos proved very beneficial for introducing new content before class, providing the students with additional examples and material for the revision of concepts that were already covered in the contact sessions. Combining this with the quizzes allowed the students to evaluate their own understanding and get immediate formative feedback. In conclusion, both from a student and a lecturer perspective, the use of videos in combination with quizzes was a positive experience that enriched the teaching and learning environment in these modules.

# Addressing module challenges with online resources
## Faculty of Engineering | Department of Process Engineering

1

**Modules:** Chemical Engineering 344
**Lecturers:** Dr TM Louw tmlouw@sun.ac.za & Dr Lidia Auret lauret@sun.ac.za
**Blended Learning Coordinator:** Dr Moira Bladergroen mbladergroen@sun.ac.za

**Learning activity:**
Online learning opportunities

**Learning technology:**
Videos & quizzes

## Context
### Background
The third-year module of Chemical Engineering 344 has always been presented in a traditional lecture and tutorial environment. The class size for Chemical Engineering 344 was 61 students in 2015.

### Subject area
Chemical Engineering 344 focuses on the derivation and application of mathematical models from process information provided and process knowledge from previous undergraduate modules. The application of mathematical models includes the use of specialised software.

### Intended learning outcomes
After completion of the module, students are expected to:

- master the modelling and simulation of integrated process units through steady and unsteady state mass and energy balances;

- master process integration methodologies for optimal heat recovery; and

- master the development and solution of numerical optimisation problems in a chemical engineering context.

### Established practice
Before the blended learning intervention, the module consisted of three traditional lectures (in the form of chalk-and-talk with PowerPoint slides) per week and one tutorial session per week. The tutorial session focused on a specific paper tutorial handed out beforehand. The lecturers and student assistants were present during the tutorial session to assist the students. Afterwards, the student assistants marked the tutorials but, because of the large student numbers, the students received minimal feedback (in the form of only a mark). This limited feedback was usually available a few weeks after the completion of the tutorial session.

### The challenge
Three main challenges were experienced in the module that motivated the lecturers to adapt their existing teaching practices.

The first challenge was the gap that existed between the actual complexity of the topic material and the perceived complexity (by the students) of the topic material. Typically, the students became aware of the gap offline (i.e. not during the lectures or tutorials) and then required assistance to bridge the gap. To address this gap, the students needed to engage in active learning (i.e. they needed to attempt the problems actively instead of just following the monologues by the lecturers).

The second challenge was that formative and summative assessments needed to be feasible in terms of the resources required for setting and marking the assessments. The then current model of hardcopy tutorial setting, hardcopy tutorial submission and offline (manual) marking was consuming resources that could have been spent elsewhere. Addressing this problem would allow the module to scale with (potential) increasing class sizes.

The third challenge was the fact that teaching the use of software tools was not optimal combined with traditional teaching methods, i.e. the lecturers talked and demonstrated and the students listened. The students easily became lost and could not explore the software interface. Another approach was the lecturers and students engaging in the software at the same time, the lecturers guiding the entire class step by step. This approach was time consuming and inefficient, since different students have different learning rates.

### Advantages associated with the integration of technology
Technology was integrated into the module to address the specific challenges (complex concepts, assessment and software demonstration). With regard to the complex concepts, videos of theory application examples were made containing question and answer stops. Having the videos available ensured that the students could access the explanations and the built-in knowledge test any time that they needed to. The lecturers saved time by not presenting such theory application examples during traditional lecture times and by reusing the same videos every year.

With regard to the assessments, the use of automated assessments saved time and energy. Tutorials were created online with a question bank allowing for a large number of questions with easy extension of questions

UNIVERSITEIT STELLENBOSCH UNIVERSITY

# Addressing module challenges with online resources
## Faculty of Engineering | Department of Process Engineering

2

**Modules:** Chemical Engineering 344
**Lecturers:** Dr TM Louw tmlouw@sun.ac.za & Dr Lidia Auret lauret@sun.ac.za
**Blended Learning Coordinator:** Dr Moira Bladergroen mbladergroen@sun.ac.za

through changing numerical parameters in each. The online tutorials provided immediate feedback for the formative assessments and allowed for the automatic marking of the summative assessments.

With regard to the software demonstrations, videos were made that the students could access any time that they needed to and pause and proceed as they required while mastering the software themselves. The lecturers saved time by not presenting the software usage during the traditional lectures and by reusing the videos.

## Student overview
A total of 61 third-year Chemical Engineering students was enrolled in the module. The students had limited competence in the specialised software required and had access to the software only in the computer user areas on campus.

## Other relevant role-players
The student assistants still played a role after the integration of the technology. They were available to answer student questions during tutorial times and to assist with the marking of tutorials and tutorial tests when needed.

## Learning and assessment activities
### Educational approach
The blended learning strategy was evaluated in the light of two theoretical frameworks: the transactional distance theory (Moore, 1993) and the four approaches to learning in the engineering context (Case & Marshall, 2007). The transactional distance theory was used to analyse the students' engagement with the online resources and to identify opportunities and threats to learning, which could include mobility, structure and dialogue. The potential for online resources to shift student learning, as defined by Case and Marshall (2007), was also investigated.

### Learning and assessment activities
The students were provided with two sets of instructional videos. The first set contained videos with worked-out examples and question stops. The second set contained videos with software demonstrations. Online quizzes provided the students with hints and immediate feedback. Four of these

online tutorials were available to the students on SUNLearn.

## Feedback practice
During the online tutorials, the students were provided with multiple hints per question. They received immediate feedback on whether their answers were correct or not. The feedback also contained an explanation of how the final answer could be determined. Immediately after an entire tutorial was completed, the students received feedback on their marks and a second opportunity to take the quiz.

## Student self-regulation
During the online tutorials, the students had the opportunity to respond to the feedback received by retrying questions or the entire quiz.

## Examples



Figure 1: A worked-out example from instructional video set 1

# Addressing module challenges with online resources
## Faculty of Engineering | Department of Process Engineering

**Modules:** Chemical Engineering 344
**Lecturers:** Dr TM Louw tmlouw@sun.ac.za & Dr Lidia Auret lauret@sun.ac.za
**Blended Learning Coordinator:** Dr Moira Bladergroen mbladergroen@sun.ac.za

### Simulink for dynamic modelling: Demonstrations

Preview | Edit | Reports | Grade essays

#### Demo 5: Multiple ODEs

This demonstration considers a more complex dynamic model, with two ODEs.

Simulink aspects covered in this demonstration include:

- Product
- Math function
- MATLAB function

The system under consideration is a CSTR with an inhibitor; read more about the system at the following link:

CSTR with inhibitor

The ODEs for this system are given by:

$$\frac{dC_I}{dt} = \frac{1}{V}(FC_{I0} - FC_I)$$

$$\frac{dC_A}{dt} = \frac{1}{V}\left(FC_{A0} - FC_A - \frac{VkC_A}{1 + k_I C_I^2}\right)$$

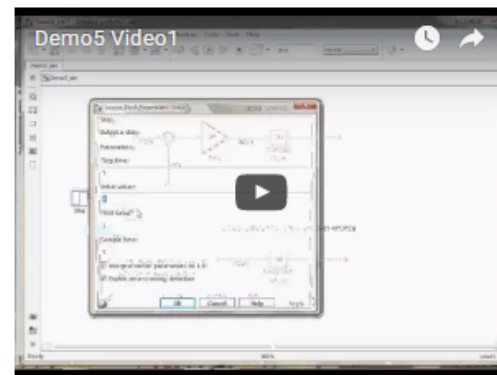The parameters and input conditions can be found in the link above.

Video 1:



Figure 2: A software demonstration from instructional video set 2

To validate the accuracy of the discrete-time model, you need to create a validation model. In a new Simulink file, create a new Simulink model which contains the $c_{A,in}$ generator and the non-linear model, but with an end time of 300 time units. Using the regression coefficients calculated in part d), determine the predicted $c_{A,m}$. Compare the predicted $c_{B,m}$ with the actual $c_{B,m}$ by calculating the sum of squared errors between predicted and actual $c_{B,m}$. Now determine the optimal coefficients and optimal delay D by repeating the above steps for a range of delays between 0 and 20. You can do this by hand, or create a for-loop in MATLAB. Remember that the regression coefficients need to be re-estimated every time you change the delay!

Answer:

Check

To validate the accuracy of the discrete-time model, you need to create a validation model. In a new Simulink file, create a new Simulink model which contains the $c_{A,in}$ generator and the non-linear model, but with an end time of 300 time units. Using the regression coefficients calculated in part d), determine the predicted $c_{A,m}$. Compare the predicted $c_{B,m}$ with the actual $c_{B,m}$ by calculating the sum of squared errors between predicted and actual $c_{B,m}$. Now determine the optimal coefficients and optimal delay D by repeating the above steps for a range of delays between 0 and 20. You can do this by hand, or create a for-loop in MATLAB. Remember that the regression coefficients need to be re-estimated every time you change the delay!
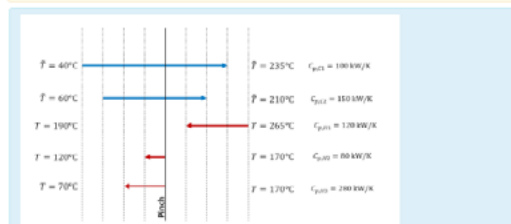
Answer: 5

Check

See below for an example of how a discrete-time dynamic model can be constructed in Simulink. This will be required as part of validating the model.
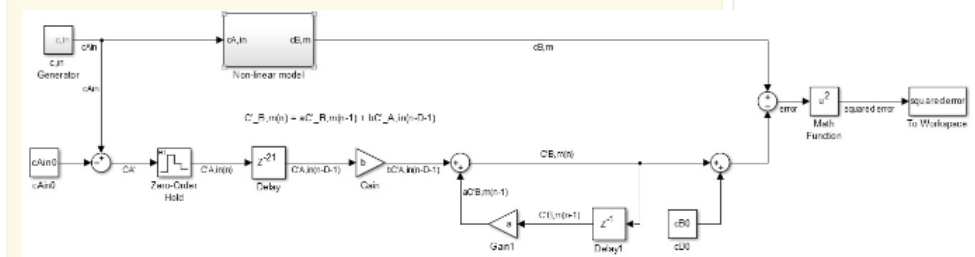


Try again



Consider the region above the pinch. Which cold streams (and in what order as you move away from the pinch) should stream H1 preferably be matched with?

Select one:
- a. H1-C1 only
- b. H1-C2 only
- c. H1-C2, followed by H1-C2
- d. H1-C2, followed by H1-C1 ✓
- e. H1 shouldn't be matched with any of the cold streams.

Check

Your answer is correct.

Above the pinch, and close to the pinch-point temperature, streams should be matched such that the total heat capacity of the hot stream is smaller than the total heat capacity of the cold stream:

$$C_{p,H} < C_{p,C}$$

Thus, H1 ($C_p$ = 120 kW/K) should first be matched with C2 ($C_p$ = 150 kW/K).
This restriction can be relaxed further away from the pinch, when a larger temperature difference exists between the hot and cold streams. Away from the pinch, it is safe to match H1 with C1 ($C_p$ = 100 kW/K), as long as the temperature of H1 stays greater than the temperature of C1.
The correct answer is: H1-C2, followed by H1-C1

Figure 3: An online tutorial question, a hint and feedback

# Addressing module challenges with online resources
## Faculty of Engineering | Department of Process Engineering

4

**Modules:** Chemical Engineering 344
**Lecturers:** Dr TM Louw tmlouw@sun.ac.za & Dr Lidia Auret lauret@sun.ac.za
**Blended Learning Coordinator:** Dr Moira Bladergroen mbladergroen@sun.ac.za

## LEARNING ENVIRONMENT
### Learning setting
Learning took place during traditional lectures, traditional tutorials and online tutorials.

### Collaborative setting
No collaborative activities were explicitly designed for this learning activity but the students spontaneously formed groups and tended to work together during tutorials and assignments.

### Technology resources
SUNLearn was used as the platform for the online quizzes, videos and all other module content. The videos were recorded with CamStudio and then loaded onto YouTube. The students could view the YouTube videos free of charge when using the campus internet.

The videos were integrated as part of the lesson structures in SUNLearn. This allowed the creation of a step-by-step (page-by-page) presentation of the videos. Each page contained some introductory text along with the video and links to the previous page, the next page and the overall lesson outline.

Mathematical model development and Laplace domain analysis: worked example

Preview   Edit   Reports   Grade essays

Contents

The lesson is composed of four sections.
You can jump to the first page in each section from here.
You can also navigate to any page using the block to the left.

A) Background and model formulation (4 videos)

B) Simplification, linearization, and deviation variables (3 videos)

C) Laplace transform and block diagrams (3 videos)

D) Laplace domain analysis and review (2 videos)

Figure 4: A lesson outline

### Support challenges
The specialised software (MATLAB and Simulink) required for this module was available only in the computer user areas. This seriously impeded learning from home.

One challenge experienced with the SUNLearn platform was the inability to create look-up table type numeric quiz questions. The idea behind such a question type is the following: A question is created with one or more variable parameters, e.g. a and b. The parameters can take a range of values, e.g. a in the range of 1 to 5 and b in the range of 3 to 7. When a specific student accesses this question, random values for a and b are presented as part of the question. The student then calculates the answer to the question using her or his unique a and b values and the answer is entered in the quiz. Based on pre-calculated answers, the answer (e.g. a value for y) can then be verified as correct or incorrect. This functionality is available in SUNLearn only if the answer can be written as an explicit formula of a and b, e.g. $y = 4*a + \sin(b)$. However, for more complex problems (as is typical in Chemical Engineering 344), no explicit formula exists. For the ranges of a and b, all y values can be generated. The requirement to present such a question in an online quiz is then some form of look-up table: given the specific a and b, look up the pre-calculated correct answer for y.

The SUNLearn technical team was contacted on numerous occasions and the problem was explained numerous times but no solution was found.

## Student experience
### Student feedback on the learning experience
The students completed online surveys and engaged in a focus group discussion, during which they were asked for feedback on the theoretical concepts identified by Moore (1993) and Case and Marshall (2007). When asked about the transactional distance of the learning experience, the students stated that engaging online did not create a barrier between them and the lecturers or the content; the videos did, in fact, create a sense of interaction with the lecturers, possibly because the lecturers' voices could be heard and their facial expressions could be seen. The students highlighted the fact that personal interaction remained important. They also felt that the online resources enabled them to equip themselves to solve problems on their own before going to the lecturers to ask for help.

# Addressing module challenges with online resources
## Faculty of Engineering | Department of Process Engineering

5

**Modules:** Chemical Engineering 344
**Lecturers:** Dr TM Louw tmlouw@sun.ac.za & Dr Lidia Auret lauret@sun.ac.za
**Blended Learning Coordinator:** Dr Moira Bladergroen mbladergroen@sun.ac.za

They were then able to ask fewer but more important questions, therefore actually increasing their level of interaction with the lecturers and student assistants.

When asked about the four approaches, the students felt that the online tutorials assisted them in understanding concepts and procedures. One student stated the following:

"*It did not necessarily increase the amount I learned, but the quality of that learning . . .*"

The students felt that the online tutorials enabled them to identify problem areas quickly when learning new concepts before engaging in the procedures. The videos and online tutorials were generally very well received by the students.

## General
### Opportunities
The online tutorials optimised student-to-student and student-to-lecturer interaction. After engaging in the online tutorials, the students asked the right questions, which were often those not covered by the hint system built into the online tutorial quizzes. The immediate feedback saved time and built the students' confidence. The videos and quizzes (with the hint system) exemplified a thought system that helped to build conceptual and procedural understanding.

### Challenges
Although the integration of online tutorials significantly decreased time spent marking and loading marks onto the system, the lecturers did experience an increase in preparation time. Creating the videos and online tutorials took a lot of time but there was the opportunity to reuse the material on a year-on-year basis or, at least, simply to update the material.

### Advice
Effective use should be made of the assistants' time. The lecturers could easily prepare offline document tutorials (or have them already available), which the assistants could then translate to online tutorials. Online tutorials are an effective summative assessment tool that saves a lot of time on

marking. Demi hours could be leveraged in terms of the online tutorials.

### Reference list
Case, J. & Marshall, D. 2007. Between deep and surface: Procedural approaches to learning in engineering education contexts. *Studies in Higher Education*, 29(5):605–615.

Moore, M.G. 1993. Theory of transactional distance, in Keegan D. (ed.). *Theoretical principles of distance education*. New York: Routledge.

# In-time teaching through videos in practical Electrical Engineering
## Faculty of Engineering | Department of Electrical and Electronic Engineering

1

**Modules:** Design Engineering 344
**Lecturer:** Prof Johan de Swardt deswardt@sun.ac.za
**Blended Learning Coordinator:** Dr Moira Bladergroen mbladergroen@sun.ac.za

**Learning activity:**
Assistance with practical

**Learning technology:**
Videos

## Context
### Background
Design Engineering 344 is a third-year course in Electrical and Electronic Engineering. All students receive the same assignment at the beginning of the semester. They have to make their own unique design, which includes the process, analysis, simulation, building, testing and documentation of the design.

### Subject area
Design Engineering 344 is a design course in Electrical and Electronic Engineering. The students are expected to use the knowledge of their undergraduate courses to design, analyse, simulate, build and test a prescribed electronic circuit.

### Intended learning outcomes
The students have to design a practical circuit for specific non-ideal effects of electronic components. They have to develop software and learn the concept of version control and software testing. A microprocessor is used to set and read parameters from the practical circuit. The students have to develop the microprocessor software and learn the concept of version control and software testing.

### Established practice
The design course is a practical module that gives the students the opportunity to apply the knowledge that they gained over the first three years of their engineering degree. Different aspects of design, component characteristics, analysis tools and software are applied to a real-world electronic circuit.

### The challenge and possible advantages associated with the integration of technology
The main challenge was the fact that the students struggled to use their undergraduate knowledge in practical problems because this is usually not explained by the theory of ideal systems. It is important that students be shown these possible problems in a practical manner; the measurement setup for such a demonstration is relatively complicated, however, and entails a great deal of electronic equipment. The amount of information is

such that they watched the video more than once to grasp the idea. The information was then available in the moment that the students struggled with the problem and not beforehand in an information session.

Measurement results of practical electronic circuits have to be conveyed to students while the difficulties that may be encountered are explained. If videos are used to demonstrate these practical measurements of non-ideal electronic circuits, the students see results that are very difficult to explain in theory.

### Student overview
The course had 101 third-year Engineering students in their second semester.

### Other relevant role-players
Competent master's and doctoral students with experience in analogue electronic circuits and computer programming assisted during the practical sessions of the course.

## Learning and assessment activities
### Learning and assessment activities
The students have to create an open-ended design with more than one solution and write reports as they progress with their design. Every week, a topic is discussed to assist them with their progress. The videos were related to that week's discussion on possible problems. During their design of a specific electronic circuit, the students encounter unexpected results because of the non-ideal nature of the circuits; the videos provided information that enabled them to understand the measurements and how to adjust their design for the correct outcome. After each assessment, the students write a report on their findings.

### Feedback practices
The students' written reports are graded and returned to them. They are graded by looking at the general design of the circuits and the presentation of the results. This is a simple 1-to-4 scale of grading. The reports do not count for the final mark but give some idea of what is expected. The turnover time is less than a week.

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# In-time teaching through videos in practical Electrical Engineering
## Faculty of Engineering | Department of Electrical and Electronic Engineering

2

**Modules:** Design Engineering 344
**Lecturer:** Prof Johan de Swardt deswardt@sun.ac.za
**Blended Learning Coordinator:** Dr Moira Bladergroen mbladergroen@sun.ac.za

Learning activity:
Assistance with practical

Learning technology:
Videos

## Learning environment
### Learning setting
The practical section of the course takes place in an engineering electronics laboratory that can host 180 students. Each student's electronic station is equipped with an online computer, power supply, signal generator and oscilloscope. The videos were posted on the SUNLearn website and the students could use the lab computers to access them.

### Collaborative setting
The students work in the laboratory at the same time and are welcome to discuss problems with each other but they all have to do their own assessment activities. The tutors are available to assist with any theoretical or practical questions.

### Content resources
All relevant information is available on SUNLearn. The students are required to access the content of all previous courses.



Figure 1: Students working on electronic circuits in the lab

## Support challenges
Each student has a unique design and the tutors first have to understand each circuit before being able to help the student. This is a time-consuming process.

## Student experience
### Student feedback on the learning experience
The student feedback was collected at the end of the module. Students who encounter practical problems with electronic circuits normally think that their problem is unique and unexplainable. They were therefore surprised to find that the video explanations solved most of their problems. The feedback was mostly positive; 85% of the students said that the videos saved them time when doing the assessment activity. The students also advised that the videos be used in future courses.

### Assessment impact
The videos enabled the students to obtain the knowledge that they needed to deliver a better electronic design. Both the students and the tutors were able to assess problem areas effectively where there was a lack of knowledge.

## General
### Opportunities
The design course has a new topic each year. Each topic has its own new set of problems. There is the opportunity to create videos each year until there is a large set to choose from for a new topic.

### Challenges
Good videos need the correct balance of information, script and audio, which is difficult to obtain if one is not a professional video designer. The videos made by the lecturers, however, were still more than sufficient for the purposes of teaching and learning.

### Other concluding thoughts
It is worthwhile to try new techniques in teaching and learning but it is important to obtain early feedback from students on the value of the effort.

# Using instructional videos for the laboratory sessions of Control Systems 354

Faculty of Engineering | Department of Mechanical and Mechatronic Engineering

**1**

**Module:** Control Systems 354
**Lecturer:** Mr Karel Kruger kkruger@sun.ac.za
**Blended Learning Coordinator:** Dr Moira Bladergroen mbladergroen@sun.ac.za

## Context

### Background

The module Control Systems 354 is facilitated by the Department of Mechanical and Mechatronic Engineering.

### Subject area

The module focuses on the theory and application of control systems for typical engineering systems and processes. The module consists of theory (lectures, tutorials and tests) and laboratory sessions – the latter being the focus of this case study.

### Intended learning outcomes

The module aims to equip students with an understanding of the control theory and the implementation of the theory in real-world applications.

### Established practice

For the laboratory sessions, all instructions (for the setting up of the equipment and the steps of the assignment) were previously presented as documents. Students were required to study the documents, which were published online, prior to the laboratory sessions. The documents presented step-by-step guidance for the setting up of the laboratory equipment and could thus be consulted during the sessions.

### The challenge

The setting up of the equipment for the laboratory sessions requires a large quantity of information for both the step-by-step instructions and for the explanation of the role and workings of each component. The challenges lie with the conveyance of this information to students in a manner that is clear and understandable. The description of the laboratory setup relies on visual clarification, which is limited when using a static picture in a document – the pictures become too detailed when adding the necessary labels. Also, the back-and-forth between the lengthy descriptions and the pictures hinders the coherence of the explanations.

### Advantages associated with the integration of technology

The integration of video technology, as is the case with the laboratory sessions, enriches the medium of information transfer. The use of screen captures and camera footage provides visualisation of all the steps required for the setting up of the equipment. This is accompanied with a narration that conveys the detailed information required to understand the workstation fully. The videos provide the students with an opportunity to replay, pause or rewind; the students can then learn at their own pace.

### Student overview

The module is taken by third-year Mechanical and Mechatronic Engineering students. In 2015, the class consisted of 195 students, of whom 160 were non-repeating students. In previous years, the general feeling among students was that they felt they understood very little of what was being done during the laboratory sessions and therefore did not feel that the sessions added much value to their experience of the module.

### Other relevant role-players

The laboratory sessions are facilitated by a lecturer, who is assisted by a laboratory technician and a student assistant. Their responsibility covers the answering of questions related to both the hardware and the theory involved in the sessions.
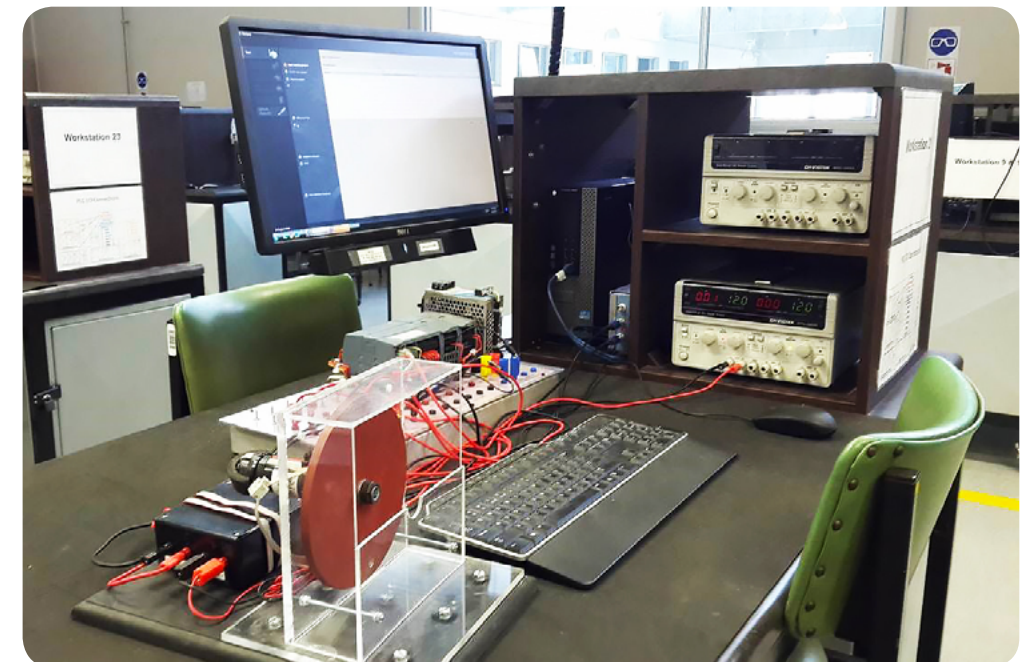


Figure 1: Equipment available at each workstation in the laboratory

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# Using instructional videos for the laboratory sessions of Control Systems 354
## Faculty of Engineering | Department of Mechanical and Mechatronic Engineering

**Module:** Control Systems 354
**Lecturer:** Mr Karel Kruger kkruger@sun.ac.za
**Blended Learning Coordinator:** Dr Moira Bladergroen mbladergroen@sun.ac.za

Learning activity:
Practical assistance

Learning technology:
Videos

## Learning and assessment activities
### Learning activities
The students were required to complete three laboratory sessions utilising the same practical setup for each session but covering different parts of the theory. The students were divided into two groups, alternating among the sessions in subsequent weeks. Two videos, which could be used during preparation for the sessions, focused on the description of the setup and a demonstration of its working. Two more videos, which could be used during the sessions, provided instructions for setting up the laboratory equipment.

### Assessment activities
The laboratory sessions were assessed through a design report that was submitted by each student. The report consisted of the work done during the laboratory sessions and the interpretation of the results, based on the students' theoretical knowledge.

### Feedback practices
The students received feedback during some of the usual module lectures.

### Student self-regulation
The lecturer was available for questions regarding the laboratory sessions before and after lectures and after the laboratory sessions.

## Learning environment
### Learning setting
The sessions were held in the mechatronics laboratory of the Department of Mechanical and Mechatronic Engineering. The laboratory was equipped with 22 workstations on which the equipment for the sessions were set up. The videos were made available online before the first laboratory session and remained available throughout the semester.

### Collaborative setting
Due to the limited number of workstations and module contact time, the students were divided into groups of two, these pairs of students then working together at the workstation.
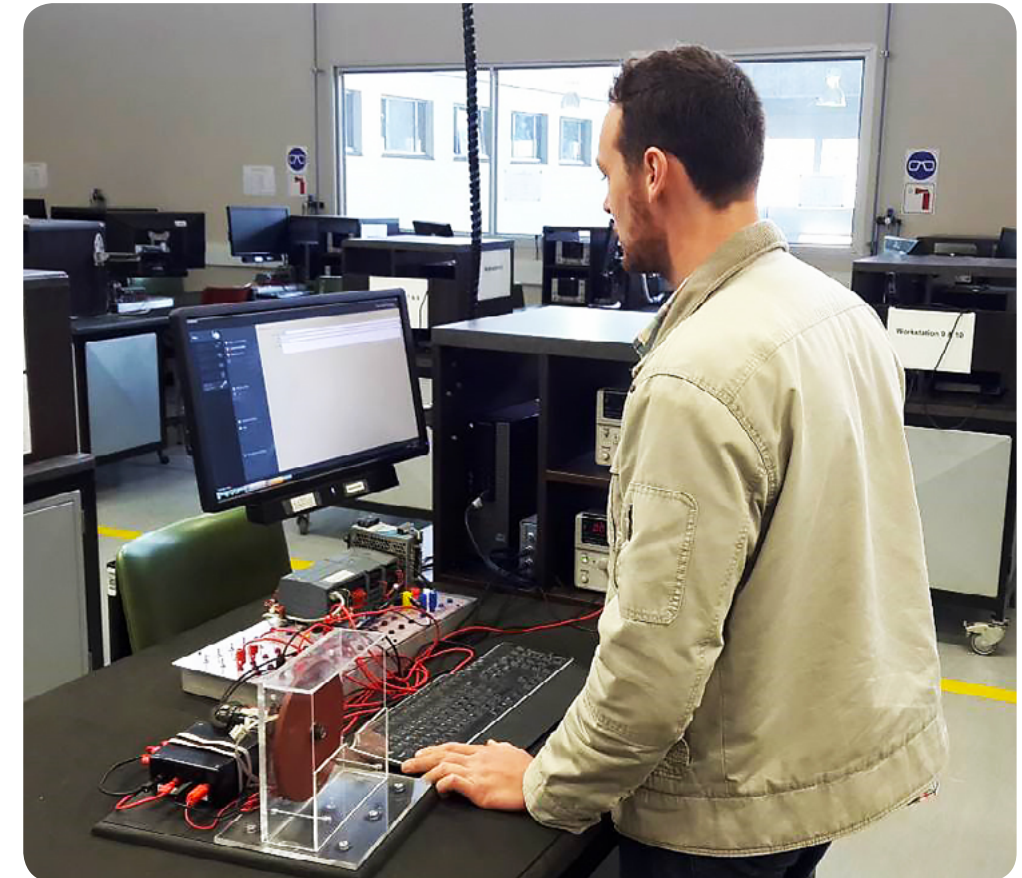


Figure 2: A student working at the workstation in the laboratory

### Technology resources
The students had access to the videos via SUNLearn and also used the facility to upload their work after each session was completed.
The videos were created using Camtasia video editing software. The software was used to integrate graphical information (in slide form), screen and camera recordings and voice narrations.

## Student experience
### Student feedback on the learning experience
A formal feedback survey was done on the student experiences with the implementation of the information and communications technology. The

UNIVERSITEIT STELLENBOSCH UNIVERSITY

# Using instructional videos for the laboratory sessions of Control Systems 354

## Faculty of Engineering | Department of Mechanical and Mechatronic Engineering

**Module:** Control Systems 354
**Lecturer:** Mr Karel Kruger kkruger@sun.ac.za
**Blended Learning Coordinator:** Dr Moira Bladergroen mbladergroen@sun.ac.za

feedback showed that the majority of the students found that the videos added value to their learning experiences. The statistics of the number of views per video also indicated that the majority of the students watched all the videos, sometimes more than once.
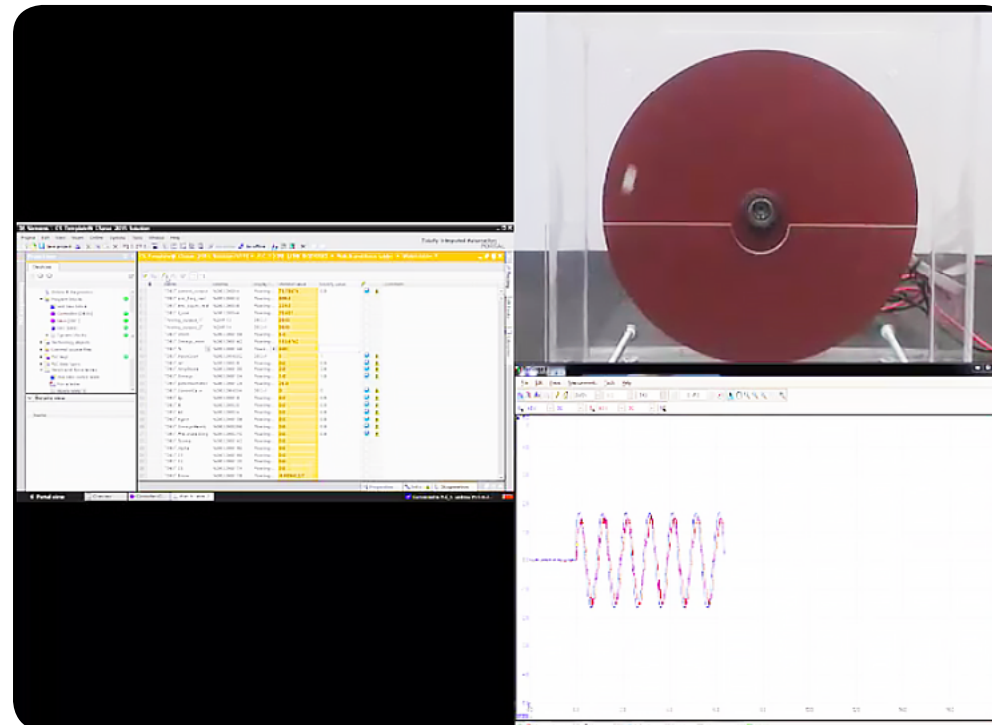


Figure 3: Screenshot of one of the videos available to students during laboratory sessions

## General
### Opportunities
The general impression is that the videos helped the students to get going with the laboratory work much faster than in the past. With the students spending less time on setting up the equipment, they could spend more time on understanding the work done during the sessions. This led to more insightful questions asked by the students during the sessions.

### Challenges
The greatest challenge lies in the quantity of information that must be conveyed. A balance must be found between providing the students with the detail for a complete understanding of the setup and making the videos short enough so as not to overwhelm them. The videos also take a long time to produce and it furthermore seems that some students still remain reluctant to utilise the resources provided because they are not obliged to do so.

### Advice
Time must be taken to analyse the material and identify the parts of the work that are critical to understanding the module and that lend themselves to implementation with a selected technology.
To motivate students to watch the videos, it might be effective to have "access tests" to the laboratory sessions. This could entail the students answering one or two questions about the content of the videos. The students who answer the questions correctly in two attempts gain access to the session, while those who do not answer the questions correctly have to watch the videos and then retry the questions to gain access to the session.

# Using interactive online lessons to facilitate learning in Anatomy: Life Forms and Functions 111
## Faculty of Medicine and Health Sciences | Department of Anatomy

1

**Module:** Life Forms and Functions 111
**Lecturer:** Mrs Mandi Alblas aa2@sun.ac.za
**Blended Learning Coordinator:** Mr Alex Keiller avkeiller@sun.ac.za

## Context
### Background
The teaching load on lecturers in the interdisciplinary phase at the Faculty of Medicine and Health Sciences is high due to various factors. The lecturer teaching the Life Forms and Functions 111 module is among this group, which has a large volume of work to cover within the first semester.

A major problem that has been identified is that the first few weeks of the module consist primarily of the revision of the biology content from Grades 8 to 12. This is due to a lack of recall of this secondary school content and the need to establish an equal foundation for all the students in the various undergraduate courses. Since this happens at the start of the module, the responsibility and pressure to get the students on par with the content lie primarily with the lecturer of Life Forms and Functions 111.

### Subject area
Interdisciplinary Health Sciences

### Intended learning outcomes
The main focus of the learning activities discussed in this case study is to get all students on the same knowledge level before they start their undergraduate courses.

### Established practice and challenges
Certain topics within the module consist of joint classes of mainstream and extended degree programme (EDP) students. These classes are presented using primarily acquisition, with some practice, as the modes for both teaching and learning (Laurillard, 2012). Assessments are administered online using SUNLearn. With an average of 350 students to teach, the pressure on the lecturer is immense.

The EDP students had extra classes, in which the inquiry mode of teaching and learning was adopted. The students completed exercises in groups by reading through the notes provided; the group assignments were marked by the lecturer, with assistance from Anatomy postgraduate students.

Even though online assessment feedback was available immediately, feedback on the group assignments was not, as the assignments had to be marked manually. This increased the pressure on the lecturer and delayed the learning process of the EDP students.

### Advantages associated with the integration of technology
The Shareable Content Object Reference Model, in this case, iSpring, refers to a software application that is used for online teaching and learning. iSpring allows lecturers to convert their PowerPoint slides into interactive lessons with quizzes, videos and images. iSpring lessons can be set in such a way as to allow the lessons to adapt to the students' level of understanding as opposed to the students trying to keep up with the lessons. When uploaded to a learning management system, such as SUNLearn, iSpring lessons also generate detailed reports of the student interactions with the lessons.

Previously, the EDP students worked in groups on assignments that covered content, finding the answers in the content handouts that they received in class. By adding the use of technology and thus enabling the students to do these assignments online, the students are now able to receive feedback and marks immediately, and review their submissions immediately.

### Student overview
The Life Forms and Functions 111 module students come from the Medicine, Physiotherapy and Human Nutrition first-year classes. The student group concerned consisted of 366 mainstream programme students and 44 EDP students.

## Learning and assessment activities
### Educational approach
Three ways of learning (Laurillard, 2012) were identified: acquisition, where learners read, listen to or watch an explanation of their teachers' model actions; inquiry, where learners are prompted to investigate resources that reflect the concepts and ideas being taught; and practice, where learners use their developing concepts to improve their actions. These three ways of learning were applied to understand the way in which the students interacted with the learning technologies in this module.

### Learning and assessment activities
Four iSpring lessons, one for every week or topic covered in class, were

# Using interactive online lessons to facilitate learning in Anatomy: Life Forms and Functions 111
## Faculty of Medicine and Health Sciences | Department of Anatomy

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**Module:** Life Forms and Functions 111
**Lecturer:** Mrs Mandi Alblas aa2@sun.ac.za
**Blended Learning Coordinator:** Mr Alex Keiller avkeiller@sun.ac.za

created as self-study materials to assist the students. Each iSpring lesson was made available after the lecture. The first four lessons were conducted as a pilot study, with the intention of rolling the technology out to the module on a larger scale, depending on the outcome of the initiative. The initial iSpring lesson (Cytology) was made available to the entire class and the three other lessons (Organismic Kingdoms, Embryology and Histology of Primary Tissue) were made available only to the EDP students.

No availability restrictions were placed on any of the lesson activities, which included an unlimited number of attempts. The students could pause the lessons and return to them at a later stage.

## Feedback practices and student self-regulation
Previously, the students had to wait a week before they received any kind of feedback. With the iSpring lessons, the students received feedback on their activities immediately. They could implement the feedback immediately and re-attempt the lessons. The lessons were created as self-study opportunities and therefore did not count towards the students' module marks.

# Learning environment
## Learning setting
Learning took place online on SUNLearn. The iSpring lessons were made available to the students at the start of a new topic. The students completed their lessons in their own time over a predetermined period.

## Content resources
iSpring allows content slides to be added to the iSpring lessons. Students can master the content and then immediately move on to the assessment phase of the lesson. Content can be added in the form of voice notes, text, videos and links to external webpages.

The students were also provided with diagrams in which they could identify the location of cells and important philological aspects more easily.

## Technology resources
iSpring, part of Microsoft PowerPoint, was the main technology resource.

## Support challenges
The need for assistance with the first lesson was greater than the lecturer anticipated. She therefore decided to note and address these issues in future opportunities of this nature for the full class, with further analysis of the initiative in the smaller EDP group. Since the EDP class consisted only of 44 students, any queries or problems could be managed more easily.

# Student experience
## Student feedback on the learning experience
No formal feedback was obtained from the students but the lecturer did receive numerous verbal requests for more of these types of activities.

## Assessment impact
Most of the students attempted and completed the first lesson activity. What was encouraging was the fact that some students had made multiple attempts and had used the iSpring lesson as a means of studying for the early assessment quiz in March. Even though this was the only iSpring lesson that the mainstream students had, their feedback to the lecturer requested more interactive self-study lessons. Out of the 387 students who had access to this iSpring lesson, 374 completed their first attempt. There were only five incomplete attempts and eight students who did not attempt the iSpring lesson.

# Using interactive online lessons to facilitate learning in Anatomy: Life Forms and Functions 111

## Faculty of Medicine and Health Sciences | Department of Anatomy

**Module:** Life Forms and Functions 111
**Lecturer:** Mrs Mandi Alblas aa2@sun.ac.za
**Blended Learning Coordinator:** Mr Alex Keiller avkeiller@sun.ac.za
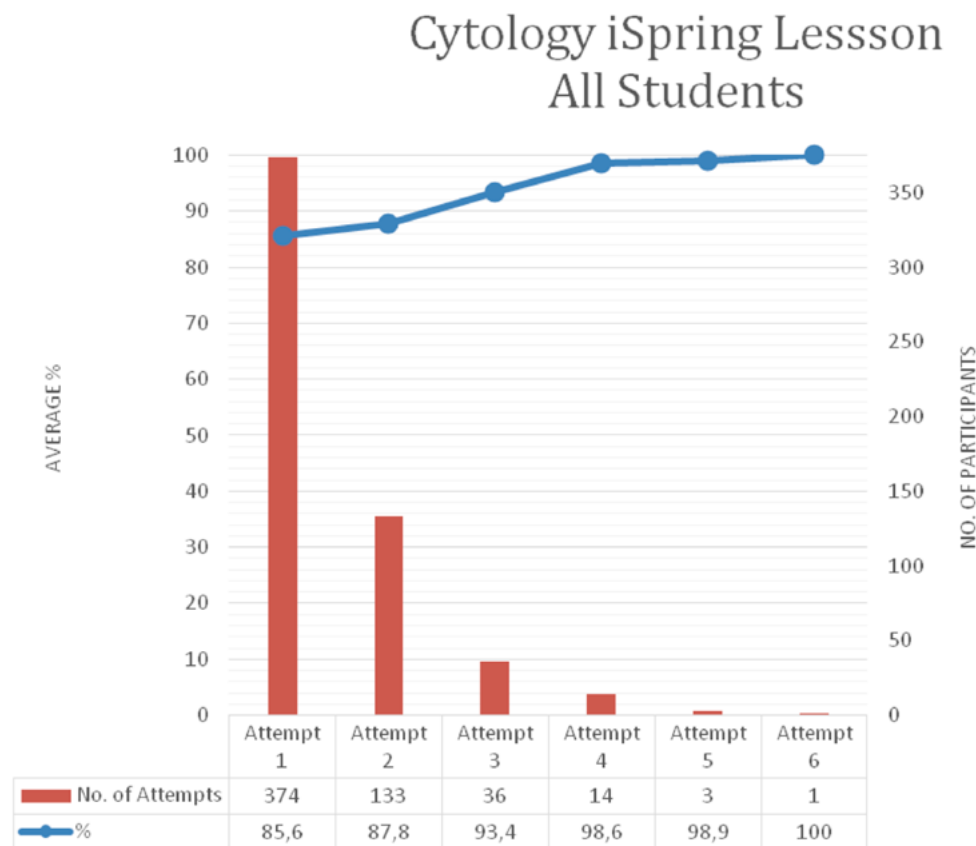
Figure 1: Marks for the Cytology iSpring lesson for all the students

The EDP students also enjoyed the Cytology iSpring interactive lesson and, like the mainstream students, used this as part of their preparation for the early assessment quiz. Although there were no significant changes to the marks of the assessment compared to previous years, the lecturer did notice that the students' understanding of the content had improved. She was also able to view student participation and identify problem areas by the way that the students performed in the lesson.

Students were given the opportunity to work in groups, as in previous years. The majority of the EDP students, however, preferred to work on their own and at their own pace.

Although fewer multiple attempts in the Organismic Kingdoms iSpring

lesson (Figure 2) were made compared with the Cytology iSpring lesson, it was still encouraging to notice that most of these attempts were made just before the early assessment quiz. All the EDP students completed their first attempts, as can be seen in the figures below.
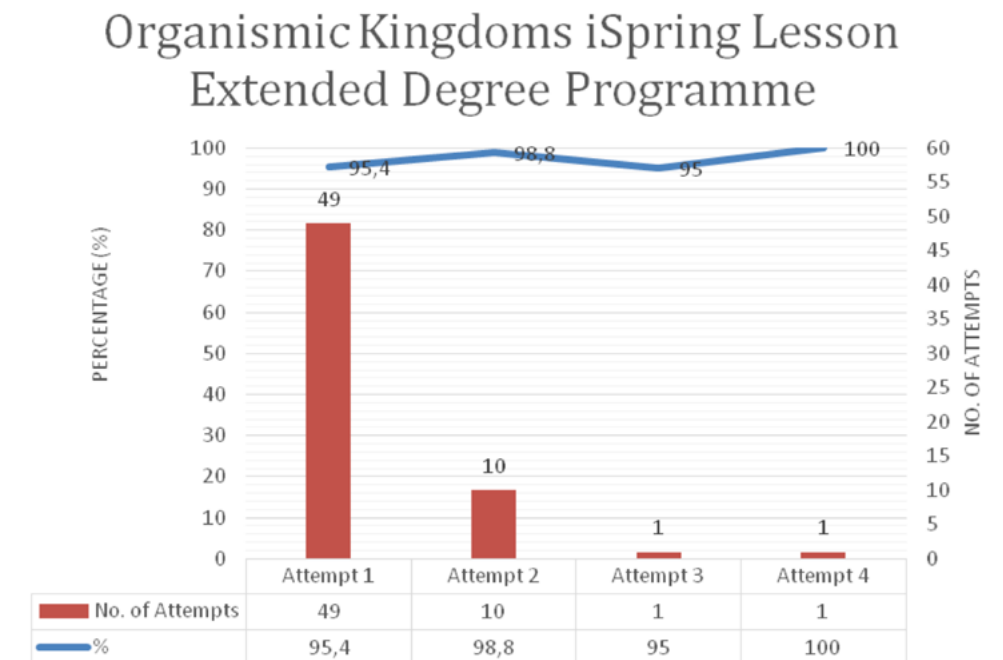


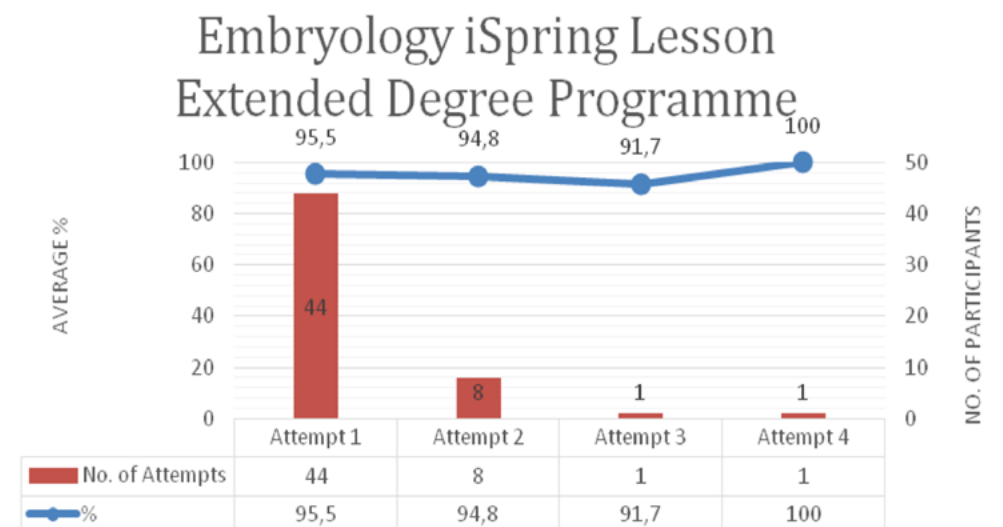Figure 2: Marks for the Organismic Kingdom iSpring lesson for the EDP students



Figure 3: Marks for the Embryology iSpring lesson for the EDP students

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# Using interactive online lessons to facilitate learning in Anatomy: Life Forms and Functions 111
## Faculty of Medicine and Health Sciences | Department of Anatomy

4

**Module:** Life Forms and Functions 111
**Lecturer:** Mrs Mandi Alblas aa2@sun.ac.za
**Blended Learning Coordinator:** Mr Alex Keiller avkeiller@sun.ac.za

Learning activity:
Interactive lessons

Learning technology:
iSpring

Figure 4: Marks for the Histology Primary Tissue iSpring lesson for the EDP students

## General
### Opportunities
Since the Department of Anatomy will be renewing its curriculum in 2017, this is still an ideal time to plan and create more content using iSpring lessons. The starting point for this is to use iSpring to create interactive self-study lessons that help students to review the high school content that they need to know for the module.

### Reference list
Laurillard, D. 2012. Teaching as a design science: *Building pedagogical patters for learning and technology.* New York: Routledge.

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# Enhancing student collaboration through a Google suite
## Faculty of Arts | Department of Drama

1

**Module:** Theatre Arts 178
**Lecturer:** Dr Rufus Swart rswart@sun.ac.za
**Blended Learning Advisor:** Dr Faiq Waghid faiq@sun.ac.za

**Learning activity:**
Collaborative student presentations

**Learning technology:**
Google Suite

## Context
### Background
The Stellenbosch University Drama Department's annual intake usually amounts to about 50 students in the acting stream. Having been responsible for the module since 2011, the lecturer describes the module as an essential component in the development of a drama student.

### Subject area
In this module, students are introduced to a number of key theories relating to the works of various 20th century theatre practitioners. These renowned practitioners include the foremost acting teachers of the last century and their ideologies.

### Established practice and challenges
Initially, the lecturer made use of traditional pedagogies through which he conveyed the content pertaining to the theatre practitioners. He felt, however, that he was not doing justice to the content and not allowing his students the time to internalise what was covered in class meaningfully. This experience is shared by many lectures in the Stellenbosch University context. Lecturers are often constrained by a lack of teaching time, having to convey large volumes of content to students in small timeframes, a problem that the lecturer encountered in the offering of his module. Being allocated a single period per week left little opportunity for him to engage with his students meaningfully around the theories of the aforementioned practitioners.

### Advantages associated with the integration of technology
After consultation with the Faculty advisors operating in the Faculty of Arts' Teaching and Learning Hub, the lecturer was advised to try a blended mode of delivery, as his traditional pedagogies were being constrained by time. After many consultations with the Teaching and Learning Hub of other faculties and enrolling for the blended learning short course offered by the Centre for Learning Technologies at the University, it was decided that a blended learning approach would not only address the problems that the lecturer had with time but also create opportunities for more engaging forms of learning for his students both within and beyond the confines of the lecture hall.

Learning through capitalising on the strengths of face-to-face and online learning experiences engendered learning through acquisition and through inquiry, discussion, collaboration, practice and production (Laurillard, 2012). In this way, the students could also assume responsibility for their own learning.

The tools that best facilitated such a learning experience was the Google collaboration suite, a free tool that shares many high-end features with the far more expensive Microsoft Office Suite.

### Other relevant role-players
The lecturer engaged with the Centre for Teaching and Learning representative and the Faculty librarian for advice on specific pedagogical issues.

## Learning and assessment activities
### Learning activities
The students worked in groups of five, with team leaders identified during the group selection phase. These team leaders negotiated on behalf of their group on aspects such as which theatre practitioner the group wanted to research. The students shared their research in class with the rest of their peers through Google Slides presentations. These presentations were then peer-assessed.

The students also received marks for their resource entries into the Google Forms database. These had to be reliable and suitable resources for academic work.

### Assessment activities
In addition to using Google Forms as an early assessment task, an additional Google Form was used as a peer-assessment tool. This Google Form was designed to be accessible on laptops, tablets and mobile phones connected to the WiFi network in the lecture venue. Through user-friendly dropdown tabs and linear scale inputs, the students could actively assign grades in class to various aspects of their peers' presentations.

# Enhancing student collaboration through a Google suite
## Faculty of Arts | Department of Drama

2

**Module:** Theatre Arts 178
**Lecturer:** Dr Rufus Swart rswart@sun.ac.za
**Blended Learning Advisor:** Dr Faiq Waghid faiq@sun.ac.za

**Learning activity:**
Collaborative student presentations

**Learning technology:**
Google Suite

## Technical Presentation - First Presentation Peer Assessment Form

Please answer the questions about one of the presenters

*Required

**What's your name? ***

**What's the name of the student you are reviewing? ***

### Body language / Eye contact

**How was his/her posture? ***
(Tick one or more)
☐ Too much to one side
☐ Nice and straight
☐ Too stiff
☐ Relaxed
☐ Too relaxed

**What about the hands? ***
(Tick one or more)
☐ In your pockets
☐ Playing with a pen/pointer
☐ Folded together behind your back or in front of you
☐ Making appropriate gestures
☐ Moving too much

Figure 1: Screenshot of how a peer-assessment tool can look on a mobile device

### Feedback practices
The students received feedback during their presentations from both the lecturer and their peers. The marks assigned by the peers were anonymous.

### Learning environment
#### Collaborative setting
The students worked in groups of five. Previously, students had worked individually but the lecturer was then unable to get through all the theory.

Working in their groups, each group identified a group leader. The Google Slides activity logs, together with its communication capabilities, ensured that the research presentations reflected the work done by each member in each group.

### Content resources
Before the students proceeded with their research, the lecturer ensured that they could navigate and filter internet-based resources, cognisant of the fact that they might not be as competent as they should be at filtering the comprehensive information at their disposal. To facilitate this, the students were provided with notes on each practitioner and referred to resources in the library; the Faculty librarian also presented workshops during class times. To gauge the effectiveness of these workshops in ensuring that the students' work would be of high quality, the Faculty librarian and the lecturer created an assessment task that required the students to identify and list credible internet-based resources. The assessment was done through Google Forms, an application of the Google collaboration suite. This was introduced with relative ease and integrated directly into the learning management system, SUNLearn. Traditionally, Google Forms is used to initiate online surveys but it is now gradually being used as a viable assessment tool. In this instance, a Google form was used to ensure that the students' data inputs would be efficiently archived so that constructive feedback could be provided.

# Enhancing student collaboration through a Google suite
## Faculty of Arts | Department of Drama

3

**Module:** Theatre Arts 178
**Lecturer:** Dr Rufus Swart rswart@sun.ac.za
**Blended Learning Advisor:** Dr Faiq Waghid faiq@sun.ac.za

## Technology resources

Given that the students were required to collaborate on their group presentations, the lecturer needed to ensure that they would not be hampered by logistical issues with regard to time and location. The students therefore used Google Slides. As mentioned earlier, Google Slides, which forms part of the Google collaboration suite, is a free presentation-creating tool, sharing features with many high-end tools, such as Microsoft Office Suite. It has a low learning curve and, unlike Microsoft Office, affords the students opportunities to collaborate seamlessly on a single presentation both synchronously and asynchronously, using any device. Google Slides also has a number of communication capabilities, such as a chat feature and interactive tracking. Google Slides furthermore provides users with detailed activity logs, which, in this case, was used to monitor student activity as they created their slides.

## Student experience
### Student feedback on the learning experience

The peer-assessment tool produced an overwhelmingly positive response from the students. They could complete the peer-assessment forms by accessing the lecture venue through a dedicated hotspot provided by IT on their devices concomitantly with the students presenting their substantive, well-researched endeavours.

## General
### Opportunities

Through the adoption of a blended learning approach, the lecturer felt that he could cover a wider range of content than through a traditional pedagogical approach. He could also make learning more playful and insightful for his learners. The students became increasingly adventurous over the weeks as they presented their works, augmenting their presentations with audio and visual enhancements, such as sound effects and videos. They were taking responsibility for their own learning by searching the internet to produce rich presentations from which their peers could benefit.

## Reference list

Laurillard, D. 2012. Teaching as a design science: *Building pedagogical patters for learning and technology.* New York: Routledge.

# Not just a statistic: Providing students with reflective opportunities through blogging
## Faculty of Military Science | Department of Military Management

**Module:** Military Management 214
**Lecturer:** Ms Bontle Monnanyane bontlem@ma2.sun.ac.za
**Chair for Educational Technology (Military Science):** Ms Mhaka Khoza lindiwe.khoza@ma2.sun.ac.za

Learning activity:
Reflection

Learning technology:
Mahara

## Context
### Background
The blog project was a collaborative study between the Department of Military Management and the Centre for Educational Technology. Sixty-seven students participated in the study. The students were both residential and non-residential students.

### Subject area
This is a course in logistics management, a term that denotes a total systems approach to the management of all of those activities involved in physically moving raw materials and doing inventories and finished goods inventories from the point of origin to the point of consumption. Effective logistics management can improve an organisation's marketing effort by establishing consistent and dependable customer service levels.

### Established practice
The lecturer used to upload all relevant course materials on SUNLearn. She created a Turnitin assignment and uploaded a rubric that was used to guide students on how the task was going to be graded. The students uploaded the assignment on SUNLearn. The lecturer marked the individual assignments by making comments (through Track Changes) and allocating marks. At the end, she consolidated all her comments and compiled generic feedback that she uploaded as a file on SUNLearn.

### The challenge
The lecturer took time to make comments on the students' assignments. Although the students were provided with both individual and generic feedback, the lecturer observed that they appeared to have little to do with the feedback because they often did not address aspects of previous feedback in subsequent assignments. This meant that they focused more on their grades and less on engagement with the feedback.

### Advantages associated with the integration of technology
Integrating blogs as a reflective tool enabled the lecturer to move towards student-centred teaching and learning. It also enabled collaboration and engagement among the students and improved communication.

## Student overview
Sixty-seven residential students participated in the study. These students were studying for a BMil degree.

## Learning and assessment activities
### Educational approach
The focus was on authentic learning, with the incorporation of aspects of the authentic learning model (Ozcerir, Herrington & Osam, 2016) and the affordances of blogging to support teaching and learning (Bower, 2008).



Figure 1: Screenshot of student blog entry

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# Not just a statistic: Providing students with reflective opportunities through blogging
## Faculty of Military Science | Department of Military Management

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**Module:** Military Management 214
**Lecturer:** Ms Bontle Monnanyane bontlem@ma2.sun.ac.za
**Chair for Educational Technology (Military Science):** Ms Mhaka Khoza lindiwe.khoza@ma2.sun.ac.za

## Learning activities

The students engaged in problem-based learning. They were required to identify a problem in their working environment, complete a case study and then create a blog entry to reflect on the feedback by the lecturer and their peers.

## Assessment activities and feedback practices

The task was done in two stages. In the first stage, the lecturer used the rubric to provide the students with feedback on their first submission of the task but not to grade the task. The students reflected on the feedback by creating blog entries on SUNLearn. They then shared with their group members how they improved their task based on the feedback. The group members made comments on their peers' blogs by offering ideas and critiques, pointing out any omissions or asking questions. The students then updated their task based on the feedback from both the lecturer and their peers. In the second stage, the task was submitted to the lecturer for grading. Grades were allocated as follows: 5% for the comments on peers' blogs, 10% for the reflections on the blog and 85% for the final submission.

## Student self-regulation

The students could reflect continuously on the feedback from both the lecturer and their peers. They could also resubmit their assignments after receiving feedback.

# Learning environment
## Learning setting

The residential students attend face-to-face classes, while the non-residential students work in the military units and attend one week-long contact session at the beginning of a semester. The lecturer is redesigning the module in a blended learning mode of practice on SUNLearn to enhance student-student, student-lecturer and student-content interaction.

## Collaborative setting

All the students created their own blogs. They had to share their blogs with their group members and the group members had to comment on each other's blogs. The students also had to showcase their blogs to the rest of the class for final inputs before final submission.

## Content resources

The students were provided with the PowerPoint slides and rubrics beforehand.

## Technology resources

SUNLearn was the main technology resource, with the Forum serving as the blogging platform.



**Comments (4)**

- George Enslin - Tue, 14 Apr 2015, 9:11 PM

  Nice work A Team, I enjoyed reading your post - very interesting topic.

  If I may, here are a few suggestions that I think you can maybe consider to make your blog a bit more appealing.

  -In your Operational Overview, I would like to see a bit more of an introduction to the pipeline industry. Tell your readers what it's all about and how it works. I feel your overview is merely part of the strengths of pipelines.

  -Also you might want to consider putting the Strengths and Limitations in a list format for neatness and readability.

  -Maybe add a video or some picture?

- Charlene Woodcroft Brown - Tue, 14 Apr 2015, 9:56 PM

  Great blog A Team - I feel like this was a good summary of pipeline transportation. I enjoyed the focus on South African infrastructure.

  I agree that a picture or two, or maybe some other form of colour would have made the blog more vibrant.

- Coenraad Kotz - Wed, 15 Apr 2015, 8:55 AM

  A Team I could understand the pipeline system better after reading the blog.

  A picture here and there will be nice to see and there is places like limitations that could rather been listed to shorten the blog and give the reader easier read material.

Figure 2: Students commenting on each other's blog posts

# Not just a statistic: Providing students with reflective opportunities through blogging
## Faculty of Military Science | Department of Military Management

3

**Module:** Military Management 214
**Lecturer:** Ms Bontle Monnanyane bontlem@ma2.sun.ac.za
**Chair for Educational Technology (Military Science):** Ms Mhaka Khoza lindiwe.khoza@ma2.sun.ac.za

Learning activity:
Reflection

Learning technology:
Mahara

## Support challenges
The main challenge was access to the internet (data bundles and WiFi), which limited the freedom of the students to work on the blogs. The students could therefore work only on the blogs at the computer lab.

## Student experience
### Student feedback on the learning experience
Feedback was collected using clickers, which provided student anonymity and therefore for freely given constructive feedback. The students felt that the learning process allowed them the opportunity to discuss the feedback with the lecturer, which helped them to make corrections. It also allowed them to engage with the feedback and so ensure a good final product. Feedback from both the lecturer and the peers was an eye-opener, as ideas were mentioned that the groups had not thought of, which helped the students to improve their blogs.

### Assessment impact
There was a great improvement in the quality of the work that the students submitted and the students took ownership of their own learning.

## General
### Opportunities
Students' peer review skills can be further developed. They tend to act defensively when receiving feedback from other groups.

### Challenges
Some of the students did not participate in their groups. They also felt uncomfortable that their comments were made available to all the students instead of only to their group members. Developing student skills in giving and receiving feedback could address this problem as well.

### Advice
Time is needed to develop the whole process and it needs to be tested and adopted according to the learner profile. Students must feel part of the process. The resources that the students have access to should also be taken into consideration.

Reference list
Bower, M. 2008. Affordance analysis – matching learning tasks with learning technologies. *Educational Media International*, 45(1):3–15.

Ozcerir, I., Herrington, J. & Osam, U.V. 2016. Design principles for authentic learning of English as a foreign language. *British Journal of Educational Technology*, 47(3):484–493.

# One module, four teachers: Using rubrics as an assignment teaching & learning tool in a multi-lecturer module

## Faculty of Theology | Department of Old and New Testament Studies

1

**Modules:** Old and New Testament 144: Narrative Literature in the Bible
**Lecturers:** Prof Louis Jonker lcj@sun.ac.za, Prof Elna Mouton emouton@sun.ac.za, Ms Ydalene Coetsee yc@sun.ac.za & Ms Heila Maré heilam@sun.ac.za
**Blended Learning Coordinator:** Ms Magriet de Villiers mdev@sun.ac.za

**Learning activity:**
Writing assignments

**Learning technology:**
Turnitin Grademark

## Context

### Background

The Department of Old and New Testament Studies focuses on rigorous, responsible and accountable theological interpretation of the Bible. Rigorous theological exegesis of the Bible must always be responsible to the rest of the academic scholarly community and accountable to the communities of faith, both in Africa and abroad, within which the interpretation of Scripture takes place. The Hebrew and Greek texts of the Bible must therefore be interpreted in close relationship with the world of the Biblical authors (then) and readers (now).

### Subject area

The module Old and New Testament 144: Narrative Literature in the Bible (ONT 114) is an introductory and orientating module about the study of Biblical narratives in the Old and New Testament within their socio-historical contexts. It is also about the study of the nature of the narrative genre and ancient historiography, together with appropriate methodologies. In the Old Testament section, focus is on the Deuteronomistic history, Ezra-Nehemia and Chronicles are highlighted and, in the New Testament section, focus is on Acts and aspects of the Synoptic Gospels.

### Intended learning outcomes

After completion of the module, students will be able to:

- identify the literary form of a text and explain the use of narrative genres in Biblical texts;

- demonstrate basic aspects of the use of appropriate methodologies in the reading and analysis of Biblical narratives;

- describe the socio-historical context of Biblical narratives and explain the importance of such context in the interpretation of the narratives;

- demonstrate basic skills in reading, translating and interpreting narrative texts in a theological context;

- display a basic understanding of how Biblical historiography communicates in narrative form;

- indicate the relevance of narrative Biblical texts to theology and ethics in the contemporary world; and

- demonstrate a basic ability to design practical programmes for implementation in the contexts of congregations, through which familiarity with the narrative and historiographical genres in the Bible can be facilitated among secondary school learners in particular.

The cultivation of research and academic writing skills is an integral learning outcome and forms a central part of the teaching and learning practice.

### Established practice and the challenge

The undergraduate theology curriculum is a writing-intensive programme, with many, if not most, important assessments consisting of assignment creation. Many students find this to be challenging, as their tertiary education does not teach them the necessary skills of academic writing and they are therefore not adept at effectively reading assignment missions and questions, structuring their arguments and/or writing coherently. Neither are they well versed in effective literature research and/or referencing techniques and they consequently step into the plagiarism trap quite easily.

In order to address this teaching and learning challenge, the Departments of Old and New Testament Studies, Systematic Theology and Ecclesiology, and Practical Theology and Missiology started a rotating academic literacy period. Modules consist of two lecture periods and one tutorial period and, each year, one of the modules (based on a three-year rotation) is given an extra tutorial period of 50 minutes to spend on academic literacy. In 2015, the Department of Old and New Testament Studies was responsible for incorporating this academic literacy period into its ONT 144 module. Over a period of 12 to 13 weeks, two lecturers, the Faculty librarian and a Language Centre representative – the assessors – worked together to assist the students with the research, content creation and academic writing of their ONT 144 academic literacy written assignment. This assignment served as a summative assessment that, together with class attendance and tutorial assessments, contributed to the students' final marks. It also equipped them, however, with a foundational understanding of what the academic writing process entails and provided transferable skills for use in their general theological training.

UNIVERSITEIT STELLENBOSCH UNIVERSITY

# One module, four teachers: Using rubrics as an assignment teaching & learning tool in a multi-lecturer module

2

## Faculty of Theology | Department of Old and New Testament Studies

**Modules:** Old and New Testament 144: Narrative Literature in the Bible
**Lecturers:** Prof Louis Jonker lcj@sun.ac.za, Prof Elna Mouton emouton@sun.ac.za, Ms Ydalene Coetsee yc@sun.ac.za & Ms Heila Maré heilam@sun.ac.za
**Blended Learning Coordinator:** Ms Magriet de Villiers mdev@sun.ac.za

**Learning activity:**
Writing assignments

**Learning technology:**
Turnitin Grademark

Due to the number of assessors and students involved in this assignment process, however, timeous assessment and thorough feedback posed a challenge: how could the assessors work on and mark the assignments simultaneously and speedily whilst still giving in-depth feedback that would help the students with their academic literacy?

### Advantages associated with the integration of technology

As all the students were submitting their assignments via Turnitin, the built-in GradeMark rubric provided a viable solution to the challenge:

- The GradeMark rubric is an electronic tool that was attached to each assignment and the students could therefore use it as a formative tool when writing their assignments.

- Once the assessors had marked the assignments, the marks and feedback were immediately accessible by the students without extra administrative communication required by the assessors.

- The assessors could mark simultaneously and therefore save time.

- The rubric structure and layout are pliable and could therefore incorporate all the necessary assessment criteria for the assignments.

- The rubric can be structured as a marking tool and could therefore assist in calculating the combined assessment marks.

- The rubric served a formative feedback function and supported the students' learning.

### Student overview

The class in question consisted of 105 first-year theology and youth work students, most of whom came to study at Stellenbosch University directly after matriculating. The ONT 144 module can be quite challenging, as the academic information is very new and foreign to the students.

### Other relevant role-players

Throughout the semester, the academic literacy classes assist the students

in acquiring reading, writing and referencing skills that they can use in their written assignments. They can continuously ask for input from the lecturers and tutors (regarding topic and content), the Faculty librarian (research strategy and referencing) and the Language Centre representative (reading, writing and structuring). The students are very fortunate that the theology library is housed within the Faculty and that the Language Centre representative is available by appointment at the Faculty, making both the librarian and Language Centre representative highly accessible.

## Learning and assessment activities
### Educational approach

For the purpose of the ONT 144 module, the rubric served a multi-faceted role. Due to the written assignments being summative, end-of-semester assessments, the rubric served primarily as a summative grading tool and the students could therefore not correct their mistakes or improve their assignment marks. The rubric also, however, served as a formative feedback and learning tool that reflected the students' incorporation of the writing and referencing skills that they had learnt throughout the semester. Since feedback comment is automatically connected to an allocated mark, it is also more structured, nuanced and descriptive; all the students obtained the same amount of feedback and they could see why they had received that specific mark. Although the students could not improve their assignments, they could use the feedback to improve the academic literacy skills that they needed for the rest of their theological studies. The fact that the rubric was also available to view (by opening the assignment link) before the students submitted their assignments further embedded the rubric's formative learning capacity.

### Learning and assessment activities

Students are asked to attend all theological and academic literacy classes and to complete certain SUNLearn and tutorial assignments to assist them in acquiring certain theological content and literacy skills. They are then required to present their acquired knowledge and skills in the form of a summative assignment that counts for 30% of their predicate mark. The rubric, attached to the SUNLearn assignment link, provided formative assistance in addressing the needed theological and literacy aspects as the students completed their assignments.

# One module, four teachers: Using rubrics as an assignment teaching & learning tool in a multi-lecturer module
## Faculty of Theology | Department of Old and New Testament Studies

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**Modules:** Old and New Testament 144: Narrative Literature in the Bible
**Lecturers:** Prof Louis Jonker lcj@sun.ac.za, Prof Elna Mouton emouton@sun.ac.za, Ms Ydalene Coetsee yc@sun.ac.za & Ms Heila Maré heilam@sun.ac.za
**Blended Learning Coordinator:** Ms Magriet de Villiers mdev@sun.ac.za

**Learning activity:**
Writing assignments

**Learning technology:**
Turnitin Grademark

### Feedback practices
All the students received complete feedback on their assignments through the Turnitin Grademark rubric. Grademark allowed the lecturers to provide comments, allocate levels in terms of the students' criteria and link comments to a set of criteria.

## Learning environment
### Learning setting
In the first lecture period, the students received a paper-based module framework stating the module's content, learning activities and assessments, and the timetable. Each aspect, including the incorporation of the academic literacy class, was thoroughly explained and discussed and the students were introduced to the SUNLearn module page, which served as their parallel classroom. The students had continuous access to the theological and literacy resources via the SUNLearn module page, which they could view and use at their own convenience. The rubric was also attached to the assignment link SUNLearn module page and served as a writing tool while the students were creating their assignments.

### Support challenges
There was a slight learning curve for the lecturers as they were learning to use the new technology but they quickly grasped the concept. The lecturers commented on how easy the technology was to use as soon as they mastered it.

## General
### Opportunities
Three rubric layouts are possible. This provides pliability in structuring a rubric according to need. For the ONT 144 module, the custom rubric was used, as it provided the possibility to nuance the grading.

The rubric worked well as a marking tool, giving the multiple assessors not only the opportunity to mark simultaneously but also to calculate a combined mark automatically. This mark was reflected on the assignments but was also connected to and reflected on the SUNLearn gradebook – one of the great advantages of using the Turnitin GradeMark rubric. In addition, the assessors did not need to mark in one unbroken session but

could save their progress and return to it at their convenience; the marks were finalised and published only once the assessors had clicked on the "apply rubric percentage to grade" button.

Comments could be conveniently attached to each grade allocation and feedback could be automatically generated, which not only saved the assessors the time of individually writing feedback but also assured the students of feedback. Also integrated in Turnitin GradeMark is the capacity to combine the different grading methods of the rubric, voice notes, in-text comments and quickmarks. The assessors could therefore use the rubric and add extra voice notes, in-text comments and quickmarks to provide further and more detailed feedback where needed.

It was advantageous that the rubric was attached to the Turnitin assignment, as it enabled the students to view and use the rubric as a formative guideline before submitting their assignments. It also provided them with immediate access to their finalised feedback and combined mark, either by opening the Turnitin assignment itself or viewing the mark in the SUNLearn gradebook.

Rubrics are reusable in other modules and can be shared amongst colleagues.

# One module, four teachers: Using rubrics as an assignment teaching & learning tool in a multi-lecturer module

## Faculty of Theology | Department of Old and New Testament Studies

4

**Modules:** Old and New Testament 144: Narrative Literature in the Bible
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**Blended Learning Coordinator:** Ms Magriet de Villiers mdev@sun.ac.za

Learning activity:
Writing assignments

Learning technology:
Turnitin Grademark

### Challenges

There is a medium learning curve for first-time rubric creators, especially regarding choosing a rubric format and completing the scales, values and percentages sections. Also, the rubric launch manager does not automatically back up submitted information and this should therefore preferably be completed in one continuous session and changes saved continuously. Rubrics can furthermore not always simply be changed once they have been created and a new rubric might have to be created to incorporate the necessary changes. This can initially be quite a frustrating process of trial and error. Lastly, each scale can have only one attributed mark (such as 1 or 3) and a grade can therefore not be allocated on a scale (such as 1–3). The rubric's size can become quite cumbersome when the scales are too detailed and the creators must inevitably make choices as to how many details they can justifiable add or omit.



Figure 1: Screenshot of the Turnitin layout

### Advice

It is helpful to create a complete rubric outline as a framework for the online rubric.

UNIVERSITEIT STELLENBOSCH UNIVERSITY

# Peer review as a valuable assessment: Using the Workshop tool
## Faculty of Theology | Department of Practical Theology and Missiology

**Module:** Module 10: Gender, Culture and Religion
**Lecturer:** Prof Julie Claassens jclaassens@sun.ac.za
**Blended Learning Coordinator:** Ms Magriet de Villiers mdev@sun.ac.za

**Learning activity:**
Peer assessment

**Learning technology:**
SUNLearn workshop tool

## Context
### Background
The Master of Divinity in Church Ministry and Church Leadership is a full-year, multi-module programme in the Department of Practical Theology and Missiology that focuses on training theology students for various facets of ministry. The programme provides students with a comprehensive knowledge integration of their previous theological Bachelors in Divinity (BDiv) content, with specific focus on equipping them to use this responsibly and professionally as ministers, clergy, pastors, lay workers, pastoral caregivers and pastoral therapists for the ministry.

In 2015, the programme had 17 full-time students and 3 part-time international students. Primarily and administratively situated in the Department of Practical Theology and Missiology, the programme incorporates all the departments of the Faculty of Theology, namely Practical Theology and Missiology, Old and New Testament Studies, and Systematic Theology and Ecclesiology. In order to incorporate all these different foci, the programme is divided into 34 modules.

### Subject area
Module 10, entitled Gender, Culture and Religion, investigates the often complex interrelationship between gender (male and female constructs and experiences) and the diverse cultural contexts in which we find ourselves.

### Intended learning outcomes and established practice
The module aims to develop skills to assist students to read the Bible in such a way that resists harmful interpretations that uphold the patriarchal values inherent in the biblical text and that propagates biblical interpretation that moves towards an understanding of the full humanity of both men and women as created in the image of God. The aim is to strive for a community in which gender justice is the norm and in which injustice is actively countered. This topic is addressed over the course of only one week (five working days and a weekend for assignment completion) and time must therefore be optimally used to immerse the students in the academic theory and provide them with the opportunity for critical reflection and interpretation.

## The challenge
The challenge lies in finding ways to combine academic theory and critical reflection in an active way to produce the aims and outcomes of the module within the allocated timeframe of one week (five working days and a weekend for assignment completion). In order to address this challenge, the module incorporated full-day lectures, classroom and group discussions, and a peer-review assignment as a learning and assessment tool. The peer-review assignment made use of the Workshop tool on SUNLearn. This tool provided the students the opportunity to submit any digital content (files), such as word-processed documents or spreadsheets, or text typed directly into a field using the text editor. The students obtained two grades in a workshop activity: a grade for their submission and a grade for their assessment of their peers' submissions. Both grades were recorded in the gradebook and were weighted to calculate a combined total mark.

For this module, the students were required to find an example on the internet of how men/women are depicted in commercials and do a critical gender analysis that used their reading and class discussions to evaluate the particular commercial's treatment of gender. As part of the peer-review process, each student was allocated two to three other students, whose work they had to review and assess according to established criteria. This constituted the assessed student's submission grade and the assessor's assessment grade. In order to assure objective submission grades, the lecturer monitored each assessor group and could influence the final mark where appropriate.

## Advantages associated with the integration of technology
The Workshop tool made it possible for the students to assess their peers simultaneously, therefore saving valuable time. The marks were automatically captured and weighted according to the settings chosen by the lecturer, which made the calculation and distribution of the grades instantaneous. As mentioned, it was also possible for the lecturer to override a grade partially or completely where deemed appropriate, although this should be done only in extreme circumstances in order not to obstruct the peer-review process. The allocation of the peers for the assessment process could be done either automatically and randomly or by the lecturer. As this was a small class of only 20 students, the lecturer

# Peer review as a valuable assessment: Using the Workshop tool
## Faculty of Theology | Department of Practical Theology and Missiology

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**Module:** Module 10: Gender, Culture and Religion
**Lecturer:** Prof Julie Claassens jclaassens@sun.ac.za
**Blended Learning Coordinator:** Ms Magriet de Villiers mdev@sun.ac.za

allocated the peers herself, aiming at the even distribution of gender and academic capacity to further support the learning process.

### Student overview
The module consisted of 20 students: 17 full-time and 3 part-time international Master's in Divinity students. All the students had completed BDiv or equivalent undergraduate studies. Sixteen of these students had experience with SUNLearn due to their undergraduate studies at the Faculty and were comfortable with the learning management system. A short demonstration of the submission and assessment phases was presented to all the students and they could continuously ask for assistance from the Blended Learning Coordinator.



## Learning and assessment activities
### Educational approach
As stipulated by the University's graduate attributes, students are expected to be enquiring of mind and capable of critical reflection and of active use of their academic theory in everyday society for the betterment of the broader community. This module, through its focus on questions of gender, culture, community, inclusion and religion, provides an excellent academic framework to help shape such enquiring minds and critical citizens. The

pedagogical aim of the lecturer is not only to make the students aware of the themes but also to open the classroom and the SUNLearn platform as spaces where cognitive (critical thinking, investigation and analysis), meta-cognitive (self-reflection and self-evaluation) and social (conversation and persuasion) competencies are fostered. The use of the Workshop tool and the peer-review process, in conjunction with the reading material, lectures and classroom discussions, aims to help form these competencies and shape critical and engaged ministerial students.

### Learning activities
For the five-day working week, the students were expected to attend all the classroom lectures, participate in the classroom discussions and read the prescribed material for the lectures and assignment. They received the framework for the module on SUNLearn at the beginning of the year and were therefore aware of what to read and what the assignment entailed. The assignment and peer-review process were discussed and explained during class and the students had the opportunity to ask logistical, administrative and academic questions in preparation of the Workshop peer-review assignment.

### Assessment activities
For this module, the students were required to find an example on the internet of how women and men are depicted in commercials and do a critical gender analysis that used their reading and class discussions to evaluate the particular commercial's treatment of gender. As part of the peer-review process, each student was allocated two to three other students, whose work they had to review and assess according to established criteria.

### Feedback practices
The students received two-fold feedback due to the Workshop grading process. Firstly, they received comment feedback for their submissions from their allocated peers and from the lecturer. Secondly, they received a grade for their assessment of their allocated peers, which served as feedback of the entire learning activity and taught them to look for the criteria of both academically sound and academically problematic assignments. This can assist them with their own future assignments and assessments.

# Peer review as a valuable assessment: Using the Workshop tool

## Faculty of Theology | Department of Practical Theology and Missiology

3

**Module:** Module 10: Gender, Culture and Religion
**Lecturer:** Prof Julie Claassens jclaassens@sun.ac.za
**Blended Learning Coordinator:** Ms Magriet de Villiers mdev@sun.ac.za

## Learning environment

### Learning setting

This was a full-time course and the students were required to attend all their classes at the Faculty. This provided the students with the opportunity to participate in the discussions with their lecturer and with their peers. SUNLearn served as their learning platform and was used as an in-class learning tool. The students could therefore continuously access the reading material provided, view the module's aims and outcomes and orientate themselves regarding the peer-review assignment.

### Support challenges

Although the students received in-class guidance on the Workshop tool and the peer-review process, they could still continuously ask the lecturer and the Blended Learning Coordinator for assistance, be it via email or one-on-one. This was helpful for the first-time Workshop users, who found the learning curve slightly challenging. This group was generally quite technologically well informed, however, and they therefore did not experience any serious challenges with the tool.

## General

### Opportunities

The peer-review process worked well as a critical reflection and self-evaluation tool to embed the academic work of the module within the short period of time available. It allowed the students the opportunity to provide their own opinions through their own submissions but also to learn from each other's submissions and assessments. The Workshop tool, with its integration of a submission and an assessment grading structure, worked well to create a formal space for the peer-review process. Although other tools could be used for the same process, the built-in grading structure provided an easier and more convenient way to set up and calculate each student's grade. The fact that it also served as a double feedback structure (feedback for the submission and feedback for the learning activity of the assessment) provided a valuable pedagogical opportunity, which assisted the students with critical reflection and self-evaluation.

The online availability of this tool on SUNLearn saved valuable assessment time, as the assessors could work individually yet simultaneously. The lecturer could also immediately view the feedback and grades given by the students and could use this information in the classroom to further the discussions and answer any lingering topic uncertainties. The integrated grading structure furthermore saved valuable time and energy, as the students and the lecturer could immediately view the feedback and grading outcomes, either in the SUNLearn gradebook or in the Workshop tool itself.

### Challenges

The Workshop tool is not as intuitive as many of the other resources in SUNLearn and it therefore has quite a steep learning curve. Special attention must be paid to the grading structure, as the differentiation between submission and assessment and their different weight allocations can initially be quite confusing. The tool also makes use of a phase system: the setup phase, submission phase, assessment phase and grading evaluation phase. These phases are not automatic – they have to be manually opened and closed – and the lecturer/creator must therefore take care to activate and deactivate each phase once completed in order to proceed through the Workshop to the final phase. For instance, once the workshop has been set up and the workshop description, instructions for submission and the assessment guidelines have been provided, the lecturer/creator must activate the submission phase in order for the students to be able to read the submission criteria and submit their submissions.

### Advice

It is quite helpful to set aside 20 minutes to explain and show the Workshop and peer-review process in the classroom. This provides time for questions and queries and gives the students a first-hand account of the process.

### Reference list

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UNIVERSITEIT STELLENBOSCH UNIVERSITY

# Using clickers to enhance interactive learning in Biochemistry 364
## Faculty of Science | Department of Biochemistry

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**Module:** Biochemistry 364
**Lecturer:** Prof Johann Rohwer jr@sun.ac.za
**Blended Learning Coordinator:** Dr Ilse Rootman-Le Grange ilser@sun.ac.za

## Context
### Background overview
The Biochemistry 364 module consists of 3 sections covering "Protein structure and function" and covers general advanced material found in several sources (text book, scientific literature, and internet). It consists of a mix of factual and conceptual learning. This being a third-year module, the material is relatively advanced and has a fair amount of depth. Despite this, assessments had previously focussed in part on mere regurgitation of factual knowledge. Also, the lecturer found it challenging to motivate the students to engage with the material in such a way that they would move beyond this rote learning mode.

The impetus for this study was provided in particular by three worrisome developments over recent years: first, levels of class attendance were very low (averaging at ~40% of registered students); second, class sizes are huge (170 for a 3rd-year module); and third, when students attended classes, they were mainly in "receptive" mode, with little participation. As a consequence, many students experienced problems when presented with assessments that moved beyond regurgitation of facts.

### Established practice
The module has previously been taught in a classical classroom approach. Content was "delivered" in three lectures per week, and students subsequently had to apply this knowledge during a 3-hour tutorial by solving problem sets. To counteract the developments listed above, various interventions were introduced. These differed between the sections of the module that consisted more of factual learning, and the section on enzyme mechanisms that was heavy on conceptual knowledge.

## Learning and assessment activities
### Learning activities
The main interventions were the following:

- formative assessment during lectures using cellphone-based clicker technology via the SUNLearn platform;

- the use of specialised subject-specific software during tutorials and summative assessments (assignments);

- the use of open-book summative assessments in class tests.

For each lecture, a set of multiple-choice clicker questions were designed. These questions were interspersed throughout the lecture and would test the application of a particular concept that had just been discussed in the class. The students would then be given one or two minutes to answer the questions (either alone or in pairs) and the instructor would have immediate access to the results, allowing him to adapt lectures on the fly to remedy weaknesses and fill in gaps. As a consequence, students were already "forced" during the lecture to move beyond mere rote learning of facts. It also provided a convenient break in the lecture and slowed down the pace.

The concepts were then further enforced during tutorials and assignments by using specialised subject-specific software (PyMOL, freely available for educational use) for visualising protein structures in 3D. This allowed the students to "play" and explore the material on their own and translate the dry theory from the lectures into a visual practical experience. The formal written assessments (class tests) were open book, which by default precluded rote learning and required that the questions be designed in such a way as to test insight and application of concepts rather than reciting facts.

## Student experience
### Student feedback on learning experience
The implementation of the clicker approach led to a dramatic increase in student participation during the class, as students were given a safe space to answer questions without fear of being exposed in front of their peers. This is especially pertinent in such a large class size, where it can be extremely challenging to get an interactive discussion going.

There was also a significant improvement in class attendance; however, this had to be incentivised. Since the clicker also affords the opportunity to take a roll call, students were offered a 5% bonus mark for the section if they attended at least 9 of the 12 lectures and participated actively in the clicker. This proved essential, as the same approach was previously attempted in a different module without the incentive: this had no impact whatsoever on the class attendance, and moreover the participation in the

# Using clickers to enhance interactive learning in Biochemistry 364
## Faculty of Science | Department of Biochemistry

**Module:** Biochemistry 364
**Lecturer:** Prof Johann Rohwer jr@sun.ac.za
**Blended Learning Coordinator:** Dr Ilse Rootman-Le Grange ilser@sun.ac.za

**Learning activity:**
Formative assessment

**Learning technology:**
SUNLearn clickers

clicker activity was mediocre (40% of the students present on a good day). With the incentive, however, virtually everyone present also participated in the clicker, and out of a class of 173 students, 101 qualified for the bonus. Such a compulsory system should, however, be implemented with the caveat that alternatives are given to students who cannot participate in the clicker for whatever reason (e.g. because they have no suitable device to participate, or do not want to use their own mobile data for academic purposes). In our case, students were given the opportunity to sign an attendance register after each lecture in order to accrue participation credits towards the attendance bonus.

The data from the clicker also allowed us to correlate attendance and participation to achievement in assessments. Figure 1 shows this relationship for the written class test, which was an open-book assessment comprising a combination of multiple choice and longer questions. The data showed a positive correlation ($R = 0.462$) of achievement with increased attendance.
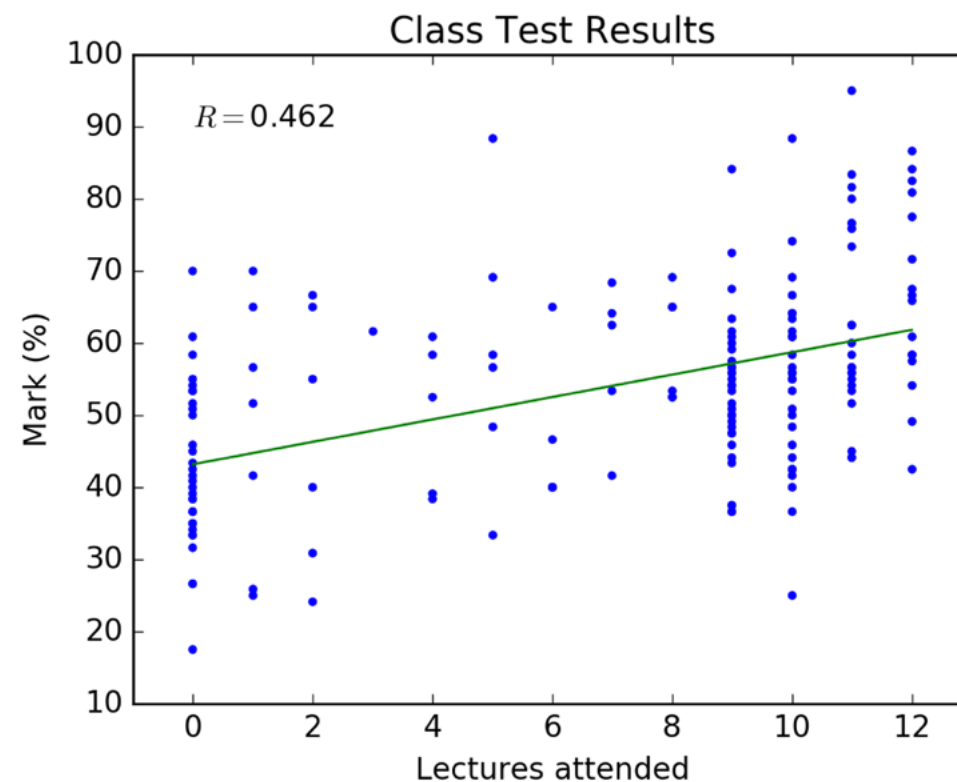

Figure 1: Correlation between attendance and participation to achievement

The feedback from students was immensely positive. Some quotes on the best aspects of the module Biochemistry 364 praise the module as "interactive" and state that the clickers assisted the students in understanding the concepts.

There was only one remark concerning the clicker in the aspects that need improvement, but it did not elaborate. It only stated that the clicker was the problem and "#Clickermustfall".

Concerning aspects of the lecturer's teaching that should be maintained, a total of 15 out of 34 comments mentioned the clicker directly, and an additional number indirectly. Some examples:

- "Ons het baie voorbeelde ontvang om ons te help om die werk in te oefen." [We received many examples to help us practice the work.]

- "Clicker questions after concepts keeps us focussed."

- "The clicker questions helped you to stay concentrated in class and the enthusiasm of the lecturer was admiring."

- "Good at explaining. Provides examples + work questions for students, to practice and apply what they're learnt."

Finally, the same section was presented in 2014 with a traditional approach and in 2015 as outlined here, allowing for a direct comparison. The student feedback score on the lecturer (average of 11 categories) increased by 0.13 points (out of 5) in 2015.

## General
### Other concluding thoughts
The main advantages of the approach outlined here are that it facilitates interactive learning and participation, especially in large classes; that it allows the instructor to ascertain in real time by means of formative assessments whether students have grasped difficult concepts and to adapt the lecture on-the-fly if necessary; and that it incentivises student class attendance.

UNIVERSITEIT STELLENBOSCH UNIVERSITY

# Using clickers to enhance interactive learning in Biochemistry 364
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Learning activity:
Formative assessment

Learning technology:
SUNLearn clickers

Good network infrastructure is absolutely imperative for implementing this approach successfully. It should only be attempted in lecture theatres that have been equipped with Wi-Fi access points. When students struggle to connect or submit their answers, this will only cause frustration and undo the benefits of the interactive learning.

Designing effective clicker questions involves a lot of thinking and hard work, because these questions should firstly test whether students have grasped the concept, but ideally also offer answer options that encompass common misconceptions. Fortunately, the questions can be recycled in subsequent years; in this case the clicker questions were never handed out to the students (despite repeated requests to do so).

Finally, the clicker data from SUNLearn can be downloaded in an Excel spreadsheet; however, it is cumbersome to extract participation data from this spreadsheet by hand. For this purpose, a custom Python program was written that will extract these data automatically. Instructors who are interested in adopting this approach can obtain a copy of this program from the author.

# BLENDED LEARNING CASE STUDIES 2015

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