12-21-2020

TEACHING PASTEL ONLINE TO A LARGE GROUP AFTER COVID-19 SHUT DOWN UNIVERSITIES WORLDWIDE: CHALLENGES FACED AND LESSONS LEARNT FROM A SOUTH AFRICAN UNIVERSITY

Komla Pillay
Department of Informatics, University of Pretoria, komla.pillay@up.ac.za

Pariksha Singh
IT Laboratories, University of Pretoria, pariksha.singh@up.ac.za

Tania Prinsloo
Department of Informatics, University of Pretoria, tania.prinsloo@up.ac.za

TEACHING PASTEL ONLINE TO A LARGE GROUP AFTER COVID-19 SHUT DOWN UNIVERSITIES WORLDWIDE: CHALLENGES FACED AND LESSONS LEARNT FROM A SOUTH AFRICAN UNIVERSITY

Komla Pillay
Department of Informatics
University of Pretoria
komla.pillay@up.ac.za

Pariksha Singh
IT Laboratories
University of Pretoria
pariksha.singh@up.ac.za

Tania Prinsloo
Department of Informatics
University of Pretoria
tania.prinsloo@up.ac.za

Abstract:

In this paper, the largest residential university in South Africa is placed in the spotlight. Measures are discussed as to how the university reacted to the sudden lockdown enforced as a result of the COVID-19 pandemic. A specific course is looked at, namely Sage Pastel Accounting, a semester course taken by second-year students. The South African scene is described, with the digital divide being highlighted among students. The manner in which the course is adapted for the new, online environment is discussed, followed by challenges faced, and lessons learnt. Future research includes, to determine if certain sections of the course cannot remain online, as the overall pass rate did not decline significantly.

Keywords: COVID-19, online learning, action research, lessons learnt

I. INTRODUCTION

COVID-19 created a massive impact on higher education institutions (Naciri, Baba, Achbani, & Kharbach, 2020). The way in which teaching occurs, had to change, and quickly. In this paper, a university in South Africa is placed under the spotlight, with the interventions it undertook to successfully complete their first semester, running from January to July annually. The university lost lecturing time, as a lockdown was imposed midway through the semester, but managed to catch-up, and started their subsequent semester a mere two weeks later than scheduled. Classes had to continue online as no physical gatherings were allowed, this was also the case at many other tertiary institutions (Hodges, Moore, Lockee, Trust, & Bond, 2020). Lecturers started to teach on computer screens (Bao, 2020), with students following at home or from a location where they are able to access the internet. The university also used their Learning Management System (LMS) as a tool to provide students with information and were able to get the data used for the LMS zero-rated. Typically, zero-rating is the process of providing subsidized digital content and/or access to the Internet at no charge to the user. The rest of the paper will sketch the background and discuss relevant literature, then highlight and explain the methodology followed, then expand on the case study, highlight the main findings, consisting of the two models – pre and during – discuss the main challenges and lessons learnt, and conclude with the conclusion and future research.

II. GENERAL BACKGROUND

As the largest residential university in South Africa, the news of a countrywide lockdown from 26 March 2020 was a shock and a tragedy for many university students. On campus and at the residences, the students have access to computers and Wi-Fi. At home, that is a luxury not everyone can afford. During the lockdown period, students can still not gain access to campus to make use of the facilities to study and write tests and exams. The entire university had to follow an online teaching approach, using a variety of methods to assist students in enabling them to finish their academic year successfully. Therefore, the aim of the paper is to sketch the scene on how a group of people worked together to put all the measures in place to empower students to complete their Sage Pastel Accounting successfully.

III. THE SOUTH AFRICAN CONTEXT

South Africa has one of the biggest socio-economic disparities between students in the world (Baldry, 2016). A group of students come from very wealthy families, whereas the majority of students are very poor and study with the help of the National Student Financial Aid Scheme (NSFAS) (Bhorat, Kimani, & Pillay, 2018). This scheme used to operate as a loan, where 60% of the loan needed to be repaid upon successful completion of the degree, but after the "#Fees Must Fall" campaign in 2016 (Langa, Ndelu, Edwin, & Vilakazi, 2017), the loan was converted into a bursary, allowing poor students access to higher education they could not otherwise afford. The ratio of students changed, with more and more poor students entering higher education (Bhorat et al., 2018). Demands were also made to decolonialise education (Malabela, 2016) and the university has been creating case studies and context-based assignments for the typical South African student.

When the first few COVID-19 cases were reported, not everyone took notice. It was only a reality that struck everyone at the university when all face-to-face classes were stopped and the lockdown was imposed. Classes were not only suspended for the first semester, but for the rest of the academic year. Staff work from home, needing a special permit to gain access to campus. Students can apply to return to the residences for short periods of time, but cannot remain in the residences for the semester or academic year. The fact that everything went online, created challenges for how the lecturers normally teach, and forced them to come up with new and innovative teaching techniques. Online and hybrid learning were now the new norm that could no longer be avoided (Hwang, 2018). The entire traditional way of how the lecturer will present a face-to-face lecture shifted to Blackboard Collaborate, or many similar tools available.

Many of the students that had to move out of the University residence, returned to their family homes, many of which are rural, poor and small. These students were now reunited with parents, siblings and some with their own children, making it very difficult to focus on their studies when they become the primary caregiver at home, looking after the entire family's needs in a confined and restricted environment.

More than 2 000 loan laptops were distributed to students, but all the required software had to be installed, a mammoth task that took time to finalize. But South Africa faced numerous other challenges: lack of electricity in some areas, and no cellphone coverage in rural areas, no fiber connections in other areas and no access to an Asymmetric Digital Subscriber Line (ADSL) line. Some students simply cannot access the Internet, making it virtually impossible to continue with their studies.

IV. BACKGROUND TO THE CASE STUDY

Sage Pastel Accounting, module code INF281, is a second-year practical module that contributes 3 credits towards a Bachelor of Commerce degree. Sage Pastel Accounting introduces students to accounting software, and the application of accounting principles in spreadsheets and databases. The course learning outcomes include understanding the setup of company parameters in Pastel, process transactions using Pastel, understanding the complete financial cycle from entering opening balances to processing year-end reports.

The purpose of INF281 is to introduce students to an accounting software tool to assist in managing a business. Students are not introduced to new accounting terminology or processing, but rather for the students to practice what they have already learned in their accounting module, using the Pastel accounting software. This module has always had a pass rate of more than 95%. The reason for this is that students need to only apply knowledge already acquired to a software package. Generous resources, both inside the University and from the private company Sage, are allocated to students to facilitate the acquisition of the software knowledge. The number of students registered for INF281 in semester 1 of 2020 was 527 students. Post 26 March 2020, the entire student cohort continued the course online after the lockdown in South Africa was administered.

V. METHODOLOGY FOLLOWED

The methodology used in this article is that of action research. It is suitable because Action research is practical in that the research conducted is research in-action (Coghlan, 2019). It is not research about a far-removed topic, but rather something oneself is immersed in. Action research is also theoretical and one cannot ignore the theoretical terrain (Kemmis, McTaggart, & Nixon, 2013) and have to ask ourselves if we are seeing the world as it really is, or are we too far removed from it? Action research is a collaborative process in that it is an iterative process (Avison, Lau, Myers, & Nielsen, 1999) and expects researchers to work together in groups and constantly learn from one another. Action research is reflexive in that during the process, “changes or improvement to practice are made through academics’ reflections on teaching approaches” (Gibbs et al., 2017). Action research is also contextual with data embedded and interpreted contextually (Coghlan, 2019), ensuring that the case study being built, is solid (Arnold & Norton, 2018).

VI. THE CASE STUDY

It was very unsettling to suddenly change models of how classes are presented in the middle of the semester. A team of hard-working lecturers had to take the time and simply adapt and continue. In this section, the pre COVID-19 scenario is firstly presented of the Pastel course to fully be able to grasp what had to change during the COVID-19 virus prompted the lockdown of the university campus.

Pre COVID-19 scenario:

In this section, the traditional way of teaching is discussed, before it was affected by the COVID-pandemic.

Infrastructure:

The IT laboratory infrastructure consists of 2 venues, each installed with 50 desktop computers. The computers are installed with the most recent, applicable version of the software required to complete the course. All computers in the laboratory are installed with deep freeze technology,

which is a reboot to restore software application. This ensures that changes made to the computer while students are using it, will be negated once the computer is rebooted. Essentially the student starts every lecture with an original state desktop computer.

Timetable:
Students can attend any one of the 12 weekly scheduled lectures. The scheduled lectures are from Monday to Thursday with a variety of time slots available. At the start of the semester, students select a lecture slot suitable to their timetable. To ensure lab capacity is not exceeded, students attend their selected time slot throughout the semester. They may change their scheduled lecture time slot only in consultation with the module lecturers.

Textbook:
Students are issued a hardcopy textbook together with an educational version of the software. Students can install the educational version of the software on their own devices, or alternatively use the IT labs on campus to execute the tasks for the module.

Classes and consultation:
Students attend a compulsory two hour lecture every week. The duration of the course, including lectures and assessments is approximately 14 weeks. Practical, face to face lectures are the main teaching methodology used. In person consultation sessions are also available to students for administrative and academic queries.

Assessment:
The student's final mark comprised 2 components, semester mark for all assessments undertaken during the semester and an exam mark. The semester mark consisted of 1 theory assignment and 2 practical assignments which together made up 25 percent. The other 75 percent of the semester mark consisted of 2 semester tests. The semester tests consisted of testing theory and practical work in a simulated environment. The exam also tests theory and simulated environment practical questions. The final mark was calculated as 30 percent weighting for the semester mark and 70 percent weighting for the exam mark. Figure 1 shows complete rework of the course after lockdown was implemented.

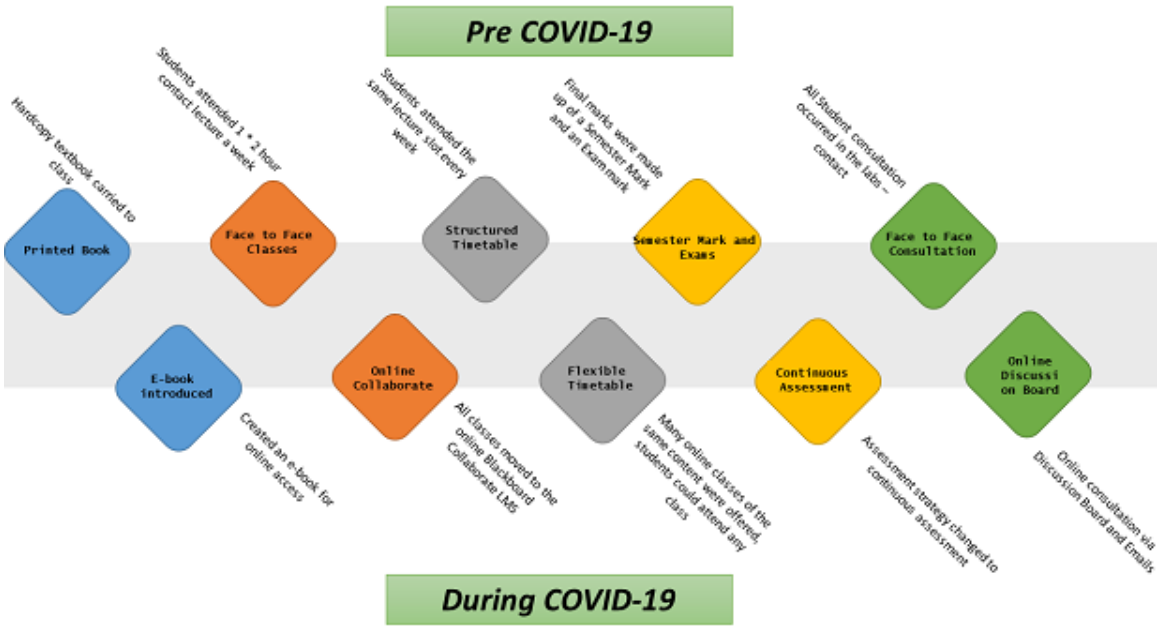

Figure 1: The complete rework of the course pre- and during COVID-19.

The during COVID-19 scenario:

In this section, the scenario is explained that had to be followed during the COVID-19 pandemic.

Infrastructure:

The infrastructure burden moved from the institution to the student almost overnight. Students had the software on the CD that they collected with their textbooks at the beginning of the semester. Some students had adequate devices to install the software, some had devices that could not run the software and some students did not have any device. This predicament was new as the students that did not have personal access to use of the software, used the on-campus infrastructure.

Timetable:

A flexible timetable structure was adopted. Many classes covering the same content were conducted throughout the week. Students did not have to sign up for a specific class, they could attend any class that suited their timetable.

Textbook:

Most students had their hardcopy textbooks with them. For those students who left their textbooks on campus, an electronic textbook was created. Due to the time constraints, the electronic textbook was a pdf book and not an interactive book.

Classes and consultation:

The classes were conducted on the University's online platform, Blackboard Collaborate. The students could attend any class as there were no restrictions on the number of students that could attend. Apart from the live virtual sessions, videos demonstrating the practical content were created for all lessons. The virtual sessions were also recorded and uploaded for students to access at any time. Lecturers were available online to consult with students. Students could also email the lecturers requesting a time outside of scheduled online consultation.

Assessment:

Assessment took the form of continuous assessment. All tasks and activities that students did, contributed toward the final mark. There were 4 assignments that contributed 55 percent of the final mark and two semester tests that contributed 45 percent of the final mark. This helped ease the pressure of one assessment being so heavily weighted like the exam was in previous semesters.

VII. MAIN FINDINGS

In 2019, INF281 registered 376 students and had a pass rate of 97.5 percent. In 2020, INF281 registered 527 students with a pass rate of 97.7 percent. The pass rate differed between the 2 consecutive years by 0.2 percent. Although the structure of both years differed significantly due to the COVID-19 pandemic, the success rate was the same. Both iterations of the course examined the same objectives using different methods. The teaching team's preference was the latter iteration where the module followed a continuous assessment approach. The continuous assessment approach tested the students more frequently on smaller chunks of work. In this way, the students were always engaged and felt more in control of their workload. This assessment approach makes sense for a small credit module that does not require the learning of new

content. The teaching team has decided to apply to University Management for the course to be continuous assessment in an online approach even when University resumes normal teaching activities.

The lessons learned from the COVID 19 online offering will guide the online course offering future. The lessons learned include the design of the learning management system must be streamlined, the flexible timetable for classes and assessments will extend beyond the normal 8 – 5 business hours, the provision of IT support for software loading / updates, the promotion of student responsibility, the provision of additional exercises and the extended administration of online discussion boards.

The similar pass rates do indicate that there is merit in an online teaching program even if there were many challenges experienced. Much of the challenges can be attributed to the economic and social challenges of a developing country.

Challenges:

There were many challenges experienced both by lecturers and students. The situation that all stakeholders found themselves in was beyond their control, and therefore no prior planning was undertaken. The challenges experienced are discussed in two categories, general challenges experienced by students across all their modules and INF281 specific challenges that other modules did not necessarily encounter. The emotional challenges that were experienced are not discussed in this paper, only the tangible challenges are discussed. This in no way minimizes the impact of the emotional dynamic. There were online counselling services offered to staff and students, by the University. Figure 2 depicts a summary of the challenges faced.

General Challenges

Lack of devices:

Many students did not have suitable electronic devices to work through their lectures and assessments. The University in partnership with private organizations, provided laptops on loan to students. This took some time to roll out so all educational activities were suspended for some time. This meant that students had a long intermission in their studies.

No electricity:

Due to the lockdown being instituted, the University residences had to be vacated. This meant that students returned to their family homes - in South Africa, a large percentage of students come from rural areas. During times of high electricity demand in South Africa, Eskom, the sole national producer of electricity is unable to meet demand. During this time, load shedding which is the reduced supply of electricity to all households on a rotational time basis, is implemented. Load shedding together with poor electrical infrastructure in rural areas meant that some students had to endure long periods of down time. This challenge was addressed in various ways – students were provided with power banks which enabled them to charge their devices to continue working during times of no electricity. The charged devices did not enable them to stay online as some data providers do not have backup generators that ensure their infrastructure can continue to work during times of electricity outages. To help mitigate these circumstances, assessments had to be open for a longer duration on the LMS. Since load shedding is on a rotational basis, this meant that students could complete the assessments as soon as their area was scheduled to be connected to the electricity grid.

A larger pool of assessment questions had to also be created to circumvent the possibility of students attempting to copy. Due to the poor state of resources for some students from rural areas, the university had to eventually allow some of the students to return to the university residences, where the infrastructure is stable. This was not an option for all students, it was handled on a case by case basis.

Unfavourable study environment:

There are some students that come from very poor households, with many individuals sharing small living spaces, lack of running water and electricity. Students are also expected to take care of their younger siblings while at home. This results in the environment not being conducive to facilitate effective learning. The university had to find the balance of being sympathetic to students who had unfavourable learning environments and students that had the required resources but were seeking undeserved sympathy. This brought to the forefront the large divide that exists in South Africa between the priviledged and under priviledged sectors of the population. Pre COVID-19, this divide between the rich and poor was minimized in the university environment, due to the university providing all the required facilities for its students to achieve the desired outcomes. The provision of necessary study resources was hindered during COVID-19. During times of turmoil, like that of the COVID-19 pandemic, it is evident that the gap between the rich and poor continue to grow. The university which is publicly funded, understands its role in developing social and financial cohesion in society but COVID-19 upset some of the strides made to bridge the gap. Education is the main element in helping future generations to bridge the divide that exists in South African society and lecturing staff were sensitized to their role in ensuring that “no child is left behind”. Lecturing and administrative staff have put in many more hours ensuring as many students as possible were assisted.

Unprepared for online teaching and learning:

Lecturers and students were ill-prepared for the online approach to teaching and learning. Students had to adjust their mind set to how they receive and engage with content. Lecturers had to overcome personal inhibitions to embrace the power of recording their content versus live physical teaching.

Reduced technical assistance:

The University’s IT / technical department could not provide the required level of support during the first few weeks of the lockdown. It was a new way of working for them to provide technical support remotely, they took time to reach an acceptable operating level.

INF281 Specific Challenges

Software compatibility:

The software required for the module required devices that had a prescribed minimum set of requirements. Some of the student’s devices did not support the software installation. This meant lecturers extending assessment deadlines to accommodate the student arranging to buy or borrow another suitable device.

Online multitasking with one device:

Students had to swap between windows during their assessments with the case study open in one window and the assessment questions in another window. Assessment times were adjusted to ensure students had sufficient time.

No data for live virtual classes:

Due to some students' financial situation, they did not have access to sufficient data to support the attendance of live sessions. The live sessions were recorded and uploaded to the learning management system. The university entered into agreements with the major data service providers, which allowed all content uploaded and downloaded from the learning management system be zero rated. This did not allow for attendance of the live sessions but it did allow students to download the recordings at a later time.

Lack of technical skill:

Some students struggled with downloading and using the software without the physical assistance of IT technicians. Video tutorials were created to support this shortcoming.

Lack of physical INF281 resources:

Some students had left the physical textbook at the University campus. An online pdf textbook was made accessible for students to download. The electronic text book was electronically distributed with the knowledge and permission of Sage Pastel.

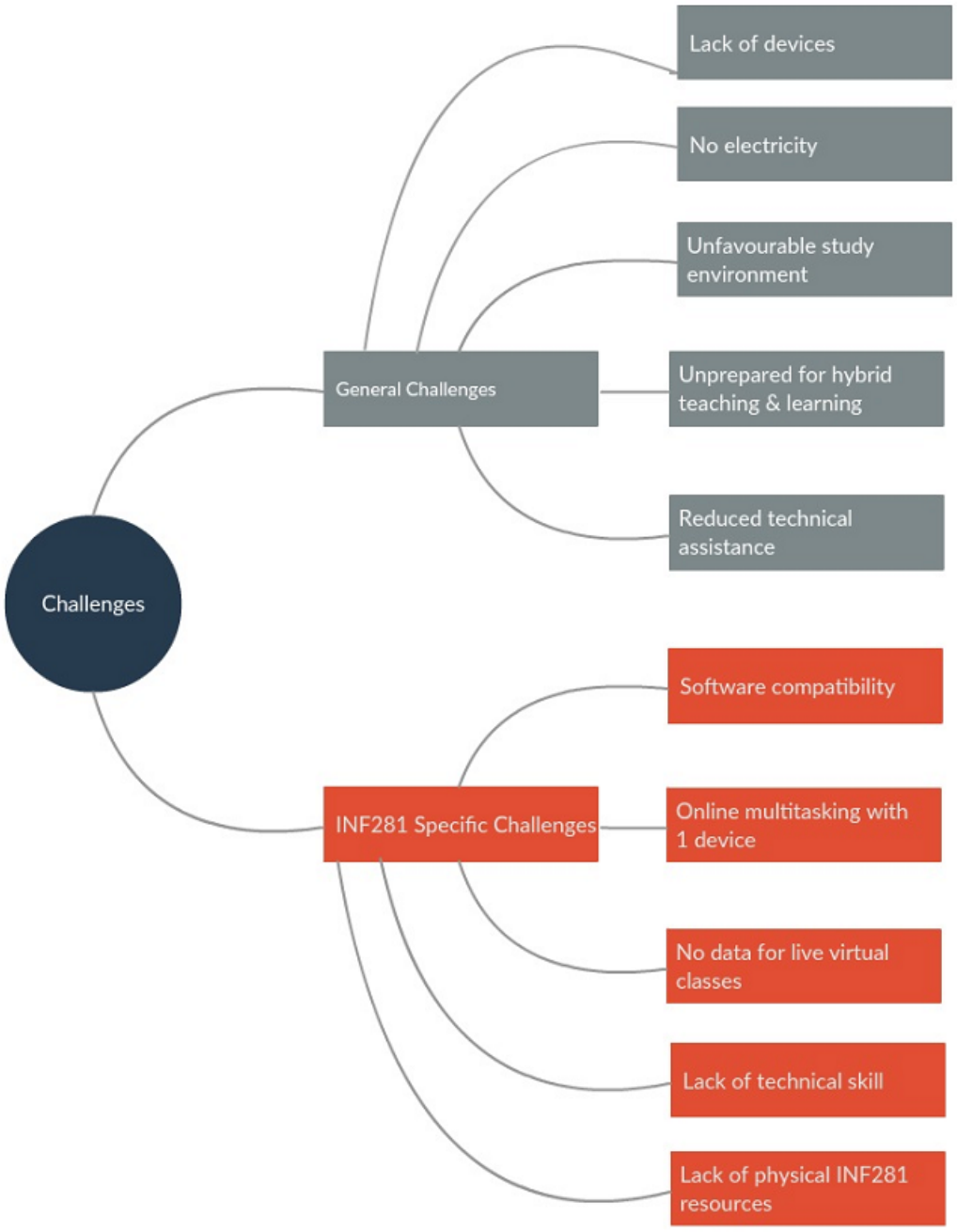

Figure 2: The main challenges faced during the COVID-19 lockdown.

Lessons learnt

Figure 3 summarises lessons learnt while teaching and administering INF281 during the COVID-19 pandemic.

Infrastructure:

The structure of the Learning Management System is vital to the success of students. User friendly interfaces and the logical grouping of module content can assist students in finding what they require and prevent them from feeling lost and unsure. Announcements on the LMS are equally important to provide guidance to students and to assure them that they are working in the right direction.

Timetable:

Having a flexible timetable allows students to feel in control. Although, it is more work for lecturing staff, many sessions teaching the same content ensures that no student is left behind.

Textbook:

Simply providing a pdf textbook is insufficient - the amount of time students spend swapping between windows can lead to frustration. The textbook should have hyperlinks affording students an interactive environment. If videos are used to supplement the textbook and teaching, the quality must be of a professional standard. Typically, videos should be created by the lecturing staff using content and terminology that is familiar to the students. The use of outsourced video content created in another environment must be properly screened to ensure no foreign concepts or alternate methods are being used.

Classes and Consultation:

The duration of the online classes should not necessarily be the same as contact classes. It is more difficult to keep students engaged in an online environment. It is also difficult for the lecturer to determine engagement. In a contact class, facial expressions guide the speed and direction of the content. The online emojis etc. that are available to students do not accurately portray the students' engagement.

Assessment:

The availability of assessments for a longer period of time is essential to its success, especially in an environment that has the many challenges of a developing country. The pool of assessments questions must be large and randomized to minimize plagiarism. The LMS must support students not being able to backtrack to previous answers, this again minimizes the plagiarism. The duration of the assessment itself must be longer than contact assessments due to the multitasking that is required between the different online windows. Marks should be awarded for all student engagement, this will motivate students to participate in the module on an ongoing basis.

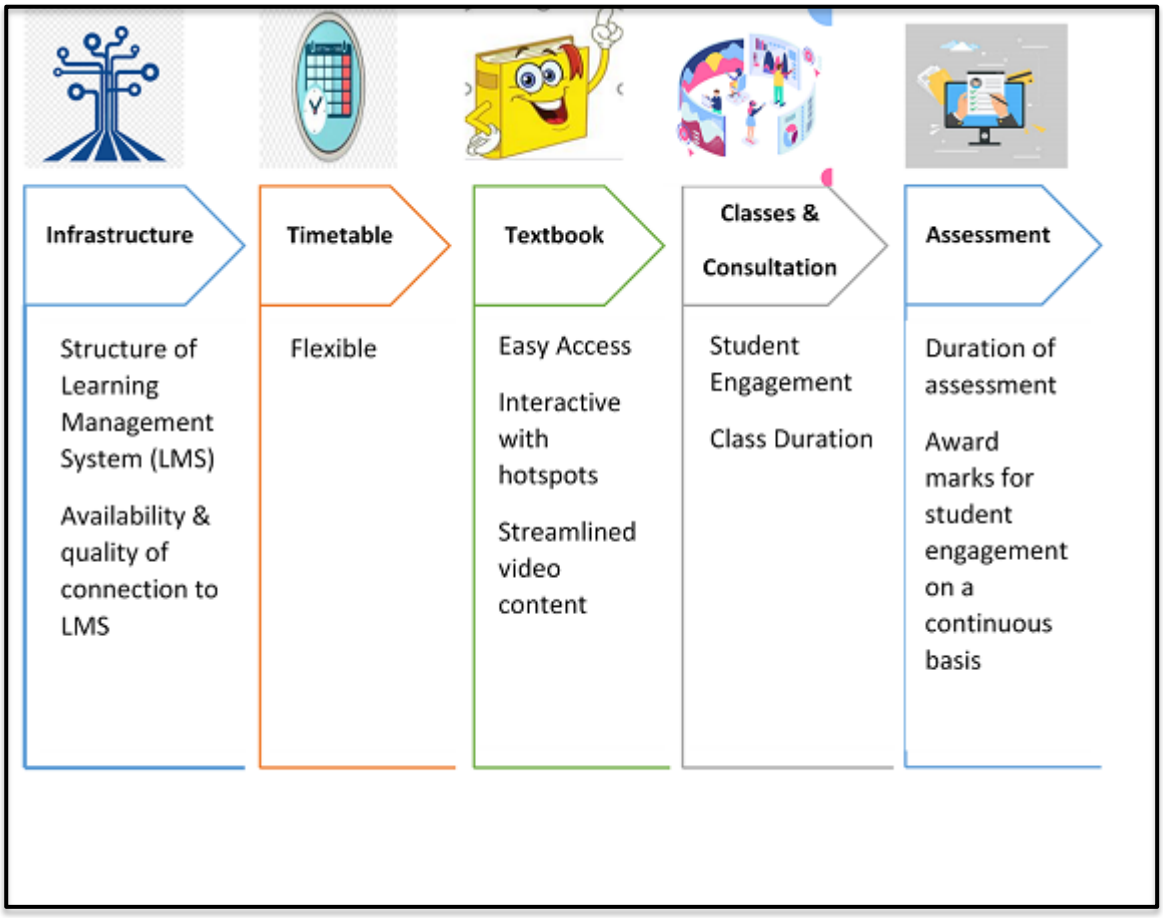

Figure 3: The lessons learnt that impacted the way the Pastel course was presented.

VII. CONCLUSION

It is concluded that COVID-19 had a severe impact on how universities worldwide teach. Even though the education landscape changed drastically with COVID-19, the university and the Informatics department were able to adjust their teaching, learning and assessment so INF281 could to be completed online successfully. This required a change in the students' academic infrastructure. The creating of an online textbook, online blackboard collaboration classes and voice over PowerPoint videos contributed to the success of teaching and learning. A great deal of thought and structure went into setting online tests with randomised questioning so dishonesty of students could be reduced. All the software was made available to the students and the university supplied loan laptops and in some instances data. Action research was used as the lens to place the case study presented in context. There were various challenges that students in South Africa had to face with lockdown. The biggest challenge was the digital divide, where the poorer students had to receive assistance in the form of loan laptops and zero-rated data usage for the LMS. Other challenges include general challenges, such as lack of electricity and an unfavourable study environment, and specific challenges for Pastel, such as a lack of technical knowledge and lack of data for online classes.

A number of lessons were learnt, such as how to structure the course if it needs to move to an online platform quickly, creating a flexible time table where students can attend virtual lectures with the opportunity to ask questions, and ensuring that students have access to an interactive

online textbook. More time should also be provided for online assessments, to enable students to complete tasks if there are electricity outages due to load sheading.

IX. FUTURE RESEARCH

Future research includes looking at the year as a whole, and then to determine what can still be done to present courses more efficiently as an online model. One can also use the results of the students to plan the course in future. One recommendation going forward can be to maybe always allow some students to attend virtual classes, rather than face-to-face, especially if it does not affect the final pass rates significantly. Other important points to consider in future is to investigate an online marking tool, creating randomised questions for Pastel Accounting assessing the same objective for each student, and the creation of an online textbook. Lastly, it will be beneficial if INF281 can be integrated online into other 2nd year modules to enhance learning.

LIST OF REFERENCES

Arnold, L., and Norton, L. (2018). HEA Action Research: Practice Guide. *Higher Education Academy*. York, United Kingdom.

Avison, D. E., Lau, F., Myers, M. D., & Nielsen, P. A. (1999). Action research. *Communications of the ACM, 42*(1), pp. 94-97.

Baldry, K. (2016). Graduate unemployment in South Africa: social inequality reproduced. *Journal of Education and work, 29*(7), pp. 788-812.

Bao, W. (2020). COVID-19 and online teaching in higher education: A case study of Peking University. *Human Behavior and Emerging Technologies, 2*(2), pp. 113-115.

Bhorat, H., Kimani, M. & Pillay, N. (2018) *The evolution of National Student Financial Aid Scheme (NSFAS) funding*. (Labour Market Intelligent Partnership (LMIP) Policy brief; 22).

Coghlan, D. (2019). *Doing action research in your own organization*: SAGE Publications Limited. London.

Gibbs, P. et al. (2017). Literature review on the use of action research in higher education. *Educational action research, 25*(1), pp. 3-22.

Hodges, C. et al. (2020). The difference between emergency remote teaching and online learning. *Educause Review, 27*.

Hwang, A. (2018). Online and hybrid learning. *Journal of Management Education, 42*(4), pp. 557-563.

Kemmis, S., McTaggart, R., and Nixon, R. (2013). *The action research planner: Doing critical participatory action research*: Springer Science & Business Media.Springer. Singapore.

Langa, M. et al. (2017). *# Hashtag: An analysis of the# FeesMustFall movement at South African universities*. Johannesburg: Centre for Violence and Reconciliation.

Malabela, M. (2016). We are not violent but just demanding free decolonized education: University of the Witwatersrand. *An analysis of the# FeesMustFall Movement at South African University*, pp. 132-152.

Naciri, A. et al. (2020). Mobile learning in Higher education: Unavoidable alternative during COVID-19. *Aquademia, 4*(1), ep20016.

ABOUT THE AUTHORS

Komla Pillay is a lecturer in the Department of Informatics at the University of Pretoria. She is passionate about higher education and making sure students achieve the best learning outcome. Her areas of interest range from tools and technologies to promote best teaching practices to investigating the impact of big data analytics in developing economies. Her latest project involves the creation of strategies for the implementation of South African smart villages.

Pariksha Singh is in higher education for the last 22 years where student-centered education is her goal. As a manager of Student Relations, her key focus is based on improving teaching, learning and assessments for courses with very large numbers. Pariksha is currently involved with information and digital literacy for first year university students and her main area of research is to personalize learning for academic information management.

Tania Prinsloo is a senior lecturer in the Department of Informatics at the University of Pretoria. She is the department's Academic Information Management coordinator at the IT Laboratories and assists with various aspects at the Laboratories, including training at the beginning of the year, class visits and content moderation. She obtained a Y2-rating from the National Research Foundation in South Africa in 2019 and aims to continue her research in line with the Sustainable Development Goals.