

TAU 4 INSTITUTIONAL PROJECT REPORT

Module Design and Restructuring for Online Adaptation to Distance Learning.

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PROJECT AIM

Over the last few years, Tshwane University of Technology (TUT) has embraced innovative practices and new approaches to promote digital transformation for teaching and learning as part of its transformation framework. This necessitated changeover to eLearning did not only involve adopting online teaching strategies, but lecturers also found themselves challenged with different approaches to module presentation to advance student-centred learning. In addition, several new modules were introduced and modules already running alongside the contact environment need to be included in this multimodal strategy.

For the first time courses with distance-learning modules were also presented to undergraduate students. This type of module presentation requires instructional guidance through a fully developed online presentation. General Chemistry I is a first-year module currently presented to full time students in a blended environment, and part-time students registered for distance learning (therefore offered completely online). The module content, assessments, and online interface is designed identically; however, the student experience and engagement are different, which affects their overall performance.

This TAU project objective was to establish an online module that supports autonomous learning and promotes the learners' capacity to self-direct their own learning, taking responsibility for the decisions concerning the different aspects of the learning process (Horvath, 2007). It must include, but not limited to, learning material, variable activities, different types of assessments, synchronous and asynchronous discussions, as well as student monitoring and risk identification. This will contribute towards building a more inclusive and flexible approach for students in diverse learning environments.

BACKGROUND

The project was conducted in the Department of Chemistry, focusing on students enrolled for the General Chemistry I module offered as a service subject for the programme Fire Technology, the Faculty of Science's first distance learning programme. These students study online remotely from various provinces. Whilst the same module is offered to the Gauteng students who are enrolled for the same programme, are studying as a blended learning environment. General Chemistry I is a year module offered over a total of 30 weeks and its module descriptor and credits are aligned with the Chemistry modules offered in the same period but as contact classes. Therefore, the difference in learning experience by students is problematic.

Because the university has only recently rolled out programmes that service additional provinces and endorses a fully instructional module structure that supports and promotes learning in an asynchronous environment, yet the practicality of this application is still lacking in most departments. The asynchronous learning requires restructuring of a module's presentation to address challenges faced when keeping students coordinated to complete the syllabus successfully in the given timeframe and on the same standard – most specifically when those students are studying in different environments under different learning conditions.

The group of remote learning students included in the module used for this project are currently facing the following injustices, which has a direct impact on their success rate:

- Their minimum entry requirement is Recognition for Prior Learning (RPL), whereas other programmes presenting the same module requires a minimum APS count of 24 with an achievement level of 5/8. However, the exit levels are both set on 24 credits, with the same content presentation and assessment strategy.
- Most of these students do not have a scholarly physical science background and they left the secondary learning system more than five years ago.
- They are working students; prioritising studies with work obligations and working in shifts over six-day cycles.
- Digital competencies have become a vital part from academic to technology skills development. However, its use as a learning tool may seem intimidating, especially to learners in older generation groups, and they may experience difficulties and frustration with technologies, leading to a disconnection with the module as a whole.

The project supports the University's strategy to expand on learning resources and diversifying its learning spaces. The use of new learning resources provides the possibility of designing more authentic meaningful tasks that engage students in both a physical and virtual student-centred environment. Curriculum development and design in a digitised space emphasises

more fluent interaction between lecturer-student-content rather than just the syllabus content. These strategies support the transformational learning and teaching approach adopted by the University to invest in the upskilling of both staff and students, incorporating learning technologies into practices and help build a culture of digital competency (TUT Learning and Teaching Strategy, 2020).

CONCEPTUAL FRAMEWORK

Investigating different design structures implemented by TUT, EDUVOS, UNISA and the short learning programme provider GetSmarter, provided benchmarking objectives for the project. However, these programmes are designed to provide the same learning experience for all enrolled students. The module design for this project had to consider that it runs parallel to two other modules with the same learning outcomes, content, assessment criteria and total credits, one being a contact module and the other a synchronised online module. Other factors that impact equitable access to online learning also had to be considered in the design, namely; physical resources (hardware, space, internet); human resources (literacy, education, self-regulated learning) and social resources (community, teachers, peers) (Tate & Warschauer, 2022).

The approach required a more holistic view between institutional support, instructional design, online pedagogy, and student learning. Specifically, focusing on content delivery in such a way that it speaks to the student's level of understanding but also builds their knowledge to reach the expected outcomes. A conceptual outline was structured around different factors as set out by Broadbent and Poon (2015):

- Time Management and Organisation: Timetabling study, considering energy levels, access to resources, deadlines, fixed events such as scheduled assessments and external commitments.
- Effort Regulation: Monitoring and sustaining effort, even when learning content and activities are difficult or frustrating.
- Peer Learning: Interacting with other students in order to achieve learning goals.
- Elaboration: Making links between new material and past lessons or experiences.
- Rehearsal: Repeating and returning to material in order to understand it thoroughly.
- Metacognition and Critical Thinking: seeking out, evaluating information and opinions, and reflecting on different perspectives in order to reach a well-informed conclusion.

Shifting the emphasis from only self-directive learning to include more active learning actions was aimed at improving student engagement and participation. However, the quality of activities should be carefully considered over quantity to maintain sustainable effort and development of critical thinking abilities (Prince, 2004), especially where time management is

a factor. A solution would be to include self-directive ‘textbook’ questions can be used as asynchronous activities followed by more in-depth problem solving and peer-led discussions during synchronised sessions.

The design intent was to also address important factors for lecturers, when configuring and managing a bichronous online learning experience. Instructional guidelines recommended in a collaborative paper on online instructor practices for blending asynchronous and synchronous online modalities (Martin *et. al.*, 2022), describes this:

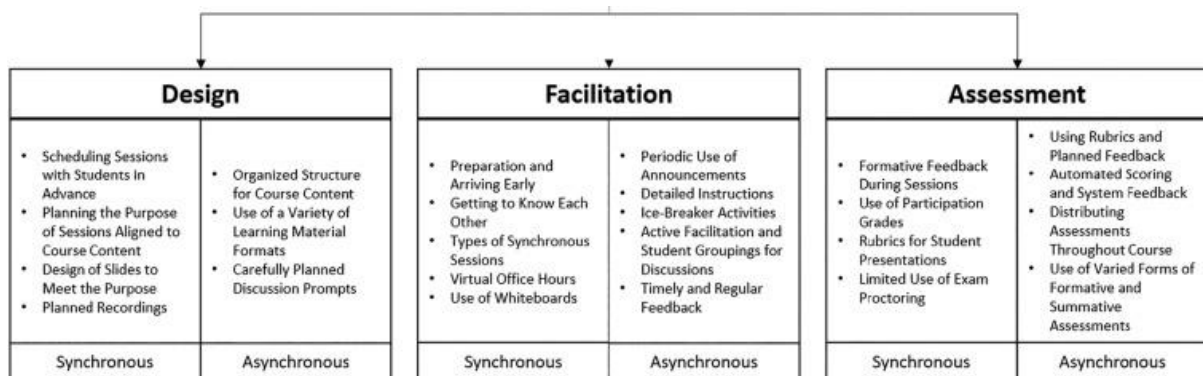


Figure 1: Summary visualisation of bichronous online learning dimensions (Martin *et. al.*, 2022)

PROJECT DEVELOPMENT AND IMPLEMENTATION

The initial content presentation structure (Figure 2a) introduced a learning unit with bulk content over variable weeks. It had limited instructional guidance through the content and rigid, one directional flow from introduction to assessment. This made it very challenging for the students to navigate through the learning material, engage with peers and to do constructive self-reflection. The lecturer was also challenged in presenting meaningful contact sessions and meeting the required assessment criteria. This led to a complete restructuring (Figure 2b), breaking content down into individual weeks with more specific instructional guidance. Reflective activities between individual topics and smaller, more frequent assessments were introduced. Types of assessment modes were also varied per semester. Student monitoring and risk identification was also introduced via an LMS tool. The lecturer could now flip their presentation order from topic introduction to topic discussion during the fortnightly online sessions.

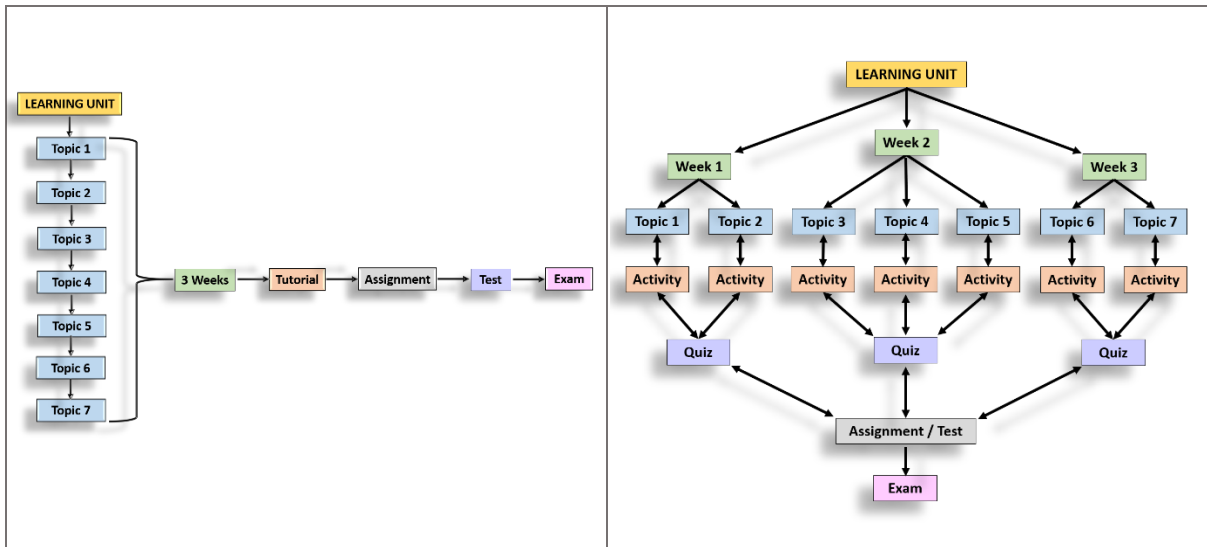


Figure 2a: Initial one-directional flow of content and assessment presentation used in 2022.

Figure 2b: Redesigned multi-directional flow of content and assessment presentation implemented in 2023.

The use of various technologies to facilitate content dissemination (LMS), the learning process (MS TEAMS, YouTube, eBooks) and assessment (LMS-assessment tools, invigilation software) was carefully considered. Only the basic required software and applications were introduced, and students were encouraged to use their mobile devices in addition to a laptop to make them comfortable in using technology as a learning platform. Virtual laboratory software and other tools was then gradually introduced as their digital competency improves.

OUTCOMES

My evaluation so far is a comparison between outcomes in 2022 before the project and 2023, after. Figure 3a represents student engagement over twelve weeks – this is the percentage students that access the content on a weekly basis. In 2022 the numbers fluctuated significantly, spiking only the week of a test, whereas 2023 students consistently engaged with the content on a weekly basis. In addition, their online class attendance and participation reflects a more engaged student. A decrease in missed tests and request for assignment extension indicates students are better prepared for assessments. Figure 3b illustrates how the difference in engagement and the active learning component reflected in their assessments.

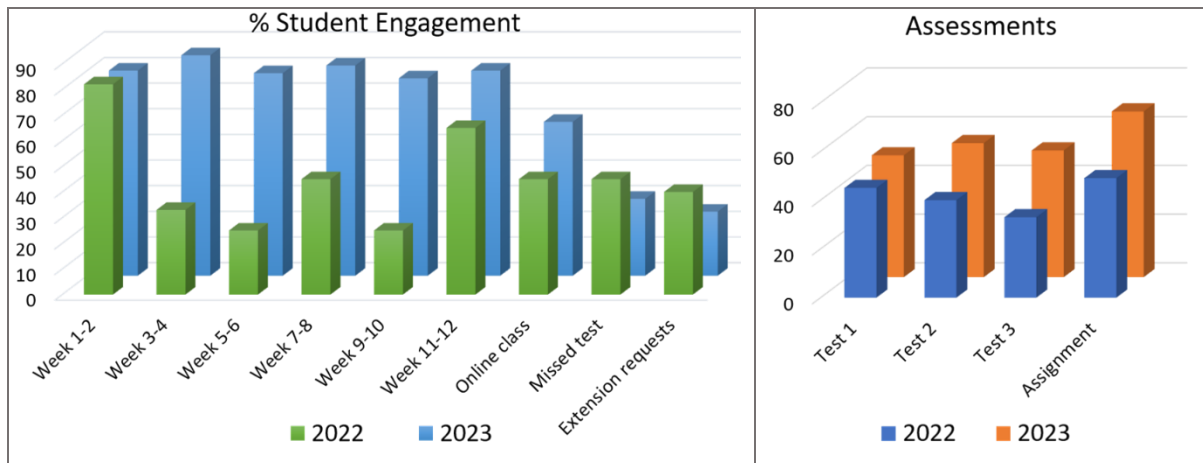


Figure 3a: A comparison between percentage student engagement with learning content before (2022) and after (2023) module restructuring.

Figure 3b: A comparison in assessment outcomes between 2022 and 2023.

COLLABORATIVE WORK

To build on a learning-centered design required input from all the end-users and institutional stakeholders, during different stages of the project. Identifying problem areas in the content presentation involved the lecturer and students in the module. Initially this was set out to be done as formal interviews and surveys, however, less formal instructive feedback from students during online class discussions and in the student WhatsApp group was used as guidance. A student e-tutor was also appointed to provide technology, learning management system and academic support. This made a significant difference to address digital competency. Development and progress of the project also included consultation with the following institutional stakeholders:

- A content expert and the programme coordinator responsible for the course.
- The faculty instructional designer and curriculum development practitioner to assist in the page design as well as the adaptation of the curriculum to online pedagogy of the learning content.
- The Department of Teaching and Learning with Technology, responsible for development on the institutional LMS to ensure that the design aligns with the institutional online development vision and greater strategic goals.
- Lecturers presenting distance learning modules for the same programme to allow for flexibility and ensure continuity between modules in the programme.

CHALLENGES FACED

- Having limited knowledge about the scholarship of teaching and learning principles (SoTL) made it challenging to understand the insight with which the project should address the problem faced by students and the lecturer involved.

- The initial user-experience feedback using a questionnaire was not successful. Students were reluctant to provide honest and constructive criticism using a survey platform, responses mostly translated to 'I don't like it, but I can't tell you why'.
- Lecturer involvement and contribution in addition to an already existing heavy workload delayed their input and commitment to the project. My own commitments also interfered with keeping to the projected timeline. As a year module (running from Jan-Dec) the project is therefore not completed yet, but the initial implementation phase has been successfully activated
- Pinpointing digital competency of distance learning students, standardising it and gradually improving on it without 'losing' a student in the process required a lot of repetitive exercises, especially with online assessment tools.

CHANGE CONTRIBUTION

Though not complete yet, the project so far has addressed and lead to upliftment in the following:

- Developing a learning space that accommodates the learner and teacher to use ways that facilitate construction of meaning of effective outcomes. This allows for shaping and implementing the curriculum in line with student's needs, abilities and interests.
- Identifying and prioritising barriers that inhibit adoption of technology in instruction and providing adequate support to improve on digital literacy.
- Investing in relevant digital tools and platforms for a learning-centred environment which support learners and lecturers with digital technology skills.
- Implementing a more active learning approach which will enable students to reach their greater learning potential earlier in the module rather than towards the end.
- Once the trial module template is complete and proven successful, it will be extended to other modules within the Fire Technology programme as well as the Post Graduate Diploma in Chemistry distance and remote learning programmes. Consistency in presentation of modules will ensure continuity and cohesiveness in these learning programmes.

Considering skills such as literacy and numeracy, critical and creative thinking, problem-solving, accountability and integrity, reflection, listening and communication processes in module development; all contribute toward social transformation and professional development of the students. Measuring student online activity and engagement, feedback in user-experience and improvement in the pass rate throughout the module development will reflect on the success of the project. The redesigned module creates a flexible yet inclusive learning environment where students are emancipated and empowered, instilling a sense of accomplishment in their learning environment and their digital proficiency.

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