

The University of South Wales

Control and Instrumentation Module A zyBooks Case Study 2023

zyBooks
A Wiley Brand



Selim Tudgey teaches the Control and Instrumentation module to undergraduate Mechanical, Aeronautical and Aerospace Engineering students. Selim's students come from diverse backgrounds with several international students with English as a second language. She has a mix of full-time and part-time students with some working alongside their studies.

The University of South Wales is a vocationally-focused university, preparing students to support key industries now, and in the future. Employers work closely with USW to co-create curriculum that supports their future needs. The university works in collaboration with industry, researching and innovating to tackle some of the biggest global challenges, from energy and health to security and sustainability.

Approach

The study was conducted in the Spring of 2023 as part of a zyBooks trial at the University of South Wales. The title used for this pilot was the 'zyVersion' of Nise's *Control Systems Engineering*. This is a well-established textbook which is widely used on undergraduate modules. The textbook has been converted and adapted into our interactive learning platform, zyBooks, offering the same trusted content, enriched through the addition of animations and learning questions, with instant feedback, to encourage interactivity and mastery of concepts.

The Challenge

Students were entering the course with varying levels of maths skills and engagement with the course material

Selim observed that her students were coming onto her course with varying levels of mathematics proficiency with knowledge gaps due to the Covid-19 pandemic.

“Control is very maths intensive. You have a lot of complex maths, like partial fractions, integrals and Laplace transforms. I have found, since Covid, that students are coming into university with gaps in their knowledge so they’re lacking the maths skills required to understand control concepts. They also struggle with understanding the theoretical aspects of the course. Additionally, it had become obvious that students rarely read the textbook. They are overwhelmed by the density of the text and the amount of content covered and don’t know where to start.”

As Selim searched for solutions to these challenges, she came across the Nise, *Control Systems Engineering* zyBook.

“When I first evaluated the zyBook, I realized that there’s so much I can do with this! I realised that I could easily incorporate it into my lectures to help students really understand what control is about. There are not a lot of animations out there for control, so I was really impressed with the number of embedded animations”.

Evaluation

The Department agreed to pilot the zyBook for semester two, with their second year undergraduate Mechanical, Aeronautical and Aerospace Engineering students and first impressions were extremely positive.

Selim very quickly discovered that using the zyBook had a really positive impact on enhancing her students' knowledge. By utilizing the Participation Activities during class sessions, she could effectively assess the students' understanding. After teaching a concept, the students were asked to open the zyBook on their phones to test their comprehension. The students were highly engaged and particularly valued the exercises and question sets, which allowed them to recap the material, solidify their understanding, and practice in areas where they felt unsure.

Selim observed that this generation is accustomed to acquiring knowledge in bite-sized chunks which is compatible with the way the content is presented in the zyBook. Her students showed a significant improvement in their reading habits, actively referencing the content and engaging with the material, which was not a common practice for them with the prescribed books before.

Since this is a short course, Selim chose to hide chapters that were unnecessary for the students to study. This approach was taken to prevent the students from feeling overwhelmed. Additionally, the functionality helped her to identify struggling students early on, enabling timely intervention and support.

"...I've been able to actually test my students' knowledge within the class session, so I might go through a concept and then I ask my students to open the zyBook on their phones and then we get to test their understanding, which the students actually really enjoy. For them, it's reaffirming: we understand what is being taught to us. We get it.

We understand it."

Student Feedback

A survey was sent out to all students at the end of the pilot period to enable them to share their experience of using the zyBook on their course.

Key findings:

- **78%** agreed or strongly agreed that using the zyBook enabled them to come to class better prepared.
- **81%** agreed or strongly agreed that using the zyBook was an easier way to learn than using print or an eTextbook.
- **81%** agreed or strongly agreed that using the zyBook provided effective digital resources to boost independent learning.
- **88%** were satisfied overall with the zyBook.

Student feedback:

"Great learning tool. Good addition to the lectures and easy to follow along yourself and to do extra questions and revision away from lectures"

"It's very useful to develop our knowledge and it's easy to search stuff and understand"

"zyBooks gives an excellent understanding and step-by-step process of the problem"

"Gave good examples, and a wide range of theory across topics"

Conclusions

This one-semester pilot has allowed for full testing of the product and platform. Both faculty and students reported that using the zyBook showed a strong positive correlation between usage, and engagement and comprehension amongst the class.

These findings, together with the ease of implementation and use, has lead to the Department committing to adopting this zyBook on the course and also evaluating additional zyBooks for other modules for the coming year.