

Enterprise Architecture Components for Digital Education Platform (uLesson)

Business Architecture

The business architecture of our digital education platform centres on delivering inclusive education to Magoza Secondary School's 1643 students despite resource constraints. Key business considerations include alignment with South African curriculum requirements (CAPS) and creating sustainable partnerships between educators, government departments, and private technology providers like Vodacom. The business model emphasises cost-effectiveness by leveraging existing infrastructure opportunities and strategic partnerships to distribute implementation costs while ensuring that educational outcomes meet Department of Education standards.

Application Architecture

Our application architecture features low-bandwidth solutions specifically designed for rural environments. uLesson serves as the primary educational content delivery platform, chosen for its ability to function in connectivity-challenged environments. The application layer prioritises offline capabilities, allowing students to download content during connectivity windows and access it later without the internet. The user interface is designed with simplicity in mind, accommodating varying levels of digital literacy among both educators and students.

Data Architecture

The data architecture employs lightweight, compressed formats to minimise bandwidth requirements. Educational content is modularised into small, downloadable units that can be accessed incrementally. Local caching mechanisms store frequently accessed resources on devices, reducing dependence on continuous connectivity. Student progress tracking uses minimal data transmission, synchronising with central systems only when connectivity is available. The system maintains data consistency through asynchronous updating protocols designed for intermittent connections.

Technology Architecture

The technology foundation relies on satellite-based solutions (VSAT and YaClick) to overcome terrestrial infrastructure limitations. This approach was chosen after analysing the severe connectivity constraints in the region. Mobile devices serve as the primary access points, supplemented by computer labs where space permits. The technology stack incorporates robust power management features to accommodate an unstable electricity supply, including offline operation modes and low-power consumption requirements for devices.

Narrative and Design Considerations

Our narrative choices reflect the journey of a rural student encountering digital education tools, highlighting how properly implemented EA components can transform educational access. We specifically focus on how satellite technology bridges the connectivity gap, enabling educational platform access where traditional broadband solutions fail. The storyline emphasises gradual capability building, showing how students' progress from basic digital literacy to meaningful educational engagement.

The design deliberately embraces simplicity over complexity, recognising the practical constraints of the environment. By showcasing how EA components work together – from business partnerships that fund satellite technology to applications designed for low-bandwidth environments – the narrative demonstrates a holistically designed solution rather than disconnected technological interventions.

This approach acknowledges the socioeconomic realities of rural South African (Dan village) education while demonstrating how thoughtful enterprise architecture can create meaningful educational opportunities despite resource limitations. The emphasis on scalability ensures that the solution can expand to similar contexts, creating a sustainable model for digital education in comparable rural environments.