



Orchestrating entangled relations to stretch the iron triangle: Observations from an LMS migration

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A key strategic issue for higher education is how to maximise the accessibility, quality, and cost efficiency of learning and teaching (Ryan et al., 2021). Higher education's *iron triangle* literature (Daniel et al, 2009; Mulder, 2013; Ryan et al, 2021) argues that effectively addressing this challenge is difficult, if not impossible, due to the "iron" connections between the three qualities. These iron connections mean maximising one quality will inevitably result in reductions in the other qualities. For example, the rapid maximisation of accessibility required by the COVID-19 pandemic resulted in a reduction in cost efficiency (increased staff costs) and a reduction in the perceived quality of learning experiences (Martin, 2020). These experiences illustrate higher education's on-going difficulties in creating orchestrations that stretch the iron triangle by sustainably and at scale fulfilling diverse requirements for quality learning, (Bennett et al., 2018; Ellis & Goodyear, 2019). This exploratory case study aims to help reduce this difficulty by answering the question: What characteristics of orchestrations help to stretch the iron triangle?

An LMS migration is an effective exploratory case for this research question since it is one of the most labour-intensive and complex projects undertaken by universities (Cottam, 2021). It is a project commonly undertaken with the aim of stretching the iron triangle. Using a socio-material perspective (Ellis & Goodyear, 2019; Fawns, 2022) and drawing on Dron's (2022) definition of educational technology the poster examines three specific migration tasks: migrating lecture recordings; designing quality course sites; and, performing quality assurance checks. For each task, two different orchestrations – organized arrangements of actions, tools, methods, and processes (Dron, 2022) – are described and analysed. The *institutional* orchestrations developed by the central project organising the migration of an institution's 4500+ courses, and the *group* orchestrations developed, due to perceived limitations of the institutional orchestrations, by a sub-group directly migrating 1700+ courses.

Descriptions of the orchestrations are used to identify their effectiveness in sustainably and at scale satisfying diverse quality requirements - stretching the iron triangle. Analysis of these orchestrations identified three characteristics that are more likely to stretch the iron triangle: contextual digital augmentation; meso-level automation; and, generativity and adaptive reuse. Each of these characteristics, their presence in each orchestration, the relationships between these characteristics; linkages with existing literature and practice; and their observed impact on the iron triangle qualities is described. These descriptions are used to illustrate the very different assumptions underpinning the two sets of orchestrations. Differences in relationships evident in the orchestrations and which mirror the distinctions between 'smooth users' and 'collective agency' (Macgilchrist et al., 2020); and, industrial and convivial tools (Illich, 1973). The characteristics identified by this exploratory case study suggest that an approach that is less atomistic and industrial, and more collective and convivial may help reconnect people with educational technology more meaningfully and sustainably. Consequently this shift may also help increase higher education's ability to maximise the accessibility, quality, and, cost efficiency of learning and teaching.

Keywords: iron triangle, educational technology, LMS migration

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