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Uncertainty, Collegial Organisation and the Collective Competencies of Digitalization

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**Research Domain:** Digital University and new learning technologies (DU)

**Abstract:** We report on two case-studies where digitalization has been approached from the perspective of the uncertainties which are generated by technology. Against the prevailing discourse around digitalization, digital literacy or computational thinking, which focuses on individual competence, we argue that digitalization represents an attribute of the collective "effective organisation" of educational institutions. We show how an orientation towards the uncertainty created by technology can be harnessed to stimulate dialogue between different stakeholders with different skills and perspectives. The two case-studies illustrate contrasting ways in which this might be done, and in each case we examine the dialogic space that opens up. We argue that this approach to institutional and personal adaptation to the technical environment is more in keeping with biological processes of adaptation, in that this is essentially a middle-out developmental approach, rather than a linear or top-down approach.

**Paper:** Attempts to unpick the essence of digitalization, digital literacy, and computational thinking have exposed large areas of uncertainty in initiatives to increase digital engagement among staff and students (Weintrop et al. 2016; Shute, Sun, and Asbell-Clarke 2017; Lye and Koh 2014). While such initiatives appear well-intentioned in attempting to 'make education better' (Century and Cassata 2016), the various approaches to implementation, its intended outcomes, and the actual consequences of using more technology in education raise troubling questions. In particular, digitalization can mean that teachers find themselves immersed in time-consuming low-level work at interfaces to manage electronic transactions with students to feed the assessment system, instead of spending time engaging in high-level conversations with students. Is this making education better? Better for whom? Better than what?

Policy-makers in recent years seem determined to insist that one definition of 'better' is a greater degree of fit between what are seen as the demands of industry - particularly those demands concerning technology, the knowledge economy, the 4<sup>th</sup> industrial revolution and 'digital competency' - and the activities of education. Given what appears to be a clear signal about the future in terms of increasing automation, networking and artificial intelligence, the opportunity has been seized by government ministers, schools and universities, to 'implement' digitalization and

increase 'digital literacy.' In all cases, this is seen as a need for *personal* development: digitalization manifests in the transformation of individual competence in relation to technology. In contrast to this, and drawing on Fischer's (2020) recent work, we argue that digitalization needs to be seen organisationally and culturally. Without this, both institutions and individuals risk exposing themselves to uncontrollable complexity which will exacerbate already manifest problems.

From a systems theory perspective, technical objects are environmental phenomena to which individuals and organisations adapt orienting their identities in relation to their lifeworlds (Simondon 2017; Hui 2019). However, the orientation of individuals to technical objects is not the same as the orientation of institutions, and since institutions present technical objects to individuals as a result of their own orientation to the world, conflict between the personal and the institutional can produce instabilities of organisation. The institutional demand to address digitalization can be seen as an epiphenomenon of this dynamic tension. This tension can result in pathologies of organisation: for example, the demand that everyone gains digital competence risks already overstretched teachers and learners having to keep another ball in the air.

As a way of addressing these challenges, we argue that the inherent uncertainty surrounding technology in education has its own dynamics, which if harnessed, can create the conditions for a more effective and organic institutional adaptation to the technical environment. Uncertainty arises because technological complexity increases the available options for acting in the system, making the selection of any particular way to act more difficult. We argue that the manifest deficiencies of the education system - whether they include underskilled students, or the various pathologies of fairness, curriculum or assessment - result from difficulties in selecting appropriate action. However, these deficiencies cannot be addressed by imagining how the system would be better if only it did x instead of y, or teachers were able to use technology z instead of w. Instead, we focus on dialogue as the most effective way in which uncertainty can be managed.

We draw on two case-studies to illustrate the dynamics of uncertainty in two universities. Instead of conceiving of digitalization as a linear movement from a perceived present to an imagined future, both case studies illustrate how the uncertainty generated by technology can be exploited to stimulate dialogue between different staff and students with different skill-sets. Case study 1 uses technology in the context of an interdisciplinary programme to stimulate dialogue between a team of 20 teachers and 200 learners by amplifying uncertainty. Case study 2 uses a process of co-design of technology, making technical solutions inspectable as a way of stimulating dialogue about new possibilities. Drawing an analogy with biological development, we argue that both these approaches illustrate a 'middle-out' (Noble 2002), rather than 'top-down' or 'bottom-up' adaptive response to technical complexity.

The middle-out approach acknowledges that in imagining institutional and personal adaptation as a journey from present to future, both present and future are constructed in discourse in different ways by different stakeholders. This means that there is uncertainty and ambiguity in the construction process, and this must be resolved in the communication dynamics between stakeholders. Technology is a powerful means of coordinating expectations between diverse stakeholders, opening a dialogic space (Wegerif 2007) wherein new forms of "effective organisation" of education can be explored.

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