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Theorising effective uses of digital technology with activity theory

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ABSTRACT

Effective uses of digital technologies are vital to full inclusion in a network society. Digital-abilities researchers have produced several major frameworks, but these have generally not incorporated socio-contextual perspectives. To explore this lacuna, and engage in a reflective act of theorisation, activity theory is used to conceptualise four sub-systems of digitally mediated action. Eschewing technological determinism, humans are positioned as active agents capable of identifying, taking up, modifying and even subverting established technology uses in pursuit of meaningful objectives. At the same time, attention is given to contextual conditions shaping diverse activity systems supported by assemblages of humans and machines. Having theorised effective digital-technology uses through the lens of activity theory, the author reflects on this conceptual apparatus itself. In so doing, activity theory is characterised as a fertile, if complex and contested, future-oriented tradition that challenges individual-social dichotomies and addresses both humans and machines as mediators of activity, development and learning.

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Problem statement

Variously cast as literacies, competences and skills, effective use of digital technology is a prominent international research theme. Ferrari (2012) identified numerous digital-abilities models, but few have developed into fully theorised and operationalised frameworks (Desjardins, 2005; Eshet, 2012; Ferrari, 2013; van Deursen, Helsper, & Eynon, 2014). Even among the most developed frameworks, socio-cultural perspectives (e.g. activity theory, distributed cognition and situated action) have not gained attention. This 'theory gap' appears significant because such approaches have deeply influenced the cognate domains of human–computer interaction (HCI) (Clemmensen, Kaptelinin, & Nardi, 2016; Kaptelinin & Nardi, 2012; Kuuti, 1995) and digital learning (DeVane & Squire, 2012; Jones, 2015). To address this gap, this study (re)theorises effective digital-technology use on the base of activity theory. It begins with a brief overview of activity theory. Next, a compact conceptual grammar is constructed, and four sub-systems of digitally mediated action are systematically explored. Finally, key findings are organised, and activity theory is assessed as a tool for theorising. This exercise deepens an established body of research and offers a case study for theorising the educational use of digital technology.

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Enter activity theory

Activity theory has been called 'an agenda for a research program' (Kuuti, 1992, p. 234), a 'conceptual framework and vocabulary' (Turner, 2016, p. 27) and an 'intellectual tradition' (DeVane & Squire, 2012, p. 242). Leontiev, one of activity theory's founding thinkers, spoke of an 'activity approach' (*dejatel'nostnyj podhod*) (Leontiev, 1977b). This approach originated in a 1920s post-revolutionary context and is associated with the 'troika' of Vygotsky, Leontiev and Luria (Kozulin, 1986). Building directly on Marx and countering the classical-conditioning paradigm of Pavlov, they launched a cultural-historical perspective open to radical psychological and social restructuring (Daniels, 2017; Kozulin & Presseisen, 1995; Rückriem, 2014). After completing a body of seminal psychological research in Moscow led by Vygotsky, with Stalin tightening party control over science in 1929, Leontiev assembled his own research group in Kharkov, Ukraine (Leontiev, 2005b; Yasnitsky, 2008) where *activity* become a major facet of study. Although Vygotsky died in 1934 of tuberculosis, he bequeathed to Leontiev a key conceptual cornerstone: *mediated action* as a unit of analysis (Wertsch, 1994; Yamagata-Lynch, 2010).

Vygotsky's mediated action

Rejecting behaviourist perspectives, Vygotsky brought humans, as active agents, together with their social environment as a single functional unit in several laboratory studies. Findings demonstrated that language and artefacts restructured cognition, thus transforming a stimulus-response process into a culturally mediated act (Wertsch & Tulviste, 1992). In addition to exploring ways in which humans mediate the cognitive processes of others as carriers of signs, symbols and meanings (Kozulin & Presseisen, 1995), Vygotsky also emphasised tool mediation. He distinguished between (a) technical tools, which are directed towards the mastery of natural processes; and (b) psychological tools – including both material artefacts (e.g. maps, works of art and blueprints) and symbolic systems (e.g. language, different forms of numeration and counting, algebraic notations, mnemonic aids and all sorts of conventional signs) – which are directed towards mental processes (Vygotsky, 1997). Because tools of all types are cultural products, Vygotsky construed individual mental functioning as determined 'from the outside', and formed fully through the gradual internalisation of external models and processes (Kaptelinin & Nardi, 2012).

Mediated action to collective activity

Leontiev (1977a) 'zoomed out' on Vygotsky's mediated action to explore *activity* – still primarily from the perspective of an individual actor – as a fuller link between the environment and human consciousness. His theorisation introduced several constituent elements and a dynamic hierarchical structure (e.g. Leontiev, 1977a, 2005a, 2006). With respect to constituent elements, activity is centred on an active *human agent* pursuing an *object* (Leontiev, 1977a). This object anchors subjective human experiences by focusing attention and providing motivation for an activity (Kaptelinin, 2005). The human pursuit of objects is mediated by *tools/instruments*. Leontiev elaborated the concept of 'functional organs' to speak about human–tool partnerships that extend natural capacities (Kaptelinin & Nardi, 2012). He derived another element from the inherently social nature of activity. Through activity, humans not only enter a relationship with nature, they also enter a relationship with a *community* to pursue social objects facilitated by coordinated action and purposeful communication. Even in ancient times, collective activity produced a technical *division of labour* and corresponding *rules* of participation. In the end, six items – *human agent, object, tools/instruments, community, division of labour* and *rules* – were introduced as the constituent elements (and mediators) of human activity.

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