

Appendix 1: Interpersonal relationships in quality improvement

Change Laboratories

This study will explore whether the Change Laboratory (CL) model can be used to systematically develop a coherent practice-based theoretical basis and modelling of experienced, as well as intended, processes to inform the design of any interventions for improvement.

The CL has been used, particularly outside of healthcare, for translating the results of theoretical and empirical modelling into interventional studies of particular local settings.^{1,2} As an innovative model of work transformation, it is worth exploring whether it can also function as a mechanism to bring together the experience of those on the frontline of healthcare interventions that are necessarily and critically dependent on human interactions to develop methodological advances for socially mediated quality improvement activities and define what ‘good’ looks like. In essence can it be used to create a framework for the “...use of knowledge to offer standardised responses to common needs, customised responses to particular needs, and flexible responses to emergent needs”³

The central tenet of the CL is the creation of a 3 X 3 matrix of viewpoints for participants to reflect on their working practices as shown in Diagram 1.

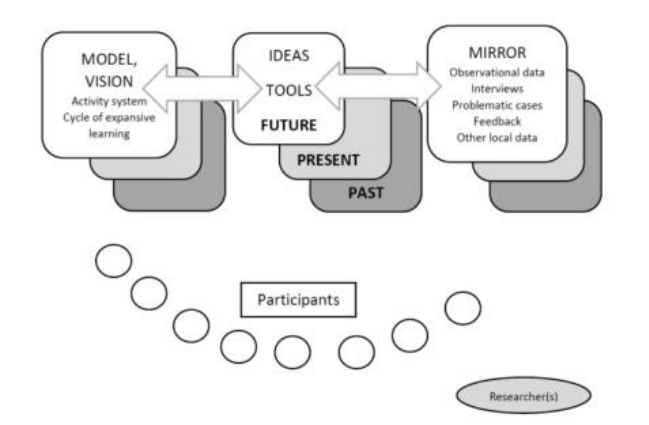


Diagram 1: Change Laboratory format

In the vertical plane, participants explore their working practice (i.e. day-to-day work, activities, routines or practices) in the past, present and future. In the horizontal plane, they do this at three levels of abstraction. At the most concrete, they work with an idea, or some data (from lived experience or introduced by the research team) that mirrors their working practice and illustrates the problems and disturbances of their work. The research team would use our metanarrative review, observational and Egonetwork maps (who talks to who, when and why) from our interview data as this starting point alongside other items chosen by participants. At the other end of the abstraction spectrum, participants develop and own locally sensitive theoretical models based on activity system theory that help them to conceptualise their work activity and make sense theoretically of the built-in contradictions generating the troubles and disturbances depicted in the mirror. Activity theory describes learning, in the broadest sense of making sense and constructing meaning as well as acquiring knowledge, skills and behaviours, as ‘expansive’. The vertical and

¹ Engeström, Y., Virkkunen, J., Helle, M., Pihlaja, J. and Poikela, R. 1996. The Change Laboratory as a tool for transforming work. *Life Long Learning in Europe* 2:10–17.

² Engeström Y. Putting Vygotsky to work: The Change laboratory as an application of double stimulation. 2007 In Daniels H, Cole M, Wertsch J, Eds. *The Cambridge Companion to Vygotsky*. Cambridge, Cambridge University Press.

³ Batalden Paul. Getting more health from healthcare: quality improvement must acknowledge patient coproduction—an essay by Paul Batalden *BMJ* 2018; 362 :k3617

horizontal planes interact to create a third and middle plane representing the ideas that surface during discussions between participants as solutions/innovations to the contradictions they have uncovered. They then explore these in a cyclical and iterative manner with regard to their potential capabilities in transforming current working practices.^{1,4}

This study will use the CL approach in six sessions, mirroring one cycle of the CL process:

CL 1: Questioning (understanding what the 'need' state is)

CL 2: Analysis – what are the challenges and binds?

CL 3: Modelling new solutions – what could be possible?

CL 4: Exploring how to examine and test the model in different ways

CL 5: Issues of implementation

CL 6: Process reflection – what might stabilise new ways of working, how could practices be consolidated and generalised

CL has been developed from Activity Theory which itself provides a theory of how human interactions function to achieve specific goals through work / activities situated within systems of practice.

Diagram 2: Representation of Activity Theory concepts⁵

Typically, the overarching concepts of Activity Theory are represented diagrammatically (see also Table 1 below for definitions of each concept). Engeström modelled human activity as an activity system that consists of the subject focusing on an object of collective activity that is mediated by signs and tools, rules and division of labour in a community.^{6,7} This demonstrates the interactive nature of each element and the broad social processes (production, consumption, exchange and distribution) that occur as a result of dynamic interactions (shaped by the rules and division of labour in the subject's community) between the people and artefacts involved in a system centred on how the object is achieved for the subject with the desired consequential outcome. Hence activity is experienced by people as actions, work and effort connected to a collective object and directed by the circumstances and tools at hand.⁸ It is important to understand that the outcome of achieving the object (even the assessment of whether it is achieved or achievable) is dependent on the sense and meaning constructed during the activities and processes which occur.

⁴ Kerosuo H, Engeström Y. Boundary crossing and learning in creation of new work practice. *Journal of Work and Learning* 2003;15:345–51.

⁵ Engeström, Y. *Learning by expanding: An activity-theoretical approach to developmental research*. Helsinki, Orienta-Konsultit.

⁶ Engeström, Y. *Learning by expanding: An activity-theoretical approach to developmental research*. Helsinki, Orienta-Konsultit. p174

⁷ Leont'ev, A N. *Activity, consciousness and personality*. 1978 Englewood Cliffs, Prentice-Hall. p63.

⁸ Virkkunen J, Newnham D S. *The Change Laboratory*. 2013. Switzerland, Springer Nature. doi:10.1007/978-94-6209-326-3

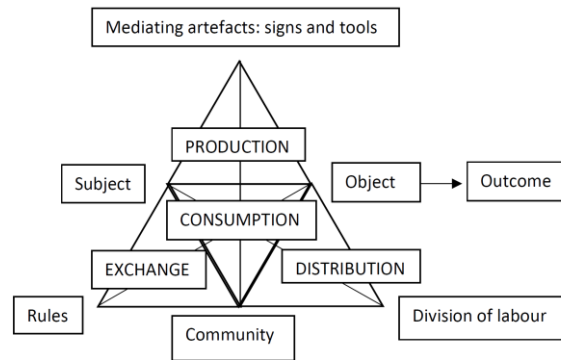


Diagram 2: Activity Theory concepts

There are five guiding principles of Activity Theory which need to be considered in CL work.⁹

(1) Each activity system, has to be understood in relation to other activity systems with shared purposes

Diagram 3: Multiple Activity Systems

Activity Theory research is particularly powerful when looking at interactions between two or more systems as it seeks to analyse disturbances in working practices that arise because of changes or challenges within and across systems that have a shared practice.^{10,11,12}

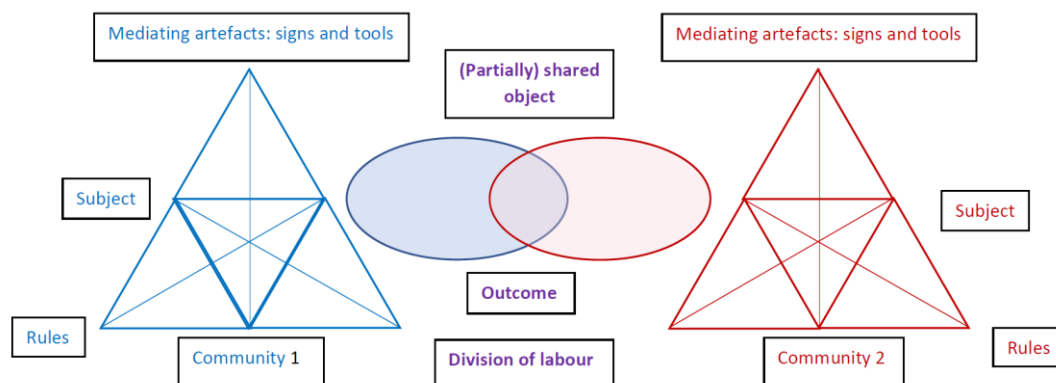


Diagram 3: Multiple Activity Systems

(2) Within an activity system there are multiple perspectives (multivoicedness) not simply because of different roles or positions of people within the system but also because of wider sociocultural

⁹ Engeström Y, Davydov V, Toulmin S, Lektorsky V, Tolman C, Cole M, Eskola A, Häyrynen Y, Tobach E, Colucci F. Theoretical issues In Engeström Y., Miettinen R., Punäsmäki E. (Eds). Perspectives on Activity Theory. Cambridge: CUP; 1999. pp1-146.

¹⁰ Engeström, Y, Kajamaa, A, Kerosuo, H, Laurila P. Process Enhancement Versus Community Building: Transcending the Dichotomy through Expansive Learning. In K. Yamazumi (Ed.) Activity Theory and Fostering Learning: Developmental interventions in education and work. Osaka: Center for Human Activity Theory, Kansai University; 2010. pp. 1–28.

¹¹ Kajamaa A. Unraveling the helix of change: an activity-theoretical study of healthcare change efforts and their consequences. [Doctoral Thesis]. Helsinki, Finland: University of Helsinki. 2010. Available at <http://urn.fi/URN:ISBN:978-952-10-6990-1> [accessed 06.12.2018].

¹² Engeström Y. From teams to knots: Activity-theoretical studies of collaboration and learning at work. Cambridge: CUP; 2008.

influences such as the influences of history and tradition on belief. Interactions between people coming from different perspectives create both challenges and the potential for change.

(3) The system itself takes shape over time and considering the history of each system (historicity) is necessary to contextualise how activity and processes occur within it.

(4) Contradictions, between 'what should happen on paper' and practice are sources of potential change and development.

(5) The introduction of novel practices or improvement ideas will produce a mix of resistance and embracing from people within the system, balanced according to whether they anticipate additional work or demands in greater measure than more meaningful and effective outcomes or not.¹³

¹³ Brennan N, Mattick K. A systematic review of educational interventions to change behaviour of prescribers in hospital settings, with a particular emphasis on new prescribers. *British Journal of Clinical Pharmacology* 2012;75:359–72.

Table 1: Activity Theory Concepts and Definitions used when working with CL methods

Concept	Definition
Activity	The processes, work and effort undertaken by people to achieve an object (see below). Always collective, activities include ambiguity, surprise and sensemaking, all of which are considered to generate the potential for change, i.e. expansion of the object, and/or new ways of achieving it. ^{14,15}
Activity System	Historically evolving systems within organisations/contexts where activities take place. ¹⁶ Increasingly in healthcare the boundaries between activity systems are blurred.
Community	People around the subject who are engaged in activities to achieve the object. Achieving the object requires collective action of a large community of professionals together with patients and their informal network of carers (such as family and friends). Multiple relations should be analysed while seeking to also analyse the systemic whole.
Contradictions	Contradictions occur within and between activity systems on several levels: Primary contradictions occur when there are internal contradictions within the elements of the activity system, e.g. use value vs. exchange value in the object. Secondary contradictions occur between different elements of the system e.g. subject vs rules. Tertiary contradictions occur when there is difference between the object of the prevailing activity and a new activity through resistance to change. Quaternary contradictions arise in parallel with the generalization of the new activity between the new activity and its neighboring activities (conflicts with others). Contradictions and disturbances in activity processes do create problems but also offer targets for new collectively generated solutions: <i>"The distance between the present everyday actions of the individuals and the historically new form of the societal activity that can be collectively generated as a solution to the double bind potentially embedded in everyday actions"</i> ¹⁷ Contradictions may also arise in different perceptions and assumptions about whose role or responsibility it is to contribute what activity within and when a patient moves between settings. Rather than viewing contradictions negatively within activity theory these will be viewed as sources of disturbance that hold the key to change and potential for improvement and learning.
Disturbances/ Deviations (used interchangeably in Activity Theory literature)	These are: <i>"deviations from the normal scripted course of events in the work process, normal being defined by plans, explicit rules and instructions, or tacitly assumed traditions. A disturbance may occur between people and their instruments, or between two or more people. Disturbances appear in the form of an obstacle, difficulty, failure, disagreement, or conflict"</i> ¹³ Activity systems (of patients, carers and professionals within and during transitions/in shared care) are interdependent and at the same time in potentially tension-laden relationships with each other, generating disturbances. Disturbances in care processes and may hinder holistic management of patient care. However, instead of being viewed as error-causing phenomena, we view disturbances as an inherent feature of work processes and as drivers for change and development. ^{11,18,19,20} Deviations may occur because of competing pressures or priorities. For example, while effective symptom control may be the intended object of activity competing objects such as the desire to please or avoid confrontation may cause disturbances in the process as may system failures or guidelines/protocols that are not practical to apply.
Divisions of labour	The divisions of labour describe how different individuals / roles act on the object of the activity. Who is responsible to enact and ensure safety in each step of the process describes the division of labour. In reality this may not be clear or straightforward in all situations. Divisions of labour tend to occur through use of implicit as well as explicitly developed norms (i.e. how we do things around here as well as officially promoted ways of how things should be done). Power is an important consideration in divisions of labour as inequalities in power will alter how divisions occur and are understood. Divisions may also evolve over time but will be influenced by what has historically been in place.

¹⁴ Engeström Y. New forms of learning in co-configuration work. *Journal of Workplace Learning* 2004;16:11-21.

¹⁵ Medical Research Council. Developing and evaluating complex interventions. London: MRC; 2006. Available at: <https://mrc.ukri.org/documents/pdf/complex-interventions-guidance/> [Accessed 06.12.18].

¹⁶ Engeström Y. Expansive Learning at Work: Toward an activity theoretical reconceptualization. *Journal of Education and Work* 2001;14(1):133-156.

¹⁷ O'Brien H, Kiely F, Carmichael A. Doctor-related medication safety incidents on a specialist palliative medicine inpatient unit: A retrospective analysis of three years of voluntary reporting. *Journal of Pain and Palliative Care Pharmacotherapy*. 2017;1-8.

¹⁸ Public Involvement Standards Development Partnership. UK standards for Public Involvement. National Standard 3: Support & learning. Available at <https://sites.google.com/nihr.ac.uk/pi-standards/home> [accessed 17.06.19].

¹⁹ Casarett D., Spence C., Clark M., Shield R., Teno J. Defining patient safety in hospice: Principles to guide measurement and public reporting. *Journal of Palliative Medicine* 2012;15:1120-3.

²⁰ Larsen D P, Wesevich A, Lichtenfeld J, Artino A R, Brydges R, Varpio L. Tying knots: an activity theory analysis of student learning goals in clinical education. *Medical Education* 2017;51:687-98.

Expansive learning	<p>In activity theory positive evolution and development of practice is framed as ‘expansive learning’ – that is learning which occurs through people interacting each other and co-producing new ways of working that better suit the goal to which they are working.</p> <p>In order to understand how this can be achieved and where system breakdowns, barriers and facilitators or problems lie study of the existing practice and workplace context in which a particular goal is needed. In doing so it is important to pay attention to anything that creates a disturbance from ideal/intended/what happens on paper practice. This type of learning can often start as in-situ ‘work-arounds’ that people develop informally. Research attempts to capture this so that it can be utilised further, bringing frontline innovations and initiatives into improvement strategies.</p>
Mediating artefacts	<p>The use of artefacts (tools and instruments) ideally driven by collective object-related motives to mediate actions between subjects and objects in the context of work.</p> <p>People both use inanimate mediating artefacts in their interactions each other and assign these artefacts a place in the system. Understanding when an artefact has ‘taken on a life of its own’ i.e. is being used beyond its original intent or in novel ways to achieve / disrupt achievement of an object is important in understanding the dynamics of the community.</p>
Object (goal)	<p>Essentially what the subject needs and what the system and community should be trying to achieve. The object includes a collective motive (goal/outcome) and connects actions of individuals to larger systems.¹⁷The sense and meaning of actions are attached to the object of an activity. The concept of object can potentially widen our understanding of why disturbances take place. The existence of the multiple, specific and sometimes competing objects typically causes disturbances in care processes. The flexible aligning of the different and competing objects calls for the collective reflection, negotiation and reconceptualization of the object to enhance collaboration in the provision of patient care.²¹</p>
Rules	<p>The parameters within which activities take place.</p> <p>These can be implicit (how things work around here) or explicit (e.g. legal regulations)</p> <p>The rules by which different people in the system are guided and constrained also vary and members of the community of professionals may or may not be party to understanding the context and capabilities of others.</p>
Subject	The person who the object should serve.

²¹ Adapted from Engeström, Y. Learning by expanding: An activity-theoretical approach to developmental research. Helsinki, Orienta-Konsultit. p78.