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Academics' learning in times of change: a change laboratory approach

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ABSTRACT

Academic work in universities is in flux with staff increasingly being confronted with multiple and conflicting roles, often leading to academics experiencing feelings of fragmentation and despair. Though much has been written about the changing nature of academic work and its effects on the academic workforce, there has been less exploration of how academics can be assisted in understanding and collaboratively resolving their difficulties. In this article the sequential and structured cycles of learning within three academic Change Laboratories are described and compared with reference to the main conflicts arising and their potential resolutions. The article then proposes that the Activity Theory-inspired Change Laboratory can assist academics in systematically learning about and potentially resolving difficulties in working life. The site of the study is the recently formed University of Technology sector in which problems may be further exacerbated as staff have to align their prior vocational identities with those of a more traditional university.

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Introduction

Professional learning for academics was, in the past, primarily through induction into disciplinary cultures (Trowler, Saunders, and Bamber 2012; Young and Beck 2005), through, for example, the PhD route. However, as academic work has changed, increasing in both complexity and range (Clegg 2008; Zukas and Malcolm 2019), it may be more suitable to understand academic professional learning as induction into the whole community of practice of the department, including teaching, assessment and administrative regimes (Jawitz 2009).

Furthermore, the culture of academic collegiality and autonomy has been eroded as universities increasingly adopt performance and quality assurance measures (Young and Beck 2005; Zukas and Malcolm 2019), and managerial cultures aligned with an increasing responsiveness to market forces (Guzman-Valenzuela and Barnett 2013).

Zukas and Malcolm (2019) highlight the need to open the 'black-box' of academic learning if we are to understand its enactment in relation to the social, material and organisational milieu of the university. The work reported on here continues within this relational research tradition and in addition extends it through suggesting a methodology for academic learning within the vocational higher education sector in South Africa.

This sector has relatively recently gained university status (2003/4), unlike, for example in Australia and the UK where polytechnics and colleges were repositioned as universities in the late 80's and 1992 respectively. Though institutions being granted new status was not unproblematic outside of South Africa, for example being described as simply changing the labels rather than the purpose and profile of the prior institutions (Scott 1992), or staff questioning their status as academics (Sikes 2006), there appeared to be particular difficulties in transitioning in South Africa. For example, according to White, Carvalho, and Riordan (2011), the vocational education system, unlike many of the traditional universities, was characterised by relatively inflexible and hierarchical forms of management. There has been some work on this transition, for example Powell and McKenna (2009) and Kraak (2009), but not focused on academics' experiences and learning nor through utilising a Change Laboratory approach.

In this article, university academics within the recently formed professional/vocational university sector collectively confront and attempt to resolve workplace problems within a Change Laboratory. A Change Laboratory is a methodology that generates knowledge by inviting participants to a sequence of workshops in which they work on structured tasks to analyse and reimagine their own practices. Furthermore, the author had recently successfully experimented with using the Laboratory in their own university to assist staff in navigating the workplace/university divide (Garraway and Christopher 2020), and believed it could be used to elucidate this more general problem. The learning actions in the Change Laboratory are typically described in the literature in the form of a developmental cycle from questioning practices, analysing problems raised and modelling new solutions (Virkunen and Newnham 2013).

The author has worked as an academic staff developer at a University of Technology for some years and so has witnessed changes in mission over this time. The author was thus aware of staff's sense of confusion about what would constitute the move to a UoT and crafted a project and sought funding to examine the problem through a Change Laboratory methodology. A general call was put out to two UoTs in South Africa, the South and East UoTs, and volunteers selected who had an interest in the problem and who could commit themselves to several consecutive workshops.

Through analysing how staff work within the Change Laboratory, the research reported on here uncovers moves staff make towards 'substantive reconceptualization of learning challenges' facing them (Schaupp 2011, 215), and the extent to which they are able to put forward innovative potential solutions. By reconceptualization is meant a shift from problem instances to a more systematic and relational understanding, underpinned by historically accumulated contradictions, in other words engaging in a process of expansive learning (Engeström 2008).

Thus the questions addressed in the article are:

How can the Change Laboratory support academic learning and the emergence of new visions in times of change?

The main question can be divided into a number of sub-questions which also match to the main learning actions in the Change Laboratory:

- Were staff able to raise and confront problems (questioning)?
- Were staff able to systematically understand these conflicts (analysis)?

- Were staff supported in suggesting innovative improvements (modelling and experimentation)?

The context of new universities in South Africa

South African Universities of Technology, or UoT, the research site for this article, emerged from the previous higher education ‘Technikon’ sector in 2003/2004. Technikons were similar to the British Polytechnics in that they focused on diploma education, predominantly towards preparing students for workplace practice, albeit at a higher level of sophistication than Technical Colleges (Kraak 2009; Singh 2008). Staff were mostly drawn from and identified themselves with their occupational sphere rather than for their knowledge of core academic disciplines or research expertise (Shay et al. 2011). Even with a change in status to universities, the UoT struggled to recruit highly qualified academic staff and postgraduate students (Powell and Mckenna 2009), and were viewed as second-class universities. The prior Technikons were also characterised by fairly rigid hierarchies, a tendency which was carried over with their change of status to UoT (White, Carvalho, and Riordan 2011).

Unlike in other countries however, where there were clear criteria for claiming a UoT status, for example in Ireland (Elwood and Rinnie 2012), no such policy criteria were introduced in South Africa. Rather, the emergence of the UoT was announced in Parliament and introduced into policy documents (Asmal 2003) without policy directives as to their distinctive character.

Within the new UoT the predominantly occupationally-orientated and skilled teaching staff were often thrust into a new regime of research, the pursuit of higher qualifications and higher degree teaching often without the requisite historically-based academic expertise (Kraak 2009). As this occurred within a historically tiered management structure (White, Carvalho, and Riordan 2011) staff were not always able to engage with nor influence these and other changes, thus setting up tensions between the old and new institutional identities. Given this context, it is therefore not surprising that the UoT coordinating body announced in 2016 that ‘We (UoT) appear to have lost our way ...’ (Van Staden 2016).

The Change Laboratory methodology

Change Laboratories have been conducted in higher education studies, notably by Engeström, Rantavuori, and Kerosuo (2013) on library staff’s difficulties of moving from distributed subject libraries into a centralised system. Englund (2018) provided a systematic Change Laboratory analysis to help resolve issues in programme integration in Pharmacology. Englund and Price (2018) analysed the development of lecturer agency through the Change methodology using Engeström’s types of expression of agency of ‘resistance’ through to ‘taking actions’. Montoro (2016) examined the vexing issue of student resistance to language teaching in Engineering Education through a discourse analysis approach within the Laboratory. Bligh and Flood (2015) give an important synopsis of Change Laboratory work in higher education. The authors suggest its usefulness, not just in resolving curriculum and teaching issues, but also in examining changing missions, particularly

involving previously more marginalised voices. This latter focus is similar to that explored in this article. Academic staff, who are not traditionally involved in developing university missions, are involved in formulating what a University of Technology could be, within the protected space of the Change Laboratory.

In this research, two separate Change Laboratory groups were formed at the East UoT, one in the Faculty of Health (7 members from departments of Dentistry, Environmental Health, Radiography & Medicine, 7 workshops) and one, the East Education UoT group, all from the university Teaching Centre (8 members and only 3 workshops as this group started late), and a third separate mixed group of staff drawn from different faculties at the South UoT (7 members from the Teaching Centre, Education, Design and Health, 6 workshops). Each workshop lasted approximately 2 ½ hours and was videotaped to serve as a bridge and a stimulus for subsequent workshops. Furthermore, all developing ideas and emerging activity systems were recorded onto A-2 paper during the sessions (see [Figure 1](#)), as is typical of Change Laboratory work (Virkkunen and Newnham 2013, 20).

The Change Laboratory draws on two main principles underpinning collective learning and development, double stimulation and ascending from the abstract to the concrete, and a number of formative tools. A significant formative tool for elucidating the different elements of an organisation, and for locating where contradictions may lie, is the activity system diagram, shown in [Figures 5–7](#). This is used extensively as a means to help workshop participants gain a more systematic understanding of lived experiences. In the Figures, the subject refers to the group from whose perspective the activity is being examined, and the object to the raw material the subjects are acting on. The object also motivates or pulls participants towards achieving some form of desirable outcome (Engeström 1999). In working on the object, subjects utilise and are constrained by a number of mediating artefacts, for example tools drawn from their own experiences, from other



Figure 1. An academic Change Laboratory.

participants or more generally from the cultural milieu. The rules element refers to the explicit rules of the organisation as well as its implicit norms and cultural values, and so also influences what can and cannot be accomplished in the activity. Likewise, the division of labour, which refers vertically to hierarchical divisions and horizontally to specialisations, influences how work is conducted within the activity. The community highlights the different stakeholders whose interests in the activity need to be recognised.

The formative tools are intertwined with the two main principles. Double stimulation involves, firstly, the formative tool of provocation leading to participants grappling with the problem at hand. This, in turn, may lead to participants raising and confronting 'conflicts of motives' (Sannino and Engeström 2017, 82); for example, having to choose between research or teaching, spurring them on to develop some sort of concept or structure that can help them navigate this difficulty.

In the Change Laboratory work, this secondary stimulus may be just an initial idea or structure, or can be the beginnings of a new way of thinking about the activity, a germ cell (Sannino and Engeström 2017). Under some circumstances secondary stimuli can be models created with the help of the researcher-interventionist from on-the-spot analysis of the discussions, for example fourfield quadrant ZPDs (see Figure 2) and activity system diagrams (Figure 5). These sorts of formative tools help the participants to supersede a narrower version of the problems they encounter through more clearly seeing the forces at play and so possibilities for change (Schaupp 2011, 211).

In ascending from the abstract to the concrete participants move from initial, individual emotive experiences of their work difficulties towards more collective and systematic understandings, using accessory thinking tools. These are primarily activity system diagrams and ZPDs infused with the underlying dialectic principle that problems experienced by participants are underlain by more fundamental, historically accumulated and systemic contradictions. Elucidating and clarifying these contradictions provides the basis for formulating new, bridging ideas across the opposites that constitute the contradictory elements. This so-called germ cell then needs to be fleshed out or concretised through trying the new idea out in the imagination (Engeström and Sannino 2011) so that real-world contingencies are brought to bear, and the idea/process can be adjusted accordingly. This whole process of collective learning, involving working with contradictions to develop new and innovative concepts, is termed expansive learning (Engeström 2008).

The expansive learning cycle typically involves seven types of learning actions (Virkkunen and Newnham 2013). The first action is that of 'questioning' in which participants raise and discuss issues and conflicts experienced in their working lives, often in direct response to provocations (often controversial statements or occurrences) raised by the facilitator and by their peers. The second action is that of analysis which is itself divided into two types; analysis of the current situation and historical analysis. Both analyses typically involve the use of activity system diagrams whose purpose is to aid participants in systematically understanding the roots of the issues and conflicts previously raised. The third learning action is termed modelling in which new concepts, tools or practices emerge from the prior analysis which embody the possibility of resolving contradictions raised. The new model is then initially tried out and tested by participants. Subsequent learning actions, five to seven, involve further implementation and evaluation towards a new way of operating.

Methods – task design and instruments used

The task design and instruments used are divided into four sections. The first, provocation and conflicting motives, corresponds to Engeström's expansive learning action one (questioning). The second, third and fourth sections, ZPDs, historical trajectories and current analysis, correspond to learning action two (analysis). The fourth section, which includes future analysis and projections, corresponds to the third learning action (modelling) and in part the fourth learning action (examining the model).

The tasks/instruments used broadly follow Sannino and Engeström's (2017) method and sequence in their comparison of knowledge generation across three Laboratories. The one addition in this research is the use of historical analysis (Virkkunen and Newnham 2013) which the author felt enriches the overall analysis.

Provocation and conflicting motives

In all three groups, the same initial provocations to stimulate discussion and the formulation of the problem were used. There was firstly a film clip of an interview with the previous Deputy Vice Chancellor of the East UoT in which he highlighted the strengths and possible future trajectories of the UoT sector (he currently chairs the representative body for all universities in South Africa). There was then an interview transcript with the current chair of the UoT sector, in which he bemoaned the loss of direction, identity and forward plan for the UoT sector. In addition, participants were encouraged to bring forward documents and other artefacts and crucial incidents which highlighted their often difficult day-to-day experiences.

The provocation helped the participants to both better understand and also confront the problems they encountered in their daily lives. The problem itself then became a first stimulus that spurred them on to use tools to work on it (the secondary stimulus). The secondary stimuli began the process of moving from initial, abstract ideas to more concrete manifestations of possible solutions to the problems uncovered, in other words moving from abstract to more concrete concepts (Sannino and Engeström 2017).

Zone of proximal development

In Vygotsky's work the ZPD refers to that development that a person can accomplish with more expert help (Engeström 2008). In Change Laboratory work the ZPD denotes the distance between a current, problematic whole activity system and a new, improved version in which at least some of the current issues can be resolved. The ZPD thus refers to possibilities for future, collective ways of working (Engeström 2008).

The ZPD in Change Laboratory work is typically represented as a fourfield diagram (Sannino and Engeström 2017). Each axis highlights a significant contradictory dimension evident in the current activity system, drawn from the first stimulus of the conflict of motives. Rather than seeing the main contradictions as isolated axes, the fourfield shows them in relation to one another. In so doing it creates a space for the emergence of a new vision or possibility, for example as shown in the top right quadrant of Figure 2.

The ZPD emerged early on, in the first or second sessions. They began with staff identifying 'poles', for example hierarchical versus collaborative decision making, which the

facilitator then suggested could be represented as a linear continuum. The facilitator then suggested that linear continua could be combined to create a more relational picture, leading to the genesis of the fourfields.

Historical trajectories of the activity systems

Often change in one part of an activity system is not matched by concomitant change in others, setting the scene for contradictions within the system. A new, theoretical concept or germ cell may then emerge through the actions of the participants as they engage in ‘mediating the interplay between the opposites of the contradiction’ (Schaupp and Virkkunen 2017, 100). Some caution has, however, been taken with making claims of germ cell identification as it is a complex concept whose manifestation may only be apparent over time (Engeström 2009). I have thus rather referred to ‘emerging new possibilities’ or ‘elements of visions’.

We thus in the historical analysis examine what has changed a lot and what has changed a little in the system over time. Activity analysis is again utilised as an analytical grid; changes over time are recorded under the headings of subjects, objects, tools, rules, DoL and community (Virkkunen and Newnham 2013, 253). Each group selects what they believe are the most significant time intervals to be examined. Both institutions were the result of mergers of previously racially disparate Technikons in early 2000 so prior to this is the generally agreed upon starting time period. Thus, though each group has slightly different time periods under examination, they can generally be described as: old Technikon (about 2000); early days of the UoT (2004 onwards) and later and present UoT developments.

Current and future activity system analysis

While participants are discussing work issues, and working through the change matrix and ZPD diagram, they are also in collaboration with the facilitator constructing an activity system of the present UoT. This systematic tool highlights the position and interrelationships of contradictions in the system, and also promotes the development of new, abstract concepts (which may become germ cells) that can break through the historically-accumulated conflicts staff experience in their work.

Findings pertaining to learning in the Change Laboratories

The findings follow the four task design and instruments method sections described above. Each section is further divided up into three sub-sections, each representing one of the three Change Laboratories examined (East UoT Health, East UoT Education and South UoT).

Provocation and conflict of motives

Provocations and conflict of motives corresponds to the first learning action, questioning, on the expansive learning cycle.

East UoT Health group

Three main conflicts emerged from early discussions, but also permeated later workshops as well. These were, firstly, the contentious move by the previous Vice-chancellor to introduce a programme of General Education into the predominately vocationally-oriented institution. The VC believed that this would provide students with a more rounded education (for example, in History, Ethics and Environmental studies) necessary to promote a more responsible citizenship and more suitable for the new status as a university. However, the on-the-ground experiences of staff were that it cut into time for professional preparation. In response to the facilitator showing a video by the previous university Vice-Chancellor on the introduction of General Education, the following points were raised:

... but now 30% of our degree goes to General Education and then there is research so what is left for our profession? (East Health 1, Session 2)

As staff discussed the introduction of General Education, further difficulties were raised about additional new pressures staff were subject too, leading to work overload and a sense of frustration:

We can and must do general education, research, teaching and innovation, and we can do this brilliantly but for all of us to do all of this is enough to drive us to apoplexy (East Health 2, Session 1)

We have got multiple personality disorder! (East Health 3, Session 2)

At least some of the difficulty of having too many different focuses in their work is laid at the door of the strongly hierarchical structure of the university. Staff were not always involved in decisions made about the direction taken by the new university:

Looking back through the years there is this disassociation between management, the decision makers, and the ground level (where things are actually carried out) (East Health 1, Session 1).

As reported on earlier, The UoT, as compared to more traditional universities, have a history of hierarchical, top-down management (White, Carvalho, and Riordan 2011), and this emerges in the change laboratory discussions. As can be seen in the quotes, staff often utilise strong metaphorical language to express their difficult situation, which is typical of how Change Laboratory participants represent their conflict of motives (Sannino and Engeström 2017). Furthermore, staff's experiences of work overload mimic those reported on by other higher education researchers, for example Zukas and Malcolm (2019).

East UoT Education group

In the East Education UoT group there is some desperation about this loss of direction in the sector but also that such a loss is not entirely the fault of the university staff. Here staff are responding directly to the challenge put out by the UoT coordinating body that 'We have lost our way', raised by in the first session by the Change Laboratory facilitator (the author):

I find this deeply disturbing, that we have lost our way, but we are too hard on ourselves as there were other hands at work here (East Education 1, Session 1)

As with the previous group, there is also reference to difficulties with university leadership. However, it is not just about the nature of those in charge, but also about the high turnover of leadership:

When a new person (VC) comes in, when you wake up one day, it is new and you don't know if you are on the right bus or who should be driving, so there is a fear of change (East Education 4, Session 1)

Again, as with the East Health group, though not so strongly articulated, there is difficulty in the introduction of General Education into the curriculum alongside the more traditional industry focus of the university. There is furthermore concern about 'academic drift' which may be undermining what the UoT has performed well in in the past:

We end up not having staff from industry where are strength should lie and we are even putting in humanities lecturers (to teach general education) you know, which is gravitating to or even mimicking a traditional university and not highlighting what we are traditionally good at (East Education 3, Session 1)

Commentators in South Africa (for example, Kraak 2009; Bunting 2006) attribute this drift, firstly, to policy which did not clearly differentiate between the different university sectors. Secondly, drift can be attributed to the university funding formula which favours offering degrees rather than diplomas and funds research outputs (Singh 2008). Broadly, the issue of who is responsible for the change in status refers to Government's push for universities to meet socioeconomic needs of the country, and the emergence of the UoTs as a means towards this goal (Kraak 2009).

South UoT group

In the third group staff again raise the problem of what the UoT focus should be, and that the university may have lost its previous, more clear focus on vocational/professional preparation (in response to the provocation of 'we have lost our way'). There is, furthermore, a drift towards forwarding research and confusion about the future direction of the university:

We are confused, where are we moving? (South 1, Session 1).

We have Deputy Vice Chancellors on teaching and research but not on work-integrated learning, where we should have a focus. It is weak, invisible and sidelined (South 3, Session 3).

Apart from confusion, there is also a recognition that society and work are changing, and not as clear cut as they perhaps were in the past. If staff are going to cope with these changes, and take on the mantle of what it is to be a university, then they need to be more thoughtful and agentic. If such agency (and flexibility) is going to flourish then there needs to be an environment which supports it. However, staff refer to a dominant culture within the university of form-filling: every time there is a new initiative, rather than thinking for themselves, staff usually request a template. This in itself is a left-over from the previous Technikons which were run in a hierarchical fashion. As previously observed, conflicts of motives are often expressed in colourful metaphorical language:

As a new university we are supposed to think for ourselves but then we get told what to do, we've got 'templatitis'! (South 2, Session 2).

We are too siloed, it is an institutional blind spot, our inability to pre-empt things ... we are stuck on compliance ... how are we supposed to innovate? (South 1, Session 1).

It is a 'cop in the head' it is about compliance, following rules ... UoT needs to represent society but there is a stuckness ... (South 2, Session 2)

In summary, the Change Laboratory provides a vibrant discursive space in which participants highlight, for example, conflicts emanating from top-down often changing management and, linked to this, the issue of compliance/lack of flexibility. There is also conflict around the focus of the emerging UoT, which is currently too multiple, unclear and confusing. The facilitator then provides participants with 'tools' to reconceptualize their learning challenges (Schaupp 2011) through abstracting and systematizing them, for example through the use of ZPDs.

Zone of proximal development

The use of the ZPD in the change laboratory corresponds to the second learning action (learning action 2, analysis) on the expansive learning cycle.

In the *East Health group*, the ZPD was identified early on through spirited discussion of difficulties experienced by staff. The first dimension was that of the hierarchical manner in which decisions were made and strategies proposed at the university (Figure 2). There was a lack, it was felt, of more consultative and collaborative processes that could contribute to the running of the university.

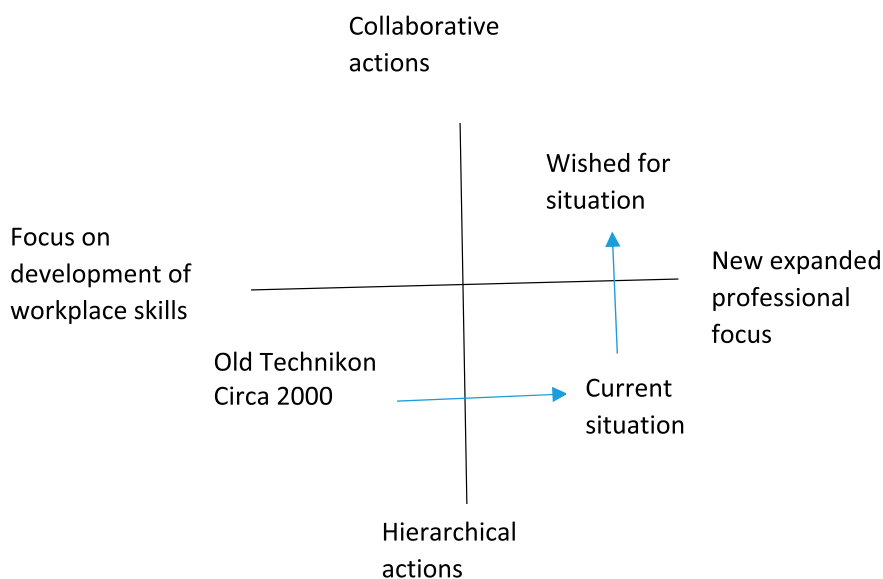


Figure 2. ZPD of the East UoT Health group.

The second dimension in Figure 2 concerns the vexing issue for this UoT of teaching workplace skills and knowledge for employability and/or teaching more soft skills for citizenship. Staff refine this dimension by introducing the idea of a 'new expanded

professional'. This is someone who possesses both work-preparation knowledge and skills and more general education-oriented skills necessary for the modern professional, for example problem solving and critical thinking (an objective, questioning and evaluative way of thinking). Moreover, such a professional would need to be able to respond to the rapidly changing and uncertain world of work, and participants refer directly to Barnett's (2005) work on supercomplexity. Thus the dimension is now between the previous technical vocational and the new proposed expanded professional thrust.

Whereas the Technikons (the earlier vocational institutions) typically were hierarchically managed and focused on technical vocational teaching, the current UoT had moved towards the inclusion of more general education to promote responsible citizenship. The UoT could thus currently (though somewhat unhappily) be situated in the bottom right quadrant. The desirable position, however, was in the top right quadrant where the institution could explore both more collaborative management and producing graduates with both general and vocational education knowledge.

In the *East UoT Education group* there is again the dominant vertical dimension of hierarchical to more collaborative decision making, but this time described through the concept of 'community of practice' and developing staff agency, as shown in Figure 3.

Similarly, the X axis follows the trajectory from the old, prior Technikon to some form of new formation, but actually what this new trajectory involves remained unclear. The lack of clarity was captured in the metaphor of 'Angel and Demons' – is the new direction going to be for the common good or will it be deleterious to the institution as a whole? As with the previous group, the current situation is one of retained hierarchy but a move into a new, possibly unknown future identity, with a desirable trajectory towards the top right quadrant.

The third *South UoT group* (Figure 4), not unsurprisingly given the history of the UoT, comes up again with a vertical dimension of hierarchical-collaborative work. In addition,

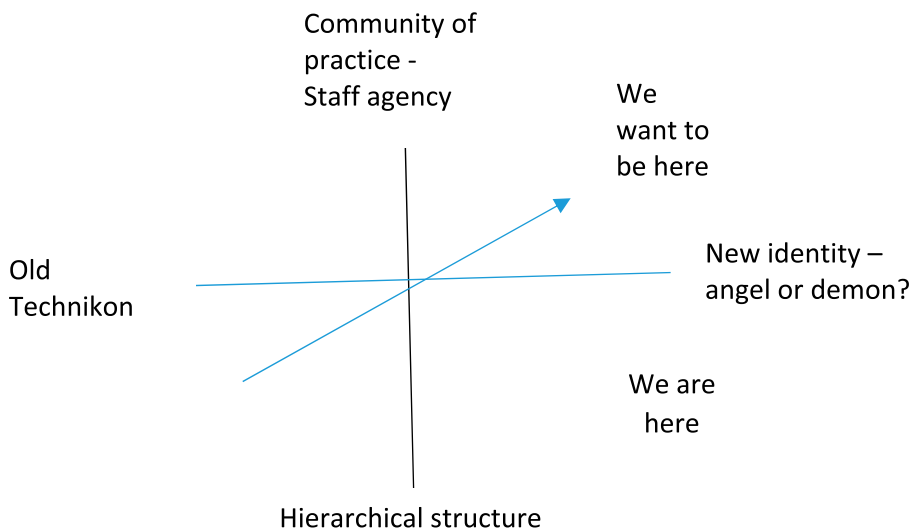


Figure 3. ZPD of the East UoT Education group.

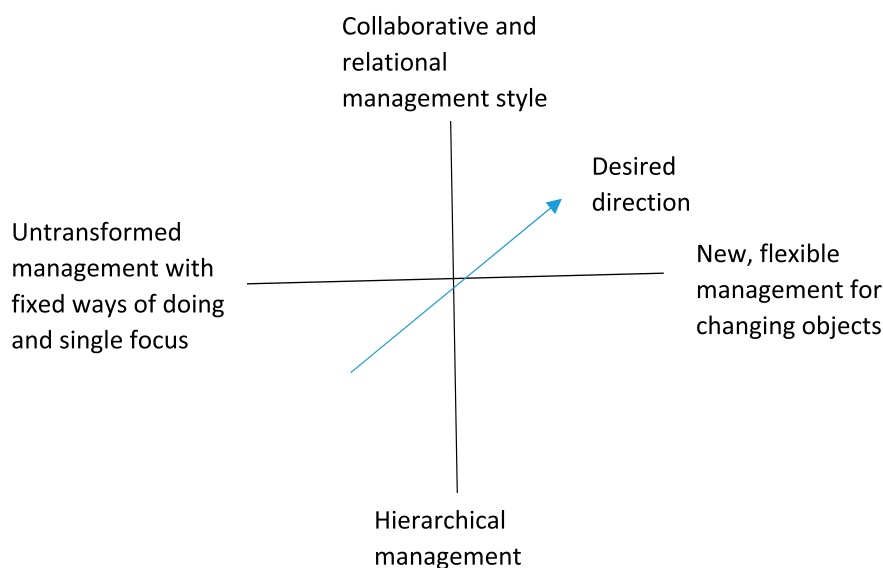


Figure 4. ZPD of the South UoT group.

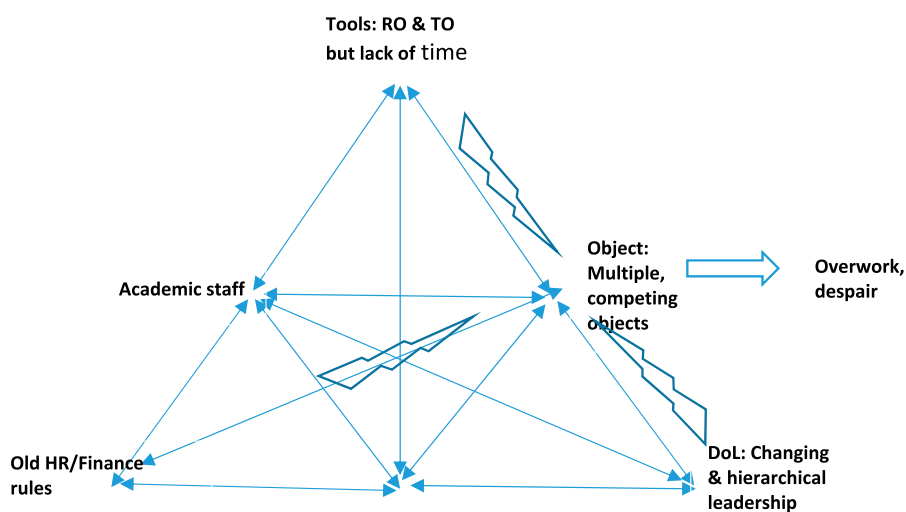


Figure 5. Activity system and contradictions in the East UoT health group.

the South group include a concept of ‘relationality’ which they understand as the ability to work across difference and boundaries, or what Anne Edwards (2007) refers to as relational agency. However, the X axis of the ZPD is somewhat different from the previous two groups. The group describes this dimension as being between the older, inflexible ways of operating in the prior Technikons and the need for more flexible approaches to teaching, research and administration for the future. The ideal, wished-for development

is then towards the top right quadrant, in which the university is characterised by both collaborative ways of operating with flexible approaches.

In addition to the fourfields, in order to help participants reflect further on the current contradictions, and possible new developments, it is always useful to attempt to track their historical development and construction (Schaupp and Virkkunen 2017). This is accomplished through participants filling in an activity-framed change matrix.

Historical trajectories of the activity systems

As with the ZPD, the tool of using historical trajectories correspond to the second learning action of ‘analysis’, but analysis of the past, on the expansive learning cycle.

For the *East Health UoT group*, a big change has been the shift from craft to a more academic object. Included here is the shift to research, what the group refer to as something of a ‘mission drift’. But there is not always a concomitant change in resources (tools). To illustrate this, staff describe how they are asked by the VC to choose a subject to introduce entrepreneurship skills, but how they are to do this is not adequately supported. In addition, staff have to include e-learning, community projects, graduate attributes and integrating non-technical humanities information into their courses without, in their view, sufficient support (including time). The demands on academic roles have increased exponentially. Staff cannot keep all the ‘balls in the air’. Participants also include a relatively rapid turnover of Vice-chancellors, each with their favoured focuses, again against the backdrop of relatively unchanging resources to work on these. There is, in addition, a lack of flexibility in the administration systems to deal with the new challenges of becoming a UoT that hamper staff’s ability to work on these new issues.

In the *East Education UoT group* there is again a rapidly changing university focus over time, but this is not always met by a changing staff contingent, the subjects of the system. Part of the issue is that the old guard is still in place in middle management who may not be willing or able to ‘translate’ the changing focus of the university into practice. Transformation, in terms of the changing object of the emerging UoT, may thus be hampered. In parallel, the DoL within the university has remained hierarchical, again hampering work on the changing object.

For the *South UoT group*, as with the East Health group, the university focus appears to change quite rapidly, from technical training around 2000 to research and publications and to developing a more holistic student, which is evidenced by the new focus on graduate attributes. What is not perhaps changing in tandem is again the staff. Staff experience a sense of being ‘left behind’ by rapid changes and often overwhelmed. This may be the source of the increased demand for template following (templatitis) in that staff are unsure of how to cope with change. What is needed, therefore, is some means to develop staff, so a shift in focus from the current student development to staff development in times of change.

In summary, all three groups agree on the object of the university undergoing rapid change, but that this is not necessarily matched by concomitant changes in the available resources, whether these be the academic staff or tools to deal with these changes. Over-arching utilising these resources is the hierarchical nature of the university, in which there are top-down pushes for change but without the involvement of the majority of staff, a situation that has remained more or less static despite major changes elsewhere.

Whereas the change matrix performs a historical analysis, the next section explores the current contradictions of the activity system, and future possibilities for development.

Current and future activity system analysis

The current analyses correspond to the analysis learning action (action 2) on the expansive learning cycle. The future analyses, as they lead into the development of new ideas, correspond to the next learning action 3 of ‘modelling’ new potential solutions. In the case of the South UoT group, there are also some projections as to what would be required for optimal functioning of the new ideas, thus corresponding to learning action 4, ‘examining the model’.

East Coast Health group

The participants identify the major issue as one of multiple and often conflicting objects that they are required to work with, for example, onerous teaching loads, conducting research and completing their PhD, teaching vocational and general education for citizenship at the same time and introducing entrepreneurship, innovation and digital skills into the curriculum. These multiple objects have emerged through a high turnover of Vice Chancellors who, in a hierarchical fashion, decide on what the future direction of the university will be. The rules, in particular those concerning HR and finance, also appear to have remained attuned to the prior Technikon requirements rather than the emerging and multiple objects staff now have to work with. On this issue alone, staff identify HR/finance as almost being outside of the university activity system. Although there is help in the form of the Research and Teaching offices (RO & TO) academic staff do not have sufficient time to meaningfully engage with these offices. For staff the meaning and purpose of their work has become less clear, resulting in overwork and feelings of despair (see Figure 5). The contradictions between the activity elements are represented by the jagged chevrons on the Figure.

In grappling with these contradictory elements both within and across the system’s elements, participants suggest a number of potentially innovative, combinatory concepts. Firstly, there is the forwarding of an earlier idea, that of the ‘expanded professional’ as the target graduate for the university, which is itself in tension with the previous target of a craft or work ready graduate as shown on the earlier ZPD. Such a graduate would necessarily have to have both high levels of technical knowledge as well as broader social, ethical and digital knowledge. This concept is still abstract, and needs to be concretized, but participants feel it provides a fruitful emerging possibility for a new activity system. Secondly, a different teaching approach, that of project-based learning, may complement the development of the new professional, and as such would be a tool to work on this new object. PjBL would involve staff and students in conducting small-scale research projects related to working life, and the administration (including HR/finance) would need to be more flexible in support of these projects.

East Coast Education group

As with the Health group, changing leadership (VCs) each with their own focus for the university creates conditions of uncertainty, even fear, for staff (Figure 6). There is concern of moving from the more defined ‘teaching for work’ to now a multiplicity of

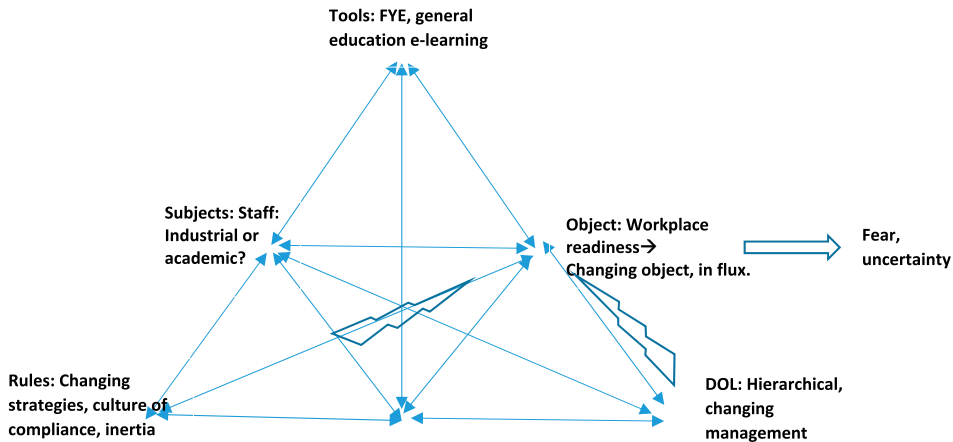


Figure 6. East UoT Education group activity system and contradictions.

objects. This arises as new rules are put forward in university strategies (for example, staff must conduct research and obtain PhDs in a given time) but these are not always matched by available tools to accomplish them. Many of the tools available are only about promoting student engagement and success, for example improving the First Year Experience (FYE), e-learning and the introduction of the general education focus.

Furthermore, there is some uncertainty about what sort of staff would be best to forward the object of the university – should they be industrially-skilled or academic staff? Though there are a number of contradictions in the activity system, the group zooms in on one that they as academic developers see as a significant contradiction: the university is in a state of dynamism and flux, with many pushes and pulls, but this is not matched by staff's attitudes which are more those of compliance and 'inertia'.

Under pressure from the facilitator, the group begins to tackle what constitutes 'inertia' and its opposite, 'the need to work with change', and to come up with some form of bridging process or concept.

As an 'in-between' concept the group suggests changing the workload model to build in time for professional development and reflection. During this time, staff should be able to experiment with new approaches to teaching and ideas about the university in safe spaces. As they stand these are just the emerging elements of a new idea (which may in time emerge as a germ cell), which attempt to resolve the opposites raised in the current activity system.

South UoT group

As with the other groups, the activity system in [Figure 7](#) fills out more details on the conflicts experienced by staff and the main contradictions which emerged in the ZPD. The earlier idea of 'templatitis', in which staff elect to be rigidly guided in their activities, even in research, leads to inflexibility in operations (teaching and research as well as administration) at the university and is symptomatic of staff's lack of agency, which in turn leads towards a strongly hierarchical DoL. But the university is also moving from a previous unitary focus on teaching workplace skills to developing students with more

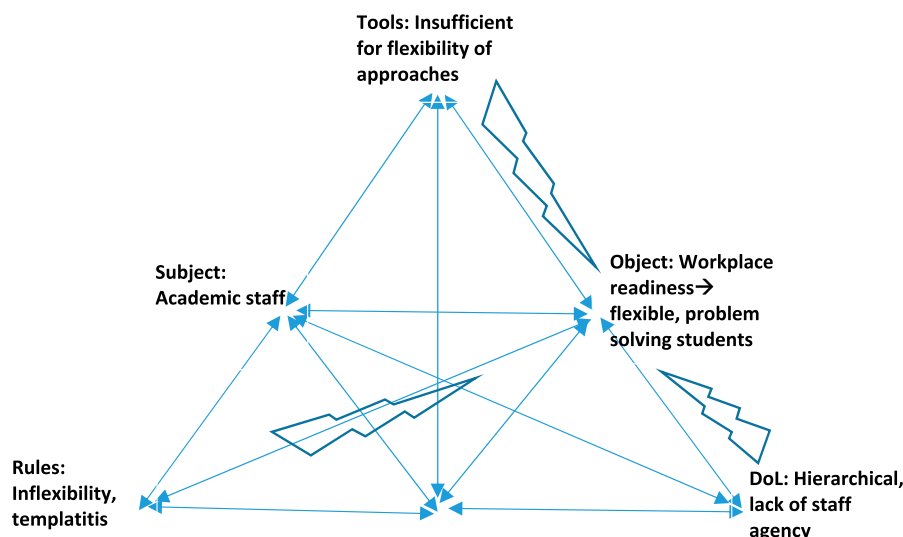


Figure 7. Activity system and contradictions in the South UoT group.

expansive problem solving abilities suitable for the changing world of work. Staff are also expected to reflect this move in their teaching approaches, which should encourage more independent, innovative thinking. Furthermore, this shift towards more open-ended teaching should also be reflected in the way students are encouraged to research, but both of these moves are hampered by a culture of ‘templatitis’ and a hierarchical DoL. Likewise, if flexible forms of teaching and research are to be the focus of the new university staff would need some form of development from their old, more rigidly assigned Technikon identity which is currently not available.

In the final session, the group grapples with apparent contradictions between the proposed move of the university towards a more flexible, responsive, open-ended and innovative institution (for example, in the emerging 2030 strategy) and its hierarchical structure and culture. How, then, are staff to be capacitated to act in more flexible and innovative ways, which may also trickle down to how they seek to develop their students as new ‘technologists’? The group suggests a new, more democratic mode of conducting strategy development and decision making in the university, in which staff are ‘equivalent in ideas though different in rank’ (South 1: Session 6) and ‘not always equal as knowers but equal as thinkers’ (South 3). The model is like a number of concentric circles representing the different hierarchical levels. Seen in this way there can be two-way communication between the different levels around issues. For example, in looking at the roll out of the learner management system there could be an equivalent discussion with all levels within the faculty, rather than an instruction from the Dean.

However, this does not imply that all decisions are to be made in this way. Rather, the flattened hierarchy discussion mode needs to be selected for core areas concerning the object of the university. The facilitator suggests the term ‘knotworking’ for this way of operating, and the group engages with some of Engeström’s (2008) writing on the

topic. Knots form on an issue-to-issue basis and are impermanent. Membership is thus discontinuous and flexible, depending on which issue is to be dealt with (Kerosuo, Mäki, and Korpela 2015).

Knotworking constitutes an initial, abstract idea which brings together the essential aspects of the opposites of inflexibility/flexibility and collaborative/hierarchical currently characteristic of the emerging UoT sector. In Change Laboratory terms knotworking could develop into a germ cell as it becomes more concretized in the real world.

The group begins to work with what would need to be in place for knotworking to function effectively. The group posits that there would need to be rules of engagement for these more flattened meetings in place, and perhaps a new language of flattened management (a tool); a knotworking culture is strongly relational, involves valuing others, working across boundaries and co-creating knowledge and a safe and collaborative space to share ideas.

Discussion

The Change Laboratory through setting up a collective discursive space in which discussion is initiated through facilitator-provided ‘provocations’ supported academic learning through, firstly, enabling staff to raise and confront issues, thus addressing the first sub-question in the introduction. Participants then sought ways to break out of these often paralysing conditions through co-constructing (with the facilitator) abstract representations of problems raised (ZPDs, historical change matrices and activity systems in Table 1). This addresses question 2 concerning staff’s developing a ‘systematic understanding’ of issues. Thereafter, participants are assisted in highlighting deep-seated contradictions which are first steps towards designing improvements which may also constitute germ cells (Sannino and Engeström 2017), thus addressing research question 3.

However, as Zukas and Malcolm (2019) observe, academic work is not typically bounded spatially and temporally making it extremely complex to organise sequential Change sessions on a regular basis, as can be done in other settings such as schools or industry. One possible solution, which the author is currently experimenting with, is to

Table 1. Systematic development towards new possibilities for action.

	East UoT Health	East UoT Education	South UoT
Conflict of motives	Are we teaching for vocations or for citizenship?	There is a loss of direction from the original vocational focus.	We are expected to be innovative but are trapped in compliance.
ZPD and main, initial contradictions	Towards more collaborative structures and an expanded professional focus.	Towards more collaborative structures in an unknown future.	Towards collaboration for flexible futures.
Historical change and contradictions	Change to multiple objects but not matching flexible rules and tools.	Change to unknown, multiple objects but unchanged staff.	Object shifts to flexibility but not matched by flexible rules and DoL.
Activity systems and contradictions	Multiple, competing objects.	Culture of inertia in times of change.	Culture of rule following in times of high change.
Emerging new possibilities (which may become germ cells) from the identified contradictions	New, expanded professional UoT focus (new object) supported by PjBL and other initiatives (tools).	Time for safe, reflective spaces (new tool) for staff.	Knotworking (new tool).

conduct more compacted Laboratories over a shortened, ten-day period as part of designated end-of-year planning sessions.

As indicated on [Table 1](#), the main contradictions emerging in the ZPD are quite similar in that all of them point towards more collaborative ways of operating, and also go some way to deal with emerging uncertainty and the need for flexibility within the new developing UoT.

To some extent, staff are responding to (and resisting) the reported trends of central control and managerialism in universities generally (Trowler, Saunders, and Bamber 2012; Young and Beck 2005), and the response may have particular resonance with South African UoTs as the sector does typically exhibit a more managerial ethos than traditional universities (White, Carvalho, and Riordan 2011). Historically, all the Laboratories chart large changes within the object of the UoT, a trend observed in universities more generally as academics are required to take on often multiple and changing roles, often leading to a sense of fragmentation and despair (Zukas and Malcolm 2019; Clegg 2008). There is, however, less change within other elements of the activity system to support changes in the object (for example within rules or staffing).

In terms of contradictions on the activity system, one of these (East Health) identifies problems with the object of the activity whereas the other two focus more on contradictions within the rules, for example cultures of inertia (primary level contradictions), and how this may affect work on a new object in uncertain times, which constitute secondary level contradictions leading in turn to tertiary contradictions between the new and old systems (Engeström and Sannino 2010). In the East Health UoT, participants determine the new vision as a new object of the UoT, the expanded professional, which can bring together some of the opposites of, for example, conducting research, teaching General Education and serving the community. This trend from a more craft-like to professional orientation in response to a 'growing and diversifying object of the activity' has also been observed in industrial Change Laboratory work (Virkkunen and Newnham 2013, 201). The other groups focus on new tools, for example forms of collective meetings (Knot-working), to enhance the operations of the emerging system in times of change. Knot-working has also emerged in other university Laboratories as a method to introduce greater flexibility in the workplace, and as a potential germ cell to resolve difficulties (Sannino and Engeström 2017). The genesis of these new visions is an attempt to resolve the tension between hierarchical management and more collaborative approaches, as well as the tension of moving into uncertain and complex developments in the new UoT.

Conclusions

The university of technology sector (UoT) in South Africa is in flux as it adopts a new identity from its previous higher technical status. Academic staff, who are at the forefront of change within the university, find themselves in often intractable problem situations or 'double binds' for which there does not seem to be an obvious solution. The Change Laboratory functions as a 'protected space' (Rip 2019) in which participants can individually and collectively engage in realising and expanding on the problems they are faced with, as is summarised in [Table 1](#). Through utilising formative thinking and learning tools such as ZPD diagrams, activity systems and change matrices in order to uncover contradictions,

participants are better able to critically reflect on and better understand problems they are faced with. Through working with contradictions such as the hierarchical, inflexible nature and confused focuses of the new universities, new and often innovative possibilities for development emerge. For example, the nascent idea of developing the ‘new, expanded professional’ student, or working more collaboratively in ‘knots’ are just such innovative possibilities.

The work, however, remains unfinished, as is often the case with Change Laboratory research, as much time and commitment is required from the participants (Virkkunen and Newnham 2013). The emergent visions are useful steps towards developing new, more advanced conceptualisations of UoTs. But they remain too raw, too abstract, and need to be concretized. Bligh and Flood (2015) refer to the Laboratories as ‘Pilot units’, or as initially limited and local explorative starting points. In other words, there is more work on learning about problems with the UoT to be done. At the time of writing, one of the groups had been invited to present their findings to the university strategic development forum. As Bligh and Flood (2015) remind us, Change Laboratories are ideal forums for contributing knowledge to Institutional Planning initiatives. The other groups had also committed to further workshops to create in the imagination the conditions under which the new visions uncovered in this research could flourish.

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