Online tasks and students' transformative agency: double-stimulation as a design principle for synchronous online workshops

Philip Moffitt [a, c] * and Brett Bligh [b, c]

[a] *MKC Training, Royal School of Military Engineering, Chatham, UK;* [b] *Department of Educational Research, Lancaster University, UK;* [c] *Centre for Technology Enhanced Learning, Lancaster University, UK*

*Corresponding author. Email: phil.moffitt@midkent.ac.uk

Abstract

Learner agency, often understood in terms of self-direction and negotiated engagement, is considered important in technical and vocational education and training (TVET). Yet nurturing and supporting agency is resource-intensive and difficult. In this paper, we consider learner agency for online TVET—a setting where content delivery models can be experienced as stultifying. We document the design and evaluation of specific task designs using the method and principle of double-stimulation, where prompts help participants to reconceptualise problematic situations and break out of conflicting motives. We draw on data from a research-intervention with adult learners undertaking a facilities management diploma online, while working. We explore how, across nine online workshops, task designs engendered transformative agency: the ability to collaboratively diverge from instructional intent, question dilemmatic conditions, and propose and enact change. We claim (1) that specific double-stimulation tasks encouraged participants to engage in understanding institutional practice, exposing conflict, and enacting change; (2) that participants came to view their own problematic conditions as stimuli for resistance, criticism, and development; and (3) that online resources were crucial for highlighting evidence of failure and learners' potential roles in change. Our findings are of importance to help learners set and evaluate their own learning agendas.

Keywords: VET and development; Learning in the professions; Workplace Learning; VET and the Labour Market; Learning in Life & Work Transitions

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Introduction

Consider a student cohort on a diploma in facilities management—studying online, part-time while working, and under pressure. With study burdens piling up alongside family and work demands, and with finances to consider, these students have much incentive to quietly focus on their final credentials. Yet, instead, they are spending their own time recording video diaries. The videos illustrate a chasm between the programme's packaged knowledge and actual work practices, and critique and challenge students' working conditions. When shared with peers, they stimulate much debate. Such practices—an emerging reality in the context we consider in this paper—illustrate, in themselves, an unusual degree of commitment and volition. Yet if we step back and realise that *it was the students who co-designed these ways of working*, in synchronous online workshops, and that the practices look quite different from what instructors had in mind, then we can see that a truly extraordinary degree of student agency has been manifest. This paper traces how that co-design was accomplished. In particular, it considers how the principle of double-stimulation was used to stimulate student agency in synchronous online co-design workshops in technical and vocational education and training (TVET). We outline the design principles of the workshops and examine how the process unfolded.

Developing learner agency in TVET has been framed as beneficial for individuals, institutions and society, allowing students to negotiate engagement in self-directed ways rather than acting as passive recipients getting enculturated for survival in waged labour (Westerhuis, 2009). Yet discussion of how tutors and instructional designers might nurture learners' agency is under-developed (Goller & Paloniemi, 2017). Moreover, agency remains too often understood, in policy and practice, as an idealised and innate quality, something 'gifted' or 'revealed': by fostering social participation to allow 'pent-up' agency to emerge (Finlay et al. 2007); or by humanistic teachers 'bestowing agency' upon disadvantaged learners (Angus et al., 2013). In the present paper we conceptualise agency in more problematic, conflictual, and processual ways. We examine *transformative agency*, through which learners collectively strive to make future-oriented and collaborative change; and we explore the stimulation of such agency within particular task designs in an online setting. We emphasise that transformative agency empowers people to *diverge* from instructional intent, questioning dilemmatic conditions as a basis for change (cf. Engeström & Sannino, 2020).

The 'online delivery' of TVET, while increasingly prevalent in practice, remains under-researched. Such delivery is typically motivated by reasons of finance or for reaching underserved learners (Westerhuis 2009). Pedagogies for online TVET are often criticised—using face-to-face formats as comparators—on grounds of lack of tutor confidence, misaligned conceptions of 'good' and 'enacted' practice, high administration workloads, problems developing rapport, and overreliance on solitary study (Cox & Prestridge, 2020). Our view, which motivates this study, is that a core issue is a reliance on instrumentalist approaches; tutors and instructional designers, in focussing on managing curriculum content, often overlook the importance of developing learner agency. We describe a research-intervention with modest yet successful agentic

outcomes. Participants rejected our intent, reconfigured and repurposed their learning artefacts, exhibited failure to each other and others, and envisioned and enacted change. We elaborate how our research-intervention was designed, and how it actually unfolded differently; with student deviation understood as participants expressing their own agency.

TVET scholars have long valorised an image of dispersed learners taking ownership of their own "objectives, resources and means of evaluation" (Moore, 1974/1988, p. 85). To pursue such objectives in *online* TVET requires, in our view, fostering forms of self-directed and even socially antagonistic student engagement, rather than encouraging consensus or following instructions. Below, we evaluate a successful example of promoting and sustaining agency through task design. Yet our aim is to understand *how* agency was stimulated, rather than establishing or celebrating success. We describe a study with twelve learners who had identified practice problems with the media and platforms used in their online TVET course. They had noted, for example, that the course platform limited them to downloading documents (cf. the 'solitary consumption' problem, above), that many learning scenarios covered were of negligible relevance to their work, and that media artefacts mainly presented declarative knowledge about longstanding facts and stable processes. We initiated a research-intervention, influenced by ideas of transformative agency, whose purposes were to assist students in aggravating and confronting their own disaffection; collaboratively changing local TVET practices in ways diverging from instructional intent (including our own); and envisioning and enacting change to the social and cultural circumstances of their work and learning.

Literature review

'Agency', in TVET scholarship, is typically framed as valuable for helping students confront practice problems. These problems—unsurprisingly, given TVET's association with a wider political economy—often arise at points of work-learning interface (Guile 2011). Two critiques are prevalent. Firstly, that tutors, even while acknowledging agency's importance for addressing practice problems, seldom engage in deliberately provoking and sustaining agency in instructional tasks centred on those problems (Westerhuis 2009). Secondly, that task designs, even for *online* TVET, are often 'digitised' forms of older and 'offline' tasks— thereby optimising student practices for "the printing industry and writing by hand" (Köhler & Drummer, 2018, p. 10). Given the intention of our own work, to examine how agency might be provoked and sustained in tasks delivered online, the relevance of these critiques ought to be obvious. However, to understand how *relations between practice problems and agency* might be mediated by task designs, there is a need to examine the different *varieties* of practice problem which, the literature suggests, learners in TVET settings need agency to confront. Our reading of the literature suggests three such varieties: understanding institutional practices, questioning reproductive learning, and aligning learning with work.

Understanding institutional practices. One strand of work examines how learners confront the 'practice problem' of actually *understanding* institutional norms. The backdrop is that many learners in TVET settings, having come from disadvantaged backgrounds, are less accustomed to the institutional practices and tacit behaviours that others take for granted. Students can thus develop agency by adopting personal characteristics that increase their success in a given workplace culture; coming to make better informed choices about "adaptability to different work environments and personal change management" (Barabasch, 2017, p. 26). Quesada-Pallarès et al. (2019), for example, examine how learners, in better understanding the tacit practices of an online TVET setting, enhance their motivation and self-regulation by developing a personal interest in identifying "task value" that they can employ "in order to successfully complete their studies" (p. 5).

Attempts to nurture the relevant agency typically involve helping students understand the institutional practices of their workplace, and/or their educational institution, often by providing guidance documentation. Barabasch (2017), for example, describes providing web-based resources about self-efficacy, motivation, and self-construction for this purpose. We agree that being better informed is a prerequisite for agency development. Yet we worry that encouraging learners to accept workplace conditions while changing their own dispositions might set up a particularly bounded form of agency—regulated by the expectations of other people. Such concerns dovetail with wider critiques about conflating business objectives and educational outcomes, and of fostering agency within discrete, temporally bounded interactions (cf. Evans, 2017). We wish, instead, to explore how learners might develop the 'personal characteristics' of envisioning and undertaking change for their own purposes.

Questioning reproductive learning. Another cluster of papers frames agency in terms of enhancing students' capabilities at questioning reproductive learning; where learners feel empowered to challenge instruction, it is suggested, they acquire greater 'ownership' over their education. Zepke et al. (2009), for instance, examine how power relationships influence learners' completion rates. Informed by Foucault's concept of governmentality, they notice that students often question reproductive learning yet go on to adapt and conform: "many educators would see these changes as transformative … [but] students changed behaviours in order to better fit requirements" (p. 455).

Studies of *supporting* students to question reproductive learning are uncommon. Pang (2015) documents an attempt to assist newcomers in TVET activity to "originate", a process involving them making judgements of how to make effective "contributions to the work situation" (p. 7), thereby "establishing a legitimate presence" (p. 13). Hyslop-Margison (2004), moreover, suggests that web-based technologies are well-suited for equipping learners "to open new democratic spaces" (p. 146). Yet these democratic spaces are themselves, in practice, usually open to only limited negotiation and criticism. We embrace the notion of questioning reproductive learning, yet we wish to prioritise supporting resistance and critique over seeking

legitimacy. Our approach, therefore, positions questioning reproductive learning as a precursor for social change.

Aligning learning with work. A further corpus emphasises how agency empowers learners to *influence* how their education aligns with work. In one example, learners undertake tasks examining 'workplace relevance', thereby becoming "responsible through the ways they choose to engage" (Smith, 2018, p. 108). Aprea and Cattaneo (2019), furthermore, call for tutors and instructional designers in online TVET to "address complex and broad-ranging learning goals such as the development of professional competence and identity as well as employability" (p. 374).

Attendant task designs, especially in online settings, typically focus attention on work-learning boundaries. Bakker and Akkerman (2019), for example, describe tasks and tools designed as 'support systems' for boundary-crossing. They suggest that learners develop agency to help in comparing work and learning settings and "coordinating resources from multiple practices" (p. 357). We share the intent to prepare learners for work, yet we identify a danger in conflating that aspiration with economic immediacy.

It is noteworthy that many relevant papers position learners as leveraging agency for economic success, rather than, say, personal development or political liberation, with tasks thus focussing on "production possibilities and income" (Oliver et al., 2019, p. 130). Such a 'marketizing' focus, in our view, serves to erode how student identity, motivation and expertise are conceived. Our critique echoes the views of Hager (2019), who cautions against TVET focussing on providing "quick-fix solutions to labour market crises" (p. 64). Our current paper documents an attempt to encourage learners, when sharing and negotiating conflicting experiences, to call upon problematic encounters from all aspects of their lives.

Research aims

The present paper examines how online task design in a TVET setting can provoke and sustain agency. We describe task design through the principle and method of double-stimulation, before highlighting the role of double-stimulation in learners rejecting their social and cultural conditions, embracing ambiguity and instability, and undertaking purposeful change.

We address the following research question:

> *How can double-stimulation tasks empower learners to engage in agentic change to their own learning activity in an online TVET setting?*

Theoretical framework

The theoretical framework for our study is cultural-historical activity theory (CHAT) (Engeström, 1987/2015). CHAT has long been associated with intervention-research on social practice and the developing agency of those involved. In the present study, we designed semi-structured online workshops using a Change Laboratory methodology (Virkkunen and Newnham 2013). The methodology is an established, CHAT-informed approach for constructing research-interventions that encourage and empower participants to influence activity, though its use has rarely been documented in online settings. The key principles we draw on are outlined below.

Cultural-Historical Activity Theory (CHAT). CHAT emphasises that 'activity', understood as collaborative and sustained human endeavour, is motivated toward and defined by social objects which provide its meaning (Engeström, 1987/2015). Activity systems (see Figure 1) relate a subject and object in ways mediated by artefacts, regulated by rules (tacit and formal), and organised through a division of labour (the specialisation and authority of those involved). CHAT emphasises that contradictions—historically emergent and systemic tensions within and between activity systems—act as drivers of change.

Figure 1. An activity system, adapted from Engeström (1987/2015, p. 78).
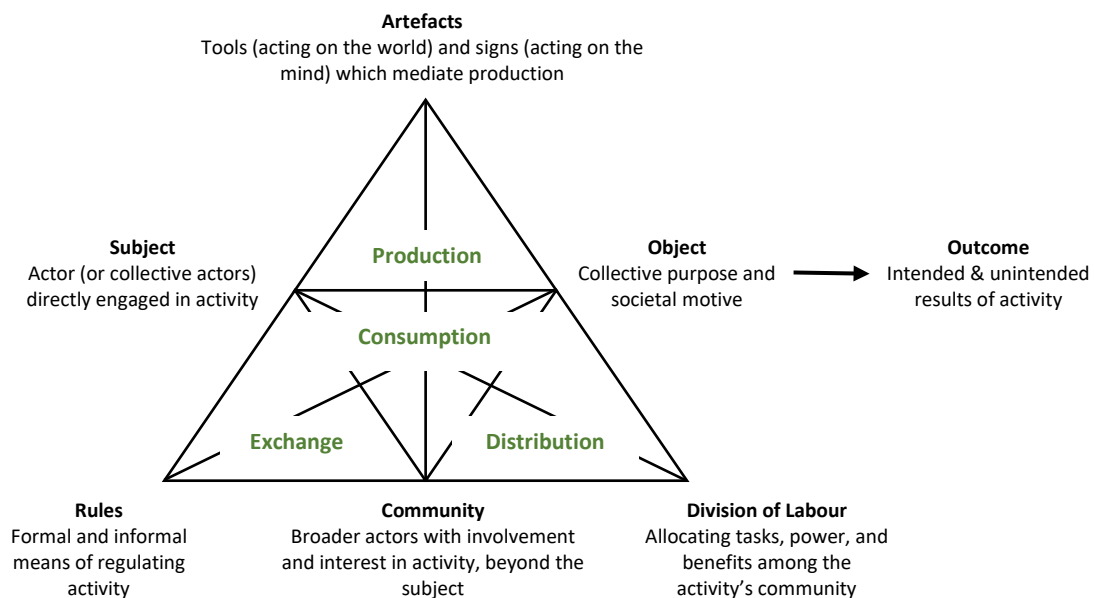
Artefacts. Artefacts mediate between an activity's subject (people directly involved) and object (which gives activity purpose and meaning). Artefacts, including physical tools (e.g., hammers) and signs (e.g., instructions for using hammers), are products of historical activity. People appropriate and adapt artefacts "to empower themselves and fulfil objects" (Kaptelinin & Nardi, 2006, p. 248). In our study, mediating artefacts—like video footage, digital technologies, and partially complete conceptual models—are introduced in constellations, to mediate between the subject (the group of learners) and their emerging object (to change TVET activity).

Participants use these artefacts to explore problems, thereby making and enacting proposals for change. The aim is that artefacts become means by which students challenge existing goals and practices and construct culturally novel knowledge (cf. Moffitt & Bligh, 2021).

Transformative agency. Transformative agency describes the shared capacity of a collective subject (e.g., a group of students) to negotiate and enact collaborative, future-oriented change (cf. Virkkunen, 2006). Transformative agency emerges alongside the destabilisation of social, cultural, structural and historically embedded norms. Its emergence is typically expressed in six ways (Haapasaari et al., 2016):

- Resisting: opposing existing practices or plans;
- Criticizing: identifying problems in current work and learning;
- Explicating: explaining the possibility and potential for change;
- Envisioning: exhibiting future-oriented observations and visualisations;
- Committing to action: self-obligating and putting forth concrete details;
- Taking action: accounting for consequent concretisation—turning from abstract notions and proposals to undertaking real-world change.

Our research-intervention involves provoking, analysing and tracing these expressions in online workshops.

Double-stimulation. Double-stimulation is a means by which people break free of conflicting motives. Double-stimulation's relationship to agency, including its deliberate use to provoke volition, has been studied for decades (Sannino, 2015). We use double-stimulation as a principle and method to design, initiate and trace tasks. The *phases* of double-stimulation (illustrated diagrammatically in the findings below) can be understood with reference to the seminal 'waiting experiment' replicated by Sannino and Laitinen (2015). Participants sit in a room with a clock, but with nothing to do, waiting in vain for an experimenter to arrive. Phase 1 (conflict of stimuli) involves conflict between being asked to wait yet having no purpose. In Phase 2 (conflict of motives) different motives—to leave or wait—alternately replace each other; subjects, studying the clock, exhibit temporary paralysis between leaving or waiting. In Phase 3 (attribution of auxiliary motive), studying the time comes to have agentic meaning. The clock artefact is promoted to auxiliary motive status; it will 'create' conditions to leave when its hands reach a certain position. In Phase 4a (real conflicting stimuli) the hands reach the anticipated position, generating heightened conflict, leading to Phase 4b (closing conditioned connections) in which these stimuli provoke volitional enactment—an agentic closure which, in this experiment, involves subjects leaving the room. Our work utilises these principles in an online TVET setting. In our research-intervention the first-stimulus presents a problematic situation, such as a question about failures and dilemmas, while second-stimuli—such as partial conceptual models—provide support for decision-making. Our workshop tasks thus seek to help students work through conflicting motives and build transformative agency.

Change Laboratory. The Change Laboratory provides a structure for designing and enacting double-stimulation tasks in workshops (cf. Virkkunen & Newnham, 2013). Contradictions felt by participants are taken as a starting point for negotiating a sequence of double-stimulation tasks. The aim is that participants increasingly take charge of changing their own activity, thereby engendering transformative agency, while interventionists' roles correspondingly reduce.

Research design

The research site for this study was a part-time, online diploma in facilities management conducted over around 18 months. Participants were twelve adults in the 2020-21 cohort: all operational members of facilities staff in education, healthcare, energy and defence sectors. Most worked full-time, with around a third having multiple jobs, balancing other priorities including family commitments. Students were employer-sponsored, with fees funded and some working hours (≈0.5 days/week) allocated for study. The diploma—accredited by a professional body whose membership and post-nominals are typically beneficial for professional status and salary—appeals to those with managerial aspirations.

Local practice problems were initially identified by students themselves. A cohort sub-group approached us because they were aware of our involvement in another project (Moffitt & Bligh 2021). We advised that they gauge the views of the wider cohort and put their frustrations into writing. Their written submission outlined several points of dissatisfaction: online media and documents used only for solitary consumption; learning scenarios inappropriate to contemporary work problems; and largely declarative knowledge about facts and stable processes, de-coupled from the reality of complex vocational challenges. We agreed to set up a research-intervention, but were clear that this would necessitate additional commitment (i.e., extra time and effort alongside existing diploma requirements). On that basis, twelve of the cohort's eighteen members volunteered to participate.

We designed nine semi-structured online Change Laboratory workshops, each one week apart, aiming for around 90 minutes per workshop. The aim was to allow participants to contribute to troublesome interactions purposefully and safely: examining problematic and contradictory instabilities; reflecting on findings and preparing for subsequent workshops; and becoming accustomed to raising problems and bringing in ideas when working on tasks. Importantly, while Change Laboratory workshops involve extensive planning in advance, they are not controlled by edict; divergence is encouraged and, as the workshops progress, participants expand their roles and exert more control while researcher-interventionists step back to allow that.

One day before each workshop, participants were emailed electronic PDF workbooks, exemplified in Figure 2, to help them prepare and record personal notes. Using an approach inspired by the Change Laboratory task design format (summarised in Bligh & Flood, 2015), these workbooks set out for each task:

- First-stimuli: questions and problem statements which we wished participants to focus on;
- Second-stimuli: conceptual frameworks and models which we hoped students would 'think with';
- Mirror-data: links to resources, including videos, which students should view in preparation.

Figure 2. Example of interactive workbook issued to participants.
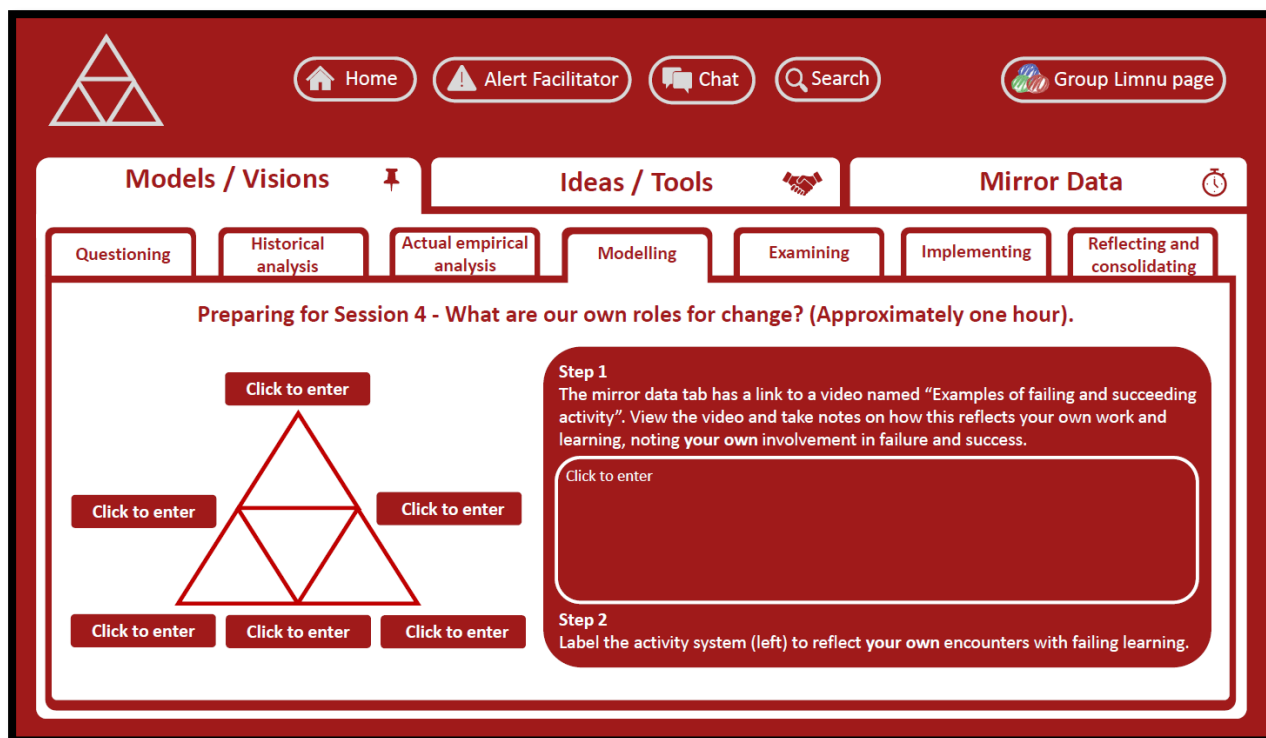
The workshops were held online using the cloud conferencing platform Zoom, while collaborative work on tasks was facilitated using the web-based interactive whiteboard Limnu, accessed by participants in real-time. Participants therefore worked on the whiteboard and engaged in discussion in real time. We recorded the workshops using screen and audio recording software, OBS Studio, archiving the recordings securely until they were later destroyed.

Examples of intended task stimuli are summarised in Table 1. During workshops, participants were first reintroduced to the task stimuli sent beforehand; the focus of the intervention was emphasised, with reference to progress in earlier workshops. Second-stimuli were then introduced for collaborative adaptation. Mirror-data were introduced next, interspersed with discussions of problems, proposals and their meaning. As researcher-interventionists we provoked, sustained and traced aspects of discussion and analysis as the group interacted with their stimuli and each other.

Table 1. *Examples of stimuli and mirror-data in the research design.*

Workshop / week	First-stimuli	Second-stimuli	Mirror-data
1	What drives the TVET activity? Why change it?	Strengths and weaknesses model.	Video footage of interviews with peers, resisting similar interventions in TVET activity.
2 and 3	How did we get to these problems?	Partial models of activity's production.	Evidence of failures in work and learning, in similar settings to those of the participants.
4 and 5	What are our own roles for change?	Partial models of current activity.	Examples of failing and succeeding activity, with video evidence of causal involvement.
6 and 7	What should the new object of activity be?	Partial models of future activity and video diaries.	Interviews with predecessors and peers, discussing alternative mediation of activity.
8	What concerns are there for sustenance?	Draft action plans, timelines and roles.	Interviews with predecessors and peers, discussing sustained change to TVET activity.
9	How do we need to consolidate change?	Tracking progress of commitments.	Re-presented video footage, of group's previous interactions and commissive acts.

A diagrammatic overview of our designed intentions for a specific workshop task in the sixth week, involving creating reflective video diaries, is provided in Figure 3. The term 'designed intent' is central to our methodology: participants are encouraged and empowered to diverge from instructional intent (including our own). Interventionists engage in ongoing processes of design, negotiation and response to participant initiative, while bearing in mind the fundamental principles of the intervention and the wider trajectory of the sequence of workshops.

Figure 3. *Designed intent for reflective video diaries, in the sixth online workshop.*

Apparatus 1: decision forming

Phase 1: conflict of stimuli
- First stimulus: what should the new object of activity be?
- Second stimulus: partially completed model of activity showing current contradictions, labelled by participants in previous workshops
- Mirror-data: video footage of failure in current activity
- Display the possibilities for reflection (video) and of passively tolerating failure (activity system diagram)

Phase 2: conflict of motives
- Video footage shows evidence of failure in division of labour and possibility of reflection
- Conflict between passively tolerating failure and actively working to reflect on possibilities for change

Phase 3: attribution of auxiliary motive
- Participants' own ability to identify and diagnose failure has agentic meaning

Phase 4a: real conflicting stimuli
- Participants reflect on their ability and commitment to identify and diagnose failure in practice
- Participants diagnose failure using provided videos and recognise their ability and commitment as a group

Phase 4b: closing conditioned connections
- Participants commit to recording individual evidence and to support each other in diagnosing failure

Apparatus 2: decision implementing

Activation of the conditioned connection
- Compile video diaries as a reflective tool to inform how change can be sustained
- Collaboratively formalise and reflect on new division of labour and object in activity system model
- Explore implications and problems for sustaining change using video dairies
- Iteratively model and remodel the diagram of the redesigned activity

The typical configuration of the workshops is illustrated in Figure 4, taken from the sixth workshop. Students (in the centre image) are discussing video footage of a facilities management technician talking with peers (mirror-data, right), while amending a conceptual model of their own activity system on the whiteboard (second-stimulus, left).

Figure 4. *Configuration of typical online workshop.*
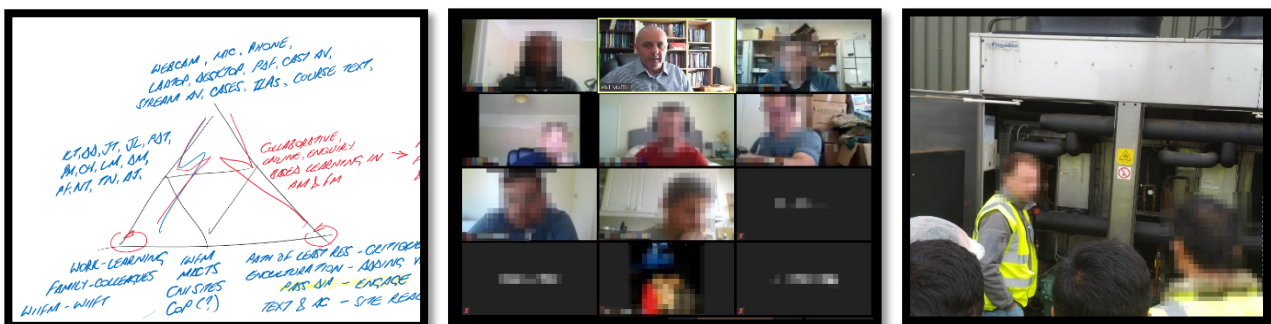
Our findings below summarise the online workshops. Such an account, it should be emphasised, is a cumulative product of three kinds of analytical activity:

1. Intra-workshop analysis: conducted jointly by researcher-interventionists and participants, and heavily influencing work within the workshops; as researcher-interventionists we stood ready to adapt plans, re-present mirror-data, and incorporate observations;
2. Inter-workshop analysis: transcription and coding of main themes enabled relevant mirror-data and task stimuli to be 'brought back' in subsequent workshops, influencing the ongoing process of design;
3. Post-intervention analysis: where overarching narratives were constructed for purposes of scholarly publication.

Our priority for the current paper involved tracing double-stimulation and transformative agency, which we addressed by scrutinising recordings, transcripts and task stimuli using the qualitative data analysis software ATLAS.ti. Doing so places our work within a recent stream of "studies in which the transcript data of an entire CL [Change Laboratory] process is analysed in great detail and with the help of elaborate categorical frameworks that seek to reveal the epistemic and interactional dynamics" (Haapasaari et al., 2016, p. 240).

To fulfil our purpose of revealing such dynamics, we worked to establish evidence, in turns of speech and visual data, of relationships between phases of double-stimulation and expressions of transformative agency. Doing so involved analysing the data using the categorical frameworks of *transformative agency expressions* and *double-stimulation phases*, exploring the relationships between those as the intervention unfolded. During our post-intervention analysis, moreover, we were able to step back and scrutinise the data, longitudinally and in detail. At that point, we systematically cross-referenced *expressions* with their points of emergence in *phases*, which allowed us to grasp how the research-intervention had unfolded overall and to identify *turning points* worthy of further in-depth investigation. This process is typical of these studies, where the analytical focus for researcher-interventionists is placed on the "discursive expressions of transformative agency in the speaking turns of the participants" (Haapasaari et al., 2016, p. 240). Such an approach, of course, risks analytically overlooking those who speak less often or for shorter lengths, which we attempted to mitigate by analysing the identified turning points as holistic episodes rather than focussing too narrowly on single turns of speech, lest "the collective dynamics of discourse would be lost" (ibid.).

Findings

In this section we analyse our intervention with reference to task design. We elaborate the dominant expressions of transformative agency in our online workshops and establish how double-stimulation was enacted at each moment. We then 'zoom in' to focus on how the sixth workshop—a turning point in the intervention—unfolded. In particular, we describe how learners exhibited agency through their own

endeavours to turn the purpose of their video diaries from *informing reflection* to *exhibiting failure*. We first consider total expressions across the intervention, before examining in more detail the qualitative impact of particular turns of speech.

Tracing transformative agency and double-stimulation. Figure 5 provides a cross-section of speech-turns, as tasks in the sequence of workshops unfolded. Of 482 total speech-turns, 143 disclosed evidence of double-stimulation and are shown in the figure. Given our focus on *how double-stimulation tasks promote transformative agency*, the x-axis shows online workshop numbers, labelled with that workshop's dominant (though not sole) expression of transformative agency. The y-axis shows the frequency of those turns of speech which reference aspects of double-stimulation, with phases stacked in columns. Across all tasks, the total frequencies for each phase of double-stimulation were: conflicting stimuli, 23; conflicting motives, 45; attribution of auxiliary motive, 21; real conflicting stimuli, 39; and closing conditioned connections, 15.

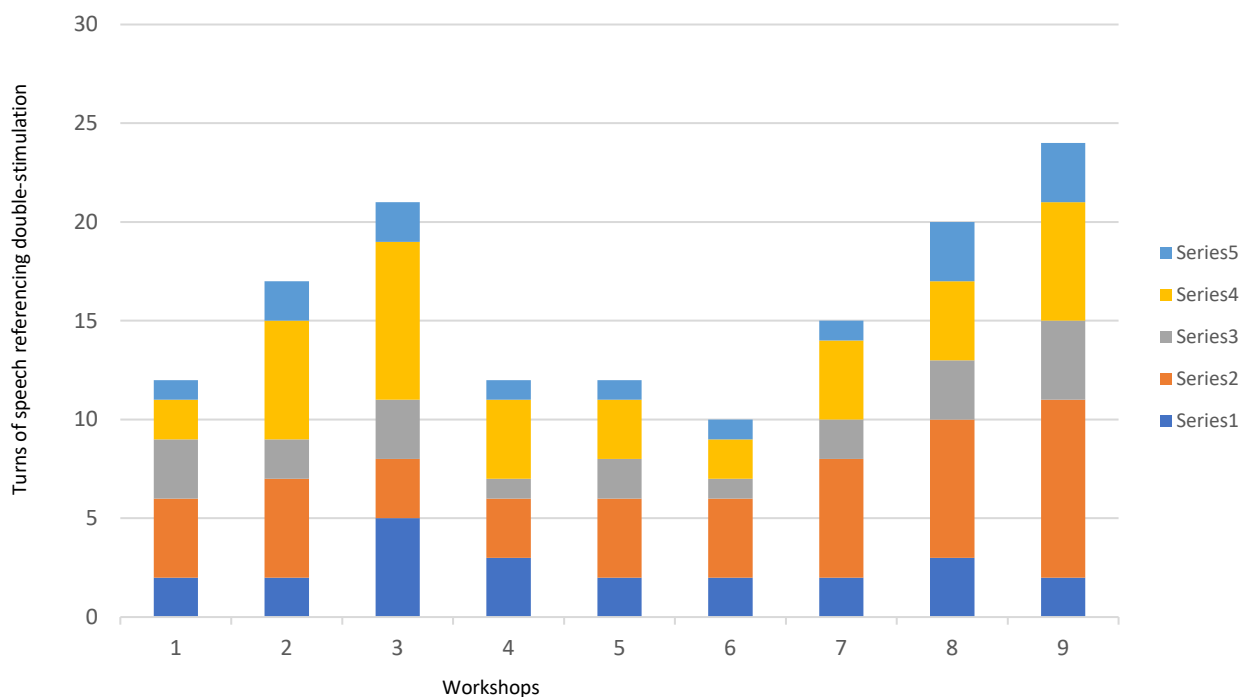*Figure 5*. *Turns of speech directed at double-stimulation (y-axis) plotted for workshop numbers (x-axis).*

Figure 5 exhibits a coarse '*italic N*' shape to the emergence of transformative agency. In early workshops, participants were enthused by *resistance* and *criticism*: engaging in confrontational and antagonistic interactions highly unusual for the programme of study, while working to build social support and legitimise conflict. The first peak of the N coincides with enacting *criticism* in workshop 3, completing the first third of the intervention. In the subsequent mid-third, participants turned to *explicating* and *envisioning*, associated with falling frequencies of relevant speech turns in workshops 4-6 (the 'trough' of the N). These workshops demanded deliberate, extended social negotiation, leading to a comparatively lower frequency of

expressions. Around the sixth session—focussed on *envisioning*—shorter, more frequent speaking turns emerged again, associated with a transition towards commissive acts and concretising prior negotiation in daily reality. Workshop 6 was thus a turning point, and we analyse how it unfolded subsequently.

Double-stimulation occurs on a per-task basis, rather than across the intervention as a whole. Our analysis suggests that all phases were indeed evident in all workshops, albeit to differing extent. Some tasks lost momentum and/or needed to be resurrected in various forms in subsequent workshops. Looking at the enactment of the tasks in terms of Sannino's (2015) model allows us to see that *conflict of motives* and *real conflicting stimuli* were particularly prevalent in the talk of participants. A consistent rise in *conflict of motives* (Phase 2) is evident throughout the intervention, with that being the dominant phase by the closing workshops—where its peak coincides, in terms of transformative agency, with expressions of taking action. *Real conflicting stimuli* (Phase 4a) peaks in the data alongside expressions of *criticising*, and then remains the second most frequently exhibited phase throughout the latter half of the intervention. These frequencies reinforce the important role of conflict in supporting the emergence of transformative agency within the intervention.
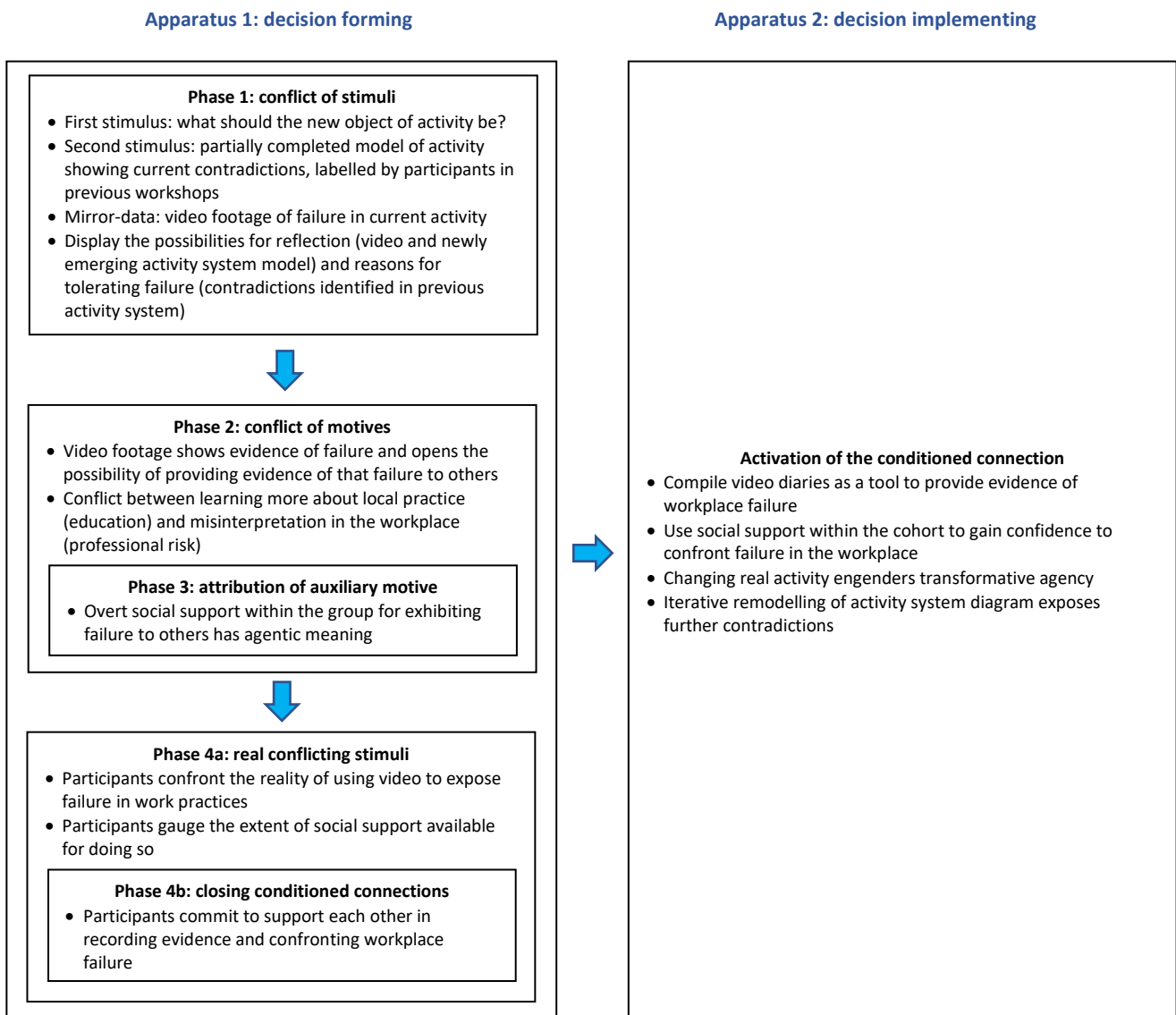
Different aspects of double-stimulation are apparent in data from across the intervention. These include:

- Conflicting stimuli (Phase 1, low frequency) typically comprising social examination and adaptation of given problem statements, questions and visual media;
- Conflicting motives (Phase 2, the highest frequency) involving social negotiation, support and argument;
- Attribution of auxiliary motive (Phase 3, low frequency) mostly associated with recognising meanings in data first considered during the prior phase;
- Real conflicting stimuli (Phase 4a, second highest frequency) demanded that participants called upon collaborative support, especially for their expressions of antagonism;
- Closing conditioned connections (Phase 4b, low frequency) generally comprising interactions of a concise and abrupt nature. An exception occurs within the data from the final workshop, where participants spent some time closing conditioned connections; at this point they were cognisant of the imminent end of formally planned workshops, and thus seemingly endeavoured to move toward closing conditioned connections.

Example double-stimulation task. Figure 6 illustrates how the sixth-workshop task first illustrated in Figure 3 actually unfolded. The example is useful because participants diverged from our designed intent openly, collaboratively and significantly, meaning they might have been exerting their own agency. Our task design (see also Table 1) had focussed on participants reconceptualising their activity's object (i.e., the purpose and meaning of their redesigned TVET activity). Students were invited to generate video diaries of learning

experiences for use as reflective artefacts. Instead, participants took an agentic turn: deciding to use video footage as evidence of failure and a need for change, with which to confront their managers.

Figure 6. Reality of rejecting reflective video diaries, in the sixth online workshop.

Apparatus 1: decision forming

Phase 1: conflict of stimuli
- First stimulus: what should the new object of activity be?
- Second stimulus: partially completed model of activity showing current contradictions, labelled by participants in previous workshops
- Mirror-data: video footage of failure in current activity
- Display the possibilities for reflection (video and newly emerging activity system model) and reasons for tolerating failure (contradictions identified in previous activity system)

Phase 2: conflict of motives
- Video footage shows evidence of failure and opens the possibility of providing evidence of that failure to others
- Conflict between learning more about local practice (education) and misinterpretation in the workplace (professional risk)

Phase 3: attribution of auxiliary motive
- Overt social support within the group for exhibiting failure to others has agentic meaning

Phase 4a: real conflicting stimuli
- Participants confront the reality of using video to expose failure in work practices
- Participants gauge the extent of social support available for doing so

Phase 4b: closing conditioned connections
- Participants commit to support each other in recording evidence and confronting workplace failure

Apparatus 2: decision implementing

Activation of the conditioned connection
- Compile video diaries as a tool to provide evidence of workplace failure
- Use social support within the cohort to gain confidence to confront failure in the workplace
- Changing real activity engenders transformative agency
- Iterative remodelling of activity system diagram exposes further contradictions

The extracts below are taken from a moment where participants had pondered the first-stimulus before viewing and discussing mirror-data. They were adapting one of their second stimuli (a partial model of new activity). In what follows we analyse, in turn, each phase of double-stimulation: briefly describing the context of action; presenting extracted transcript data; and considering the relevance for agency development.

Phase 1, conflicting stimuli. The task prompted the group to consider the first-stimulus problem: "what should the new object of activity be?". Participants watched and discussed video footage of student peers from a previous cohort discussing the value of video diaries in their own learning. Participants deliberated and adapted their model of future activity, recognising dilemmas which they depicted as contradictions; in this example, between artefacts (video footage) and the division of labour (the hierarchical direction of

managers and the collaborative expertise of peers). They thus negotiated the role, purpose and audience of the video diaries.

A conflict of stimuli arose, as the task unfolded, between (a) video footage and the new emerging model, which invited the development of practice to incorporate reflective video diaries, and (b) the depiction of systemic contradictions, which highlighted a historically constituted tolerance of failure. That conflict was discussed verbally—for example:

> "He's a good lad [technician on video footage], that'd be nice, having the time to get pictures, make a video, have a chat, write down what I'm struggling with. I reckon I'd just get given a load more work if they [line managers] thought I had the time to be filming myself all day about things I can't do properly, instead of getting on with this [diploma] and then getting back there [workplace]." [MH].

> "I was thinking 'what's the point?' too. If more of us did it though [create video diaries] … if we all did it, it'd be normal … I do wish we all did more of it rather than just 'put up and shut up' …" [JM].

Participants came to feel a sense of personal risk: creating a reflective video diary (our designed intent) might be misinterpreted by workplace managers, resulting in additional work assignments. Participants struggled with these conflicting stimuli for some time in the workshop. Reflecting on both video footage and modelling activity highlighted to the group that reshaping activity might be lucrative for their education, but also might impact negatively on their workplace lives.

Phase 2, conflicting motives. As the task progressed, two conflicting motives were stated: a desire to (a) introduce video into student practice and (b) focus on acquiring credentials (requirements for passing). Initially expressed by different individuals at different times, these motives were subsequently expressed through more direct debate—for example:

> "Maybe we could use them [video diaries] for what's wrong? It'd be brave … nowhere to hide, your mistakes they'd be on video forever, who'd want that?" [CH].

> "I reckon it'd be worth it, it'd show everyone how pressed we are … show them we need more time and help … how it [diploma] doesn't show you everything you need for work, they need to give us more time and help on site, away from here [online forum]." [JM].

> "But it's [video diary] not even an AC [assessment criteria], nobody needs it to pass [diploma] so why bother?" [MH].

Participants started to negotiate the purpose of video diarising: as a vehicle for expressing protest or personal reflection. Students grasped for a rationale that might overcome the opposing motivation.

Reflection quickly disappeared from debates; replaced with *irrefutable evidence of failure* as something that might be worth an investment of time and effort, and potential reputational impact.

Subsequently, in successive turns and sometimes within turns, expressions alternately exposed different social perspectives on conflicting motives. Participants explored, for example, the investment of time and effort required for creating video; the attendant opportunity costs of 'using up' valuable labour time; the convenience of making evidence of failure readily accessible; and the extent of reputational impact from exhibiting one's involvement in failure. Students referred to task resources—video footage and their work on the whiteboard space—to help them articulate different positions. But no resolution seemed forthcoming.

Phase 3, attribution of auxiliary motive status. The paralysis was eventually resolved by attributing an auxiliary motive: *overt social support*. Meaning was attributed by participants to a *shared* personal risk of exhibiting irrefutable evidence of failure—for example:

> "We should do it however chancy it is, as long as we're all up for it. I'm not arsed about ACs [assessment criteria] … it'd be worth it, you could show them [managers], say 'look what they [lecturers] told us, it just wasn't enough, here's my real stuff, going wrong on site' … it'll add value alright but I don't want to be on my own …" [LM].

> "Actually that's the best bit, instead of just turning a blind eye we can show them [managers] what isn't covered here [diploma] and isn't covered there [workplace] either, if we all do it, it'll be alright I reckon, there's a few of us, there's enough of us, but it'll have to be all in, for it to work we need to say we're all in the same boat sort of thing." [JM].

The narrative thus shifted to become about mediating risk. Participants felt that the *balance* of risk might shift if the majority of people supported the introduction of video evidence of failure, thus sharing the risk of exposing personal involvement. Where the classic waiting experiment sees participants agree to leave if the clock hands reach a certain position, in our task, students agreed to act if they received majority support from peers. Overt social support thus became a prerequisite for creating and using video footage as evidence of failure. Thus, in this instance, it was *the organisation of participants into a particular social configuration*, within the workshop, that provided them with a way of attributing an auxiliary motive.

Phase 4a, real conflicting stimuli. Participants now faced (a) an understanding of the reality of using video footage to individually communicate dissatisfaction and (b) a growing level of group support for doing so. In terms analogous to the hands of the clock closing to their final position, participants explored and discussed video footage in various ways, waiting for more expressions of social support to emerge. Participants made reference to the whiteboard (and named contradictions they had written there), discussing tangible examples of using artefacts:

"We can rod it off [diverge from instructional intent] here, but what about when we're back there [work]? It's there that we need to be worried, shit's just got real." [CH].

"I was talking about this [undertaking learning while at their employing organisation] at work, they said 'what are you doing that here for, isn't that what your Mondays are for?'. This is how we make them [managers] know this [diploma] doesn't cover what we need, this'll [video] do it, we can use this now, who's first? [laughter]." [LM].

"I can't do much back at [workplace] based on [diploma], they haven't given me enough time or help, what about this now, we can all have a go at putting that right [waving phone]." [MH].

Volitional enactment thus progressed from making verbal proposals to facing the stark reality of acting. The decision to confront managers involved assessing a balance of personal risk and social support. Yet that judgement had been made in an online environment designed to elicit social support, while the act of confronting managers would take place away from the group. Students worried about the different contexts of work (facing managers alone) and the diploma (socially supported by 'course-mates'). Nonetheless, when sufficient support had been reached, the group decided to use video footage to confront managers, rather than (as had been our designed intent) for reflection.

Phase 4b, closing conditioned connections. With requisite social support in place, participants proceeded towards closing the conditioned connections—determining to go away, record videos and present the recordings to work managers. Unlike for the waiting experiment, where leaving a room can be immediately realised, those actions were necessarily conducted after the workshop. The final juncture of decision forming, at the closure of the sixth workshop, was as follows:

"It's the point of no return though, we sure?" [CB].

"Some of them [lecturers and managers] won't like it … decent ones might even wish they'd thought of it, they'd know passing [the diploma] isn't enough for knowing what we're meant to be doing." [JM].

"We're sure." [MH].

By the end of this workshop, we were satisfied that students had been navigating the liminal space between work and learning in intense ways, and developing their agency, notwithstanding that they had done so differently to how we had intended. As researcher-interventionists, we proceeded to think about how the progress made in the workshop would influence our subsequent work of instructional design.

Discussion

We have framed student agency in TVET as a means for learners to confront and overcome what Renshaw (2016) characterises as being "compliant, receptive and ready to follow teacher directions" (p. 60). That conception differs from others in the TVET literature, where agency is sometimes seen as a means for releasing students' pent-up demand for learning (Finlay et al., 2007) or something bestowed by teachers upon excluded and disadvantaged learners (Angus et al., 2013). Yet, agentic confrontation of compliance resonates with how agency is characterised in the wider sociology of work (cf. Goller & Paloniemi, 2017). Our findings demonstrate a mechanism by which students can collaborate in ways that challenge compliance: questioning their circumstances, diverging from instructional intent, and envisioning and changing their activity. That mechanism relies on conceiving agency as students 'confronting' and 'overcoming', rather than something 'released' or 'bestowed'.

Our findings contribute to the literature in three principal ways:

- By examining how task designs can encourage participants to address conflict in their own activity and then strive to *change the conditions in which they work*, rather than merely adapting to the *status quo*;
- By emphasising that students can use problematic conditions as *stimuli for learning*;
- By demonstrating how constellations of mediating artefacts can present participants with resources that can increase their volition for enacting and sustaining change (in our case, evidence of failure and ways of understanding how future practices might be developed).

We expand on each of these points below.

Regarding our first point, accomplishing deep qualitative change through conflictual, troublesome, and problematic experiences is underdeveloped in the TVET literature. Our core claim is that doing so relies on a careful *task design juxtaposition* of (a) contextually relevant information to represent the problem, and (b) relatively open-ended frameworks to analyse the problem. In our case, video materials of other students were an example of the former; our use of a partially labelled activity system diagram on a shared whiteboard was an instantiation of the latter. Existing literature acknowledges agency as a situated phenomenon, and our emphasis on contextually relevant information concurs, yet such situatedness is also problematic. Quesada-Pallarès et al. (2019), for example, notice how *overly context-specific* problem-solving can encourage rote adoption of normative characteristics; Evans (2017) suggests that the *temporality* of localised situatedness curtails the building of *group* agency; and Hager (2019) notices that *pressuring* learners can narrow agentic horizons. We suggest that the design *juxtaposition* we outline above is key to ameliorating such problems.

Regarding students using problematic conditions as stimuli for learning, it is worth reiterating important prerequisites: our design sought to legitimise conflict and provide an environment *both* antagonistic and supportive. Our analysis of workshop 6 outlines how that process worked in some detail. Our approach contrasts with many prior studies, which associate conflict and antagonism with compliance or withdrawal. Zepke et al. (2009), for example, suggest that antagonism can contribute to students abandoning their studies, while Pang (2015) emphasises that conflict might exclude newcomers, or cause them to react by seeking acceptance and legitimacy. Double-stimulation principles helped us, conversely, to appreciate how problematic and conflictual motives can develop agency and stimulate development and change. Our study legitimises conflictual engagement in work and learning. Importantly, we prepared for the strong possibility (realised in our intervention) that learners would diverge from our intent in agentic ways.

Regarding the roles of constellations of technological artefacts, our work highlights the importance of an *artefact design juxtaposition* of (a) practice failure and (b) a possibility for change. Promoting agency across boundaries has a disruptive, rather than stabilising, quality, as recognised in prior accounts of how students use web-based collaboration in work-relevant decisions (Bakker & Akkerman, 2019), and how they refer to both work and learning when developing their professional competence (Aprea & Cattaneo, 2019). Our analysis highlights that such disruption can be purposefully stimulated by particular resources, embedded in a definite method of task design: one which empowers students to use artefacts as tools and signs to liberate themselves rather than, as Oliver et al. (2019) suggest is more common, to pursue economic success.

Prior to concluding, we wish to note several post-intervention anecdotal observations from participants, which indicate meaningful qualitative change *beyond* our research-intervention. Participants continue to critically review each other's video evidence of concretised change, engaging in problematic and disruptive social negotiations. They also continue to assist each other to identify and navigate tensions in work and learning, between situated workplace relevance and adopting normative characteristics. Moreover, they continue to use stimuli and artefacts from the research-intervention, such as video footage, conceptual models of activity, and digital collaborative work surfaces, to share ideas with others—including with successive cohorts.

Conclusions

TVET programmes are experiencing a growth in online and other dispersed modes of delivery, which exacerbate existing challenges of student passivity and 'consumption model' education. Our paper reinforces the widely recognised benefits of learner agency, but critiques conceptions of agency as an idealised or innate quality: something people are liberated to *have* rather than something they problematically *do* in given circumstances. We recognise persistent tensions in TVET settings, where learners expect to attain proficiency and competitive economic advantage while also becoming global citizens confronting societal

problems. Our research-intervention contributes an analysis of how double-stimulations tasks might be designed by instructors and enacted by students in ways that develop the latter's transformative agency.

In contrast with research which pursues a pretence of consensus and legitimacy, resulting in particularly 'bounded' forms of agency, our study foregrounds conflictual circumstances and task designs which might empower people to engage with failure and possibilities for real change. Students, in practice, envisioned and enacted those changes themselves—in ways that diverged from our own intentions. We emphasise that (1) problematic conditions in TVET activity can provide stimuli for learning and development; (2) specific double-stimulation task designs can encourage participants to engage in deep qualitative understanding of conflict—changing sub-optimal TVET activity; and (3) constellations of mediating artefacts can present participants with irrefutable evidence of failure and possibility. These points are important for online TVET, where students increasingly need to engage in setting and evaluating their own learning agendas.

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