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Beyond reactive responses to enduring growth: the transformation of principles and practices within initial teacher education

Katharine Burn , Jenni Ingram , Laura Molway  and Trevor Mutton 

ABSTRACT

A previous special issue of this journal (Vol 46, 4) demonstrated the significant challenges for programmes of initial teacher preparation unleashed by the Covid-19 pandemic. After forcing urgent changes, the pandemic also prompted some teacher-educators to reconsider fundamental principles underpinning their programmes, as they decided which innovative approaches to retain. Using an established model of professional growth that distinguishes between temporary 'change sequences' and enduring 'growth networks', this paper examines how opportunities for learning afforded by the pandemic were transformed into sustained professional growth. Adaptions in response to successive waves of infection created a continuously evolving 'change environment', stimulating new kinds of pedagogy while affording or constraining different kinds of feedback on its effectiveness. We consider published examples of professional responses to this changing context alongside vignettes from our own professional practice to examine what is needed for teacher-educators to move beyond crisis management, recognising opportunities for sustained growth. By focusing on different emphases given at different points to the processes of enactment and reflection, we explore the extent to which teacher-educators went on to interrogate the established principles of their teacher education programmes and we consider the potential impact of such interrogations.

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Introduction

Internationally, the Covid-19 pandemic brought significant challenges for initial teacher preparation (e.g. Barnes et al. 2020; Robinson and Rusznyak 2020). It also prompted teacher-educators 'to consider new ways of working, to adopt innovative approaches to pedagogy and to re-conceptualise the nature of their teacher education programmes' (Mutton 2020, 439). In some contexts the shift in practices has gone beyond the initial, reactive resort to online working to the careful design of high-quality blended teaching and learning (Hodges et al. 2020). Teacher-educators worldwide have not only adopted various new technologies to support their practice; they have also been rethinking the content of their programmes (la Velle et al. 2020) and the theoretical underpinnings of their work with student-teachers (e.g. Robinson and Rusznyak 2020), with potential opportunities for innovation and creativity (Ellis, Steadman, and Mao 2020).

Background

The unplanned move to ‘emergency remote teaching’ (henceforth ERT) (Hodges et al. 2020, para. 5) resulted in significant changes within teacher education programmes. As student-teachers had to become more responsible for driving their own learning (Forbes and Khoo 2015), shifts in their modes of learning prompted new thinking among teacher-educators’ about both what is taught and how (e.g. Campbell et al. 2021). Online communities have provided opportunities for student-teachers to make sense of their teaching practice (Carrillo and Flores 2020), and have offered innovative ways of bringing together learning theories, multiple perspectives, and new ideas or strategies to permit engagement in the process of ‘practical theorising’ (McIntyre 1995).

A goal for most teacher education programmes is to broaden the knowledge, skills and perspectives of their student-teachers. The pandemic intensified pre-existing imperatives to meet the needs of diverse learners in a range of contexts (Leacock and Warrican 2020). The initial challenges of inequitable access to technologies and the blurring of boundaries between personal and learning spaces highlighted the diversity both of those learning to teach and of their pupils. ERT required access to technologies and the skills to use them effectively. Some teacher-educators saw new technologies as offering opportunities to switch from ‘traditional’ knowledge transfer models of teaching to more facilitative or constructive models (Leacock and Warrican 2020). For others, the forced move to new technologies resulted in a steep learning curve for the teacher-educators (Cutri, Mena, and Whiting 2020; Mohamad Nasri et al. 2020) and subsequent resistance among them (Alonso Vilches et al. 2020).

The challenges that many programmes faced included supporting student-teachers to use online and blended pedagogies in their own practice (la Velle et al. 2020; Mohamad Nasri et al. 2020), providing appropriate or modified kinds of professional placement (Barnes et al. 2020; Kidd and Murray 2020), and assessing the student-teachers’ practice (e.g. Moyo 2020). Many teacher-educators focused on modelling online pedagogical practices, including the use of a range of tools to accomplish specific tasks (O’Brien et al. 2020), as a way of guiding student-teachers’ use of technologies in their own teaching. Although the move to online placements is unlikely to persist in many contexts, the questioning that it inspired about the nature and role of student-teachers’ classroom experiences may prompt lasting changes in how those experiences are structured and how they might be supplemented with online or blended resources.

The pandemic also highlighted and exacerbated anxieties inherent in learning to teach (e.g. Cutri, Mena, and Whiting 2020). Many adaptations sought to address student-teachers’ wellbeing (e.g. Hadar et al. 2020). Some teacher-educators focused on the importance of demonstrating care for their students during the pandemic (Moorhouse and Tiet 2021), while others considered the longer-term need for a curriculum that supports student-teachers’ social-emotional development (Hadar et al. 2020).

A key to effective, meaningful education is the ability for student-teachers and teacher-educators to engage effectively in relationships (Carrillo and Flores 2020). Nurturing productive interactions needs careful consideration (O’Brien et al. 2020). The move to online and blended learning required teacher-educators to think differently about how to enable student-teachers to build relationships and work collaboratively, even with those they had not met in person (la Velle et al. 2020).

Methods

In reviewing the development of teacher education some two years after the introduction of ERT, the key question we address here is: What is needed for teacher-educators to move beyond crisis management into recognition of opportunities for sustained professional growth? To answer it, we adopted two distinct strategies. We first conducted a search of leading journals in teacher education, identifying articles published during 2020 and 2021 focused on teacher-educators' responses to the pandemic. Table 1 shows the number of articles sourced from each journal. We then identified specific changes within our own initial teacher education programme that had endured in some way as schools and universities began returning to 'normal'. Our identification of these examples was informed by a parallel study of teacher-educators' pedagogical decision-making during the pandemic (approved by the University of Oxford Central Research Ethics Committee, reference CIA-21-234) although we have not drawn explicitly on that data, but rather on our knowledge of the programme's development as teacher-educators within it.

We used a well-established theoretical model of professional learning (Clarke and Hollingsworth 2002) to analyse both the published examples and the instances of enduring change within our own practice. This model includes four analytic domains, linked by processes of enactment and reflection that connect changes in one domain to those in another. These domains comprise the 'external domain', concerned with external sources of information or stimulus, the 'domain of practice', focused on professional experimentation; the 'personal domain', dealing with teachers' knowledge, beliefs and attitudes; and the 'domain of consequence', representing salient outcomes for the individual teacher. Clarke and Hollingsworth illustrate how this model can be used to distinguish between short-term or temporary 'change sequences' and longer-term 'growth networks'.

It is important to acknowledge that this model was developed with reference to professional growth within individual teachers, but we were applying it to the professional growth of a team of teacher-educators. In the original design, collaborators who stimulate or prompt change within an individual are treated as part of that individual's external domain. Since our focus was on *collective* learning (i.e. the learning of teams of teacher-educators within a particular partnership), we treated the shared principles,

Table 1. Journals searched and articles identified.

Journal	Number of articles
Asia-Pacific Journal of Teacher Education	2
European Journal of Teacher Education	9
International Journal of E-Learning and Distance Education	1
Issues in Teacher Education	1
Journal of Education for Teachers	15
Journal of Mathematics Teacher Education	1
Journal international de recherche en éducation et formation	1
Journal of Science Teacher Education	2
Journal of Teaching Language Skills	1
Studying Teacher Education	2
Teaching and Teacher Education	3

Change Environment

Teacher education programme policies; curricula; working conditions; programme leadership; student-teacher characteristics; collective norms of practice in the programme's institutions (universities and schools); and the collective capacity to work together towards teaching and learning goals.

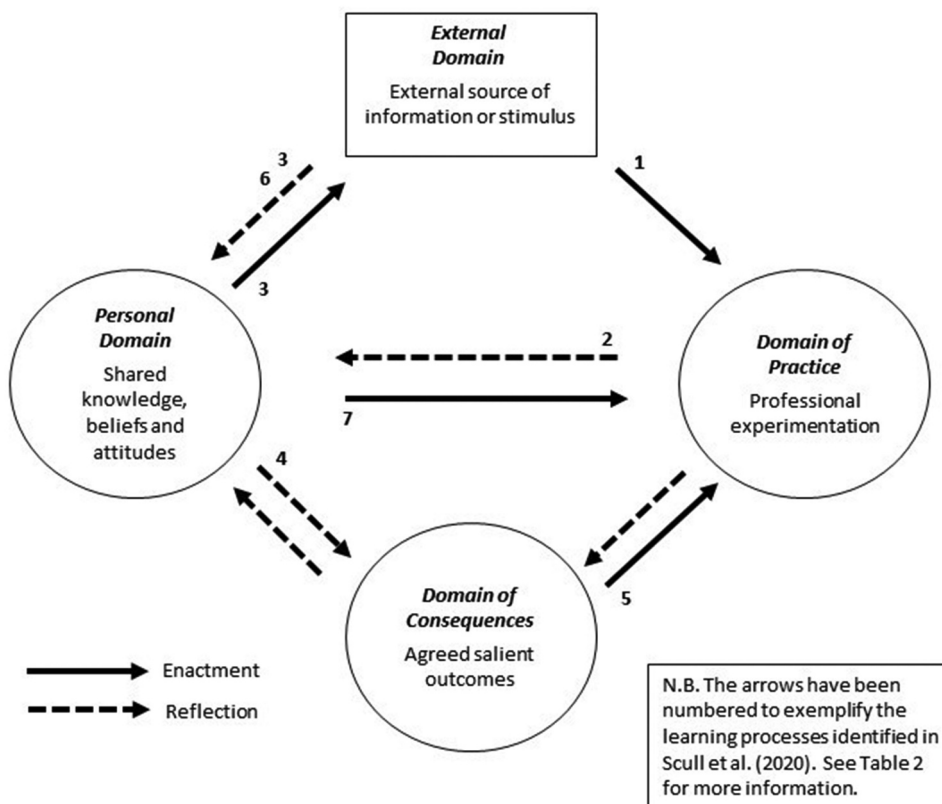


Figure 1. Model of Collaborative Teacher-Educator Growth, adapted from Clarke and Hollingsworth (2002), illustrated with analysis of Scull et al. (2020).

values and knowledge that underpin the programme structure and its implementation as part of the personal domain and examined enactment and reflection as collaborative processes of professional experimentation and evaluation (see Figure 1).

Since the traditional format of journal articles makes it challenging to identify the sequence in which reported changes occurred and were reflected upon, we focused our analysis – which is summarised in Table 2 and illustrated through three examples below – on those articles that most clearly highlighted the key processes of enactment and reflection by teacher-educators. We then explored the application Clarke and Hollingsworth's (2002) model to the collaborative learning and growth of the teacher-educators working within the different strands of our own initial teacher education programme.

Table 2. Overview of changes in different domains (published articles) *The domains are those identified by Clarke and Hollingsworth (2002). The numbers represent the order of changes reported in each article. Text in italics indicates reflection; plain text indicates enactment.*

	External Domain	Personal Domain	Domain of Practice	Domain of Consequences
Baker (2021)	1. Pandemic disrupts university teaching. 4. Collect student-teachers' weekly reflections.	5. <i>Re-affirm belief in the importance of students' well-being</i> 6. <i>Understand the value of prospective reflection (possible selves) in teacher education</i> 4. <i>Understand advantages to online practicum for resilience and continuity of programme delivery.</i>	2. Implement ERT. 7. Create a framework that can help student-teachers become aware of and process their coping strategies. 2. Curate recorded observations for student-teachers to view. 3. Plan virtual observations and feedback sessions. 5. Pilot virtual student-teacher teaching opportunities with all-online charter schools.	3. <i>Suspect student-teachers' wellbeing will be negatively affected.</i>
Barnes et al. (2020)	1. Pandemic disrupts practicum.			
Burns et al. (2020)	1. Pandemic disrupts practicum. 4. Seek student feedback via a survey.	6. <i>Reflect on different purposes of practicum.</i> 7. <i>Understand the ongoing importance of online pedagogy in teacher education curricula</i>	3. Replace in-person practicum with online course, involving opportunities for peer teaching.	2. <i>Recognise student-teachers' need to develop online instructional skills.</i> 5. <i>Notice increased need for critical reflection as the absence of pupils limits student-teachers' learning.</i> 3. <i>Notice student-teachers' lower participation levels and reluctance to be visible via webcam.</i>
Donitsa-Schmidt and Ramot (2020)	1. Pandemic disrupts university teaching and practicum. 4. Survey student-teachers, asking what prevents their participation. 6. Attend online teaching webinars 9. Some schools choose not to pursue synchronous teaching. 14. <i>Consider government calls for online teacher education provision.</i>	5. <i>Understand student-teachers' discomfort with exposing their living conditions.</i> 8. <i>Understand how to promote interaction in online spaces.</i> 13. Adopt new shared beliefs in the value of learning to teach online.	2. Implement ERT 7. Experiment with new technological tools to facilitate interaction. 11. Organise online practicum experiences in geographically remote schools. 15. Plan to deliver an entirely online teacher education course.	10. <i>Reflect on importance of synchronous teaching experience for student-teachers' learning.</i> 12. <i>Notice enriched possibilities for student-teachers' experiences in online practicum placements.</i>
Flores and Swennen (2020)	1. Pandemic disrupts practicum and assignment work.	5. Develop belief that online practicum may promote narrow focus on technical skills unless mentoring encourages deep reflection.	4. Hold weekly meetings to support student-teachers' assignment work and wellbeing.	2. <i>Notice differences in student-teacher experiences.</i> 3. <i>Notice student-teachers struggling to gather data for their assignments.</i>

(Continued)

Table 2. (Continued).

	External Domain	Personal Domain	Domain of Practice	Domain of Consequences
Moorhouse and Tiet (2021)	1. Pandemic disrupts university teaching. 4. Seek critical friend in another institution and read published literature. 7. Survey student-teachers about their needs and experiences.	8. Reaffirm belief student-teachers need to feel cared for. 9. Understand proactive actions to establish pedagogies of care in online learning spaces	2. Implement ERT. 5. Meet critical friend weekly and write collaborative reflective journal. 6. Co-plan and experiment with pedagogies of care.	3. Reflect on compromised nature of the relational aspect of teaching.
Scull et al. (2020)	1. Pandemic disrupts university teaching. 4. Contact student-teachers who were not engaged to find out why. 7. Receive and reflect on mid-term data from student-teachers.	8. Understand individual needs better. 9. Develop effective online teaching methods.	2. Implement ERT. 3. Reflect on student-teacher engagement data from online platform. 6. Adopt new online teaching strategies. 9. Further refine strategies.	5. Confirm student-teacher engagement, participation and social connections as key priorities.

Change sequences and growth networks in existing published research

We identified just seven examples from the published research as demonstrating change sequences with signs of potential development into growth networks. The summaries set out in [Table 2](#) show that each change sequence begins with the external stimulus of the pandemic, which forced immediate, unplanned changes to teacher-educator practices: change in the external domain being ‘linked through enactment to change in the domain of practice’ (Clarke and Hollingsworth 2002, 958). More detailed examination of three of these cases shows how subsequent teacher-educator reflection on the impact of the initial changes leads to more complex sequences of inquiry, further enactment, reflection, and growth. As noted above, the constraints imposed by the linear structure of social science reporting somewhat obscured the precise temporal sequences of teacher-educators’ enactment and reflection, and we fully acknowledge that the actual growth networks were probably more complex than those inferred from the articles.

Scully et al. (2020) report on the practice of four teacher-educators at Monash University in Australia. The developments involved at least two clear cycles of collaborative, planned reflection and enactment that led to sustained changes in the teacher-educators’ understanding of how to motivate student-teachers’ engagement in online learning. The beginnings of a growth network were facilitated in three ways by a supportive change environment. First, the institution benefited from high levels of technical support and a strong culture of inquiry-led development. Second, pre-existing monitoring systems were used to evaluate and respond to the student-teachers’ engagement in, and experiences of, teaching. Finally, teacher-educators were given time and flexibility to enable collaborative planning and teaching. A similarly supportive change environment played a crucial role in the growth illustrated in the articles by Barnes et al. (2020) and Burns et al. (2020).

Donitsa-Schmidt and Ramot (2020) report on the efforts of two teacher-educators to develop their practice in the Kibbutzim College of Education in Israel. Here the professional experimentation involved gathering data from student-teachers about the success of teaching strategies and visiting colleagues’ remote lessons, sharing resources and information with them. Reflections on these experiences led to changes both in individual teacher-educators’ knowledge and in their practices, developing what Donitsa-Schmidt and Ramot describe as a ‘community of learners’ (p. 588). Other examples in [Table 2](#) illustrate how teacher-educators’ reflection on specific experiences led to changes in practice (Baker 2021) and beliefs (Flores and Swennen 2020).

Our third example is a report of collaborative self-study, conducted by two teacher-educators, Moorhouse and Tiet (2021), working in different institutions in Hong Kong. It is the only example we found of cross-institutional collaboration. The teacher-educators investigated ways of enacting a pedagogy of care for their student-teachers, refining their professional experimentation through individual and collaborative reflections over a term. Gradually, this developed into a new conceptualisation of how a pedagogy of care could be expressed in an online context, and the finding that ‘anchoring ethical care from the beginning [...] was instrumental in facilitating natural care’ (p. 216). This process strengthened the value that they ascribed to their pedagogy of care – an important impact in the domain of consequence.

Change sequences and growth networks in one teacher education programme: an introduction to the vignettes

In turning to examples of enduring change in our own one-year postgraduate programme, we first provide some contextual detail, particularly to explain important shared values within the collective personal domain and the outcomes regarded as most salient within the domain of consequence. The programme follows an internship model, with the university working in close partnership with 37 nearby secondary schools. It seeks to develop student-teachers' technical and theoretical knowledge alongside their situated understanding of their placement school setting. The partnership endorses the principle that 'student teachers should question, and test against diverse criteria, whatever ideas for practice are presented to them as well as those which they bring with them' (McIntyre 1995, 371). To support student-teachers in this process of 'practical theorising' (Burn, Mutton and Thompson, 2023), classroom observation and teaching experiences are closely interwoven with theoretical input and time for discussion with peers, particularly during 'joint weeks' in the first term, split between school and university. Student-teachers thus receive ample opportunities to critically compare different sources of evidence to inform their developing understanding and judgements about their teaching practice.

The course has two main components.

1. *The curriculum programme* focuses on the teaching and learning of individual subjects, such as mathematics. Within the university, curriculum tutors lead subject-specific seminars and workshops, with occasional individual tutorials. In their placement schools, student-teachers engage in a structured programme of classroom observation and other school-based tasks, gradually assuming subject-teaching responsibilities, with careful guidance and feedback from their subject mentor. In Terms 2 and 3, most of student-teachers' time is spent in school, with two one-week blocks in the university providing scope for more theoretical input and critical review of their diverse experiences. Curriculum tutors visit each student-teacher in school on four occasions to observe their teaching and participate in three-way discussions (with the student-teacher and mentor), to review progress.

2. *The professional development programme (PDP)* focuses on issues common to all subjects, such as the needs of adolescent learners. It also seeks to develop student-teachers' critical awareness of the wider contexts of schooling in England and their professional responsibilities and agency within them. During Term 1 and the subsequent university weeks, the student-teachers attend university-based PDP lectures and meet in school groups with a university-based 'general tutor' who supports their work on a PDP assignment, investigating a whole-school issue of their choice. In placement schools, weekly PDP sessions are led by a school-based professional tutor. The PDP also includes a one-week placement in a specialist school or base for pupils with special educational needs or disabilities (SEND).

The university and partner schools assume joint responsibility for the planning, delivery and evaluation of the programme. All stakeholders engage in collective reflection at regular mentor and professional tutor meetings

Before examining examples of enduring change within this programme, it is important to acknowledge that all the co-authors act as both curriculum and general tutors within it. While our position obviously permits more detailed analysis of the sequences of enactment and reflection than was possible in relation to the published examples discussed above, that analysis is inevitably shaped and limited by our perspectives as actors within the processes described.

As with our review of the published accounts of changes initially stimulated by the pandemic, we identified those changes that have clearly endured. The many immediate responses to ERT within each of our seven curriculum subjects as well as those within the course-wide PDP were subsequently scrutinised by programme leaders, with collective reflection informed by shared values and desired (salient) outcomes, leading to their longer-term retention, enhancement or rejection.

Our choice of the mathematics curriculum programme as one of our three examples of enduring change reflects both the insider knowledge of one of the co-authors (as a mathematics tutor) and that subject's comparative immunity from another powerful stimulus for change in the external domain that was operating simultaneously upon several of the other curriculum subjects. Concerns to 'decolonise the curriculum' – given new impetus in 2020 by the Black Lives Matter movement – were, for example, driving simultaneous changes in the history, geography English and modern languages programmes, making the enduring influence of changes stimulated by ERT harder to isolate for analysis. The other two examples that we have chosen to discuss constitute the most substantial enduring changes within the PDP. Again, we analyse all three examples with reference to Clarke and Hollingsworth's (2002) model of teacher professional growth, extending the use of their analytic domains to describe teacher-educator growth resulting from collective (rather than individual) acts of reflection and enactment. Table 3 provides an overview of the changes in each domain.

Vignette 1 – Mathematics

The responses of the mathematics teacher-educators were guided by institutional and personal values, attitudes and knowledge about teacher learning within the personal domain. As noted above, one fundamental value was the importance of practical theorising (McIntyre 1995) – the interweaving of practical experience and theory, using each to challenge and support the other. Another was the importance attributed to discussion in exploring different perspectives (Darling-Hammond et al. 2005).

In relation to practical theorising, a team priority was to enable student-teachers to explore learners' mathematical thinking; a priority supported by extensive published research into ways of developing student-teachers' noticing of this thinking (e.g. Sherin, Jacobs, and Philipp 2010). The varied responses to ERT across partnership schools meant that our student-teachers' placement experiences ranged from working entirely online to highly restricted face-to-face teaching (which limited movement around the room, close proximity to pupils and access to pupils' work). These restrictions all resulted in fewer opportunities for student-teachers to notice learners' mathematical thinking.

In relation to the value of engaging in discussion, two key challenges emerged. First, discussions within face-to-face university sessions were limited by social distancing measures and restrictions on practical resources. The student-teachers were unable to

Table 3. Overview of changes in the domains (vignettes) *The domains are those identified by Clarke and Hollingsworth (2002). Numbers indicate the order of changes within our programme development. Text in italics indicates reflection; plain text indicates enactment.*

	External Domain	Personal Domain	Domain of Practice	Domain of Consequences
Mathematics	1. Pandemic disrupts university teaching and practicum. 6. Receive and reflect on student feedback surveys	5. Develop knowledge of effective online teaching methods. 7. Re-evaluate the contribution of independent group discussion tasks to student-teachers' interrogation of theory and practice.	2. Implement ERT 4. Experiment with online resources and different session structures 6. Design various tasks and prompts to support independent group work. 8. Refine and integrate independent discussion tasks into longer-term programme.	3. Notice student-teachers have fewer opportunities to notice learners' mathematical thinking in online practicum. 4. Notice student-teachers' discussion is restricted in online university sessions.
Professional Development Programme	1. Pandemic disrupts university teaching.	6. Reflect on tensions between long-established practices and core beliefs about teacher learning. 7. Re-affirm the importance of close interconnections between school and university programmes.	2. Implement ERT. 4. General tutors assume monitoring role. 5. Note diversity of tutor practices and student-teacher experiences. 8. Commit to future experimentation and co-reflection with school and university colleagues.	3. Notice impoverished opportunities to link theory with school-based practices; student-teachers benefit from flexibility of online pre-recorded lectures but low attendance at synchronous QandA sessions.
Inclusive Pedagogies	1. Pandemic disrupts schools. 3. Receive and reflect on online feedback surveys.	5. Re-affirm shared belief in the need for student-teachers to explore inclusive pedagogies in contexts where they know pupils well. 7. Recognise limitations of the original SEND programme content and timing of SEND placements. 8. Recognise potential for online elements to enhance learning and address these limitations.	2. Replace planned SEND placements with online learning focussed on case-studies. 9. Embed online tasks and materials at any earlier point in the programme. 10. Discuss with school partners and develop investigative project in second school to enable further focus on inclusion.	4. Notice high quality of student-teachers' practical theorising in response to online materials. 6. Identify enabling student-teachers' exploration of theoretical understandings about SEND in their practice as a key development goal.

work together on mathematical tasks, discussing their responses. Second, in the online setting it was harder for the teacher-educator to observe and listen to different groups and time the introduction of additional prompts.

The mathematics team experimented with and evaluated various strategies and potential resources to overcome these challenges, including the use of videos; shared, virtual whiteboards; specialist online mathematics resources (such as Desmos) widely employed in classrooms; and different session structures. This experimentation eventually led to two longer-term changes: (i) the transformation of two recurring group-work activities previously led by teacher-educators within university-based sessions into independent discussion tasks conducted in groups; and (ii) the design of a new range of tasks and prompts – a process undertaken in collaboration with teacher-educators from other institutions – to stimulate the work of these groups.

These increased opportunities for collaborative work outside taught sessions and the incorporation of a wider range of materials remain embedded in the course following our return to (near-)normal ways of working. Teacher-educator reflections, informed by the student-teachers' own evaluations, thus inspired longer-term change in the opportunities for student-teachers to interrogate theory and practice.

Vignette 2 – professional development programme

ERT created two main challenges for the PD programme: the first was ensuring that our student-teachers had access to 'general principles, theories and evidence' (McIntyre, 1990, p.32) in relation both to the wider issues of schooling and to the statutory requirements of teachers; the second was providing sufficient opportunities for the student-teachers to interrogate this evidence in the context of their placement school's policies and practices. The former had previously been provided by university-based presentations, delivered to the whole cohort; the second had been addressed through the weekly school-based PD sessions, involving all the student-teachers in a given school.

Our initial changes constituted expedient adaptations to constraints in the external domain. University presentations were made available online and, recognising that this would not guarantee engagement, we required the student-teachers to submit a regular reflective response to their general tutor, noting any questions prompted by the presentation about policy and/or practice in their placement school. This was an attempt to support the practical theorising that we regarded as a core, shared principle. Subsequent, and on-going, reflections across the tutor team highlighted a range of tensions still to be resolved through longer-term, principled changes to practice. These include an acknowledgement that the previous lecture format of the university PDP sessions was always poorly aligned with our shared beliefs about ideal conditions for student-teacher learning. Moving these presentations online has enhanced, rather than diminished, student-teachers' experiences, since they can now watch (and re-watch) the presentations at convenient times and at their own pace. But scope for interactive discussion with the presenter has been lost. Offering an online, synchronous question-and-answer session resulted in low attendance and limited engagement, partly due to the time-lag between watching the pre-recorded presentation and joining the online discussion. We also recognised the need identified by Scull et al. (2020) for strong relationship-building to

promote engagement – a particular challenge within large online meetings. We still need further experimentation in the domain of practice to better facilitate dialogue between expert contributors to the PD programme and our student-teachers.

Reflection on our experiences also revealed that the changes to practice constituted a partial re-conceptualisation of the general tutor's role. The need to monitor student-teachers' engagement through weekly reflection sheets increased tutor workload and emphasised the performance management element of the role. As other aspects of the course (such as procedural explanations related to researching, writing and submitting formal assignments) were transformed into recorded presentations, so colleagues made varying uses of the time gained, only some of them choosing to provide more individualised, targeted support. This variation in team members' enactment of the general tutor role led to inequity of experience for the student-teachers, with personalised support being enhanced in some contexts but eroded in others.

The changes made to the PD programme have thus prompted new questions about how to operationalise our partnership's underlying principles. Recognising that student-teachers benefit from close interconnections between school and university, we need to create further opportunities for colleagues from both contexts to reflect collaboratively and agree a way forward.

Vignette 3 – inclusive pedagogies project

Our third example focuses on provision for student-teachers' practical theorising about effective teaching for pupils with special educational needs or disabilities (SEND). Within the personal domain, our provision was informed by the concept of 'inclusive pedagogy' as summarised by Florian and Black Hawkins (2011):

Instead of providing something different or additional for children who experience difficulties in their learning, inclusive pedagogy seeks to extend what is ordinarily available to everybody (Florian and Black Hawkins 2011, p. 813).

When school closures provided the driver for change in the external domain, our main focus was on replacing the specialist practice-based input (previously provided in a special school or specialist base) using video case-studies developed by the National Association for Special Educational Needs. Our subsequent reflections, informed by student-teachers' evaluation, confirmed the value of these online case-studies, particularly in alerting the student-teachers to small adaptations, designed with *particular* learning needs in mind, but with the potential to improve access to the lesson content for *all* learners. Further cycles of reflection and innovation led to the retention of tasks based on these online case-studies, and to the adaptation of an existing school-based investigative project, promoting more focused practical theorising in relation to SEND and stimulating new ways of working with SEND departments in placement schools.

Although previous feedback on the special school placement had always been positive, the student-teachers had generally regretted that its benefits could not be fully realised in practice because of their immediate move to a new context. ERT prompted experimentation with alternative online provision that proved invaluable in its own right, not merely as a substitute for the special school placement. We thus gained knowledge of new resources and ways of using them that allowed us to address pre-existing problems

of programme coherence that had restricted practical theorising in relation to SEND. We had previously concluded that it would be impossible to move the special school placement earlier without seriously disrupting student-teachers' scope to build relationships with pupils in their main placement school. With new knowledge of powerful online resources and confirmation of our assumptions that inclusive pedagogy is easier to explore once student-teachers have a good knowledge of individual pupils, we could make permanent programme changes, reinstating the special school placement while retaining and adapting the two new elements introduced in response to ERT.

The online programme was therefore moved to an earlier point, when student-teachers still have six weeks in their first placement school. This permits group discussion of recommended practices within a school-based a PDP session devoted to inclusive pedagogies and allows for practical experimentation while teaching pupils whom they know well. The PDP project focus on inclusion (broadened slightly to encompass other aspects of diversity as well SEND) has been retained within student-teachers' second school placement, giving them opportunities for school-based research, supported by further recommended reading. The original special needs placement has thus been much more securely integrated within a sustained SEND strand, thereby strengthening the scope for practical theorising.

Discussion and conclusions

In discussing the implications of our findings, we focus first on the methodological insights gained from our application of Clarke and Hollingsworth's (2002) model, before considering the specific kinds of learning stimulated by the pandemic and what has determined whether and how particular changes have lasted. Examination of three instances of enduring change within our own teacher education programme alongside seven published examples allowed us to evaluate the feasibility of applying Clarke and Hollingsworth's (2002) model of individual professional learning to processes of collective growth within teacher education teams. Through our analysis, we could also identify what is needed for such teams to move beyond crisis management into recognition of opportunities for sustained professional growth.

Applying Clarke and Hollingsworth's (2002) model to collaborative or shared growth

Examining our team's collective responses to ERT, alongside Donitsa-Schmidt and Ramot's (2020) example of developing a collaborative community, suggests that enactment and reflection, including the interrogation of established values, principles and theories, can indeed occur across a professional team or partnership, leading to enduring growth. Our examples illustrate a number of sustained and still-evolving developments within the *collective* personal domain and the domain of consequences, arising from adaptations prompted by the pandemic in the domain of practice. Indeed, the requirement to take urgent, innovative action for cohorts of student-teachers which encouraged collective experimentation also called for collective evaluation, making reflection explicit through partnership meetings informed by student-teacher feedback.

We acknowledge, however, that a model designed to represent processes of change within individuals, does not as it stands effectively support analysis of variations in how practices are enacted; nor does it accommodate the tensions that arise between conflicting perspectives. It is perhaps unsurprising that our clearest example of enduring growth was within the small subject-specialist team, or that it was Baker's (2021) *paired* self-study approach that provided such effective support for the enactment of new practices and sustained reflection on their impact.

Taking effective account of the change environment

As future research builds on this conceptualisation of longer-term developments in teacher education initially stimulated by ERT, it will also need to focus more systematically on the wider change environment, acknowledged in Clarke and Hollingsworth's (2002) model. It is worth noting that in each published example identified as a growth network, the teacher-educators were operating within highly supportive change environments, characterised by collaborative working practices, ready access to appropriate technological resources and sufficient agency to take action. In some policy contexts, that agency was *only* conferred by the urgent need for action early in the pandemic. In England, for example, as emergency measures were relaxed, so policy-makers reasserted control (Brooks, McIntyre, and Mutton 2021). The ways in which initial teacher-educators here have subsequently been excluded from any role in policy formation, either in response to subsequent waves of infection or in preparing for recovery measures and planning for the future, has exercised a powerful constraint on professional experimentation, profoundly limiting teacher-educators' scope to continue acting as adaptive and agentic professionals, as they did when Covid-19 first struck.

The importance of underlying values and scope for reflection in sustaining professional growth

The disruption of ERT and the urgent response that it required originally prompted teacher-educators to revisit what is really important to them (la Velle et al. 2020). The pandemic was an undoubted catalyst for change, but – in light of the powerful contextual constraints identified by Brooks, McIntyre, and Mutton (2021), – it is unsurprising to find that only when teacher-educators had time to reflect (Hadar and Brody 2016) could they really examine the extent of alignment between such changes and their principles and values, and so determine which innovations were worth retaining and refining.

As Kidd and Murray (2020) also found, the particular adaptations made revealed which values were prioritised, but subsequent reflection also highlighted principles sacrificed at the point of crisis, that teacher-educators were reluctant to abandon in the longer term. One keystone principle, evident across the published examples and within our mathematics vignette, is that 'developing responsive relationships is at the heart of learning to think like a teacher and at the heart of supporting our students' (Crowe and Berry 2007, 33). It underpins Baker's (2021) processes of reflection and adaptation, and characterises the cases presented by Scull et al. (2020). Focusing on these relational aspects prompted further reflection and enactment by teacher-educators who recognised the need to engage more deliberately in establishing an ethic of care and to provide explicit

modelling for their student-teachers of the conscious pedagogical decisions and actions required to do so. A reluctance to abandon particular values or principles within the (collective) personal domain meant seeking out new technologies and ways of using them consistent with those values. Identifying and refining such strategies often required considerable experimentation and sustained collaboration and was not always entirely successful; but enduring changes occurred where enactment and reflection on salient outcomes demonstrated that the new practices supported or strengthened the programme's underpinning principles.

Mediating the relationship between theory and practice in a changed context

Central to those principles in many cases was the effective interweaving of theory and practice, particularly as the nature of that practice changed (Barnes et al. 2020; la Velle et al. 2020). Within our programme and the example discussed by Donitsa-Schmidt and Ramot (2020), this meant interrogating established principles and their theoretical underpinnings to identify new experiences that would enable student-teachers both to recontextualise theory in practice (Gomez Marchant et al. 2021) and to question that theory in light of experience (McIntyre 1995). Both the use of a wider range of schools for remote practicum experiences (Donitsa-Schmidt and Ramot (2020) and our own adoption of video-based SEND case-studies illustrate how technological developments permitted access to classrooms and insight into pupil perspectives that student-teachers might never otherwise have encountered. As our mathematics team found, technology can also provide new kinds of stimuli for collaborative and critical reflection, bringing direct insights from diverse classrooms and from a wider range of teacher-educators and researchers (Hatch et al. 2016). However, these new uses of technology have only endured and begun to be refined where they were found, through subsequent processes of review and reflection, to embody shared values or to address fundamental priorities at the heart of the teacher education programme in which they were deployed

Moving beyond immediate learning in response to Covid (change sequences) into enduring transformation (growth networks)

In the various examples that we have explored, schools and universities working on initial teacher education in partnership clearly demonstrated the capacity to adapt their methods of teaching in response to the crisis. They identified ways of working online, using existing resources that they had previously overlooked, as well as gaining access to more diverse learning contexts, collaborating in new ways, often beyond their own partnerships, to make particular expertise or exemplar materials more widely available. But the capacity for these change sequences to become growth networks – for teacher educators to learn effectively from these new practices and to embed aspects of them within revised programme structures once the need for emergency measures had receded – depended on two kinds of factor. The first was the wider change environment in which the teacher educators were working, particularly the technological support available and the existing cultures of collaboration. The second was the extent to which the new practices were subject to sustained

cycles of evaluation, in relation to underlying values and principles. It is technology use *combined* with continuing cycles of reflection, evaluation and research that enables potentially transformative practices to continue evolving beyond the original stimulus for change.

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