Developing the developers : supporting and researching the learning of professional development facilitators

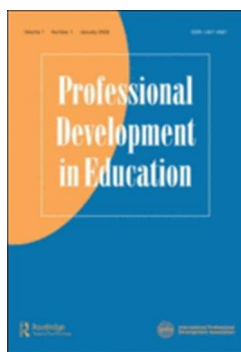PERRY, Emily <http://orcid.org/0000-0003-3413-1159> and BOYLAN, Mark <http://orcid.org/0000-0002-8581-1886>

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Developing the developers: Supporting and researching the learning of professional development facilitators

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Abstract

Research on teacher professional development is extensive but there are fewer studies about the practitioners who facilitate professional development. Here we report on a pilot programme for professional development facilitators rooted in a cycle of action research. Informed by a categorisation of professional knowledge and skills of facilitators, in the 'developing the developers' programme, professional development facilitators enquired collaboratively into their practice using video observation and peer review and engaged with theories of professional learning. The impact of the programme was evaluated using a framework based on Clarke and Hollingsworth's (2002) interconnected model of teacher professional growth. The programme was effective in allowing participants to gain insights into their practice to develop it further and to identify participants' learning needs. The latter related to improving facilitation skills and knowledge and improving knowledge about professional development. The interconnected model was found to be applicable to professional development facilitators with some adaptations. Its use enabled understanding of the impacts of the programme and the learning processes involved. Although limited in scale, our study offers a model for professional development that is potentially useful in other contexts. Further, the theoretical frameworks developed may support the design and evaluation of similar programmes.

Key words

Professional development, facilitator, professional learning, video observation, interconnected model of teacher professional growth

Developing the developers: Supporting and researching the learning of professional development facilitators

Introduction

There is an established body of literature that illuminates the processes of teacher professional learning and development (for example, Fraser et al. 2007, Evans 2008, Clarke & Hollingsworth 2002, Vermunt & Endedijk 2011, Guskey 2000, Coldwell & Simkins 2011, Desimone, 2009 and van Driel et al. 2012). In contrast, there are, so far, only a relatively small number of studies about those who lead professional development and even fewer about the professional learning itself of these practitioners. The study reported here contributes to addressing these gaps.

Leadership of professional development encompasses two strands: the management of organisational structures for professional learning, such as in-school training programmes and school-to-school support, and the design and facilitation of professional development activities such as workshops, mentoring and coaching (Boylan 2016a). In this study, we focus on practitioners of the latter, that is, those who design and facilitate teacher professional development activities. Although a number of recent studies recognise that teacher leadership often involves facilitation of professional development (Fleet et al. 2015, Margolis 2012, Margolis & Deuel 2009, Fairman & Mackenzie 2014), there is limited research into the practice of professional development facilitators and therefore little knowledge of how to support them to learn, carry out and improve their roles (van Driel et al. 2012, Lange & Meaney 2013, O'Dwyer & Atlı 2015).

This paper makes three contributions towards addressing this research gap. Firstly, we describe a successful professional development programme for professional development facilitators (PDFs) working in secondary science education in England. The programme was designed to support PDFs' professional learning and thus in turn improve the professional learning of teachers. The programme involved collaborative inquiry into practice using video observation, a technique widely employed for teachers' professional development (Gaudin & Chalies 2015). Video observation provided a stimulus for reflection and discussion of practice which enabled the PDFs to share knowledge and improve understanding of successful pedagogies, to explore models of professional learning and its evaluation and to better understand their own attitudes to teacher learning (Ince 2016). We describe the study and its outcomes.

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Secondly, we identify PDFs' professional development needs and suggest ways some of these needs can be met. One notable feature of our study was the introduction to PDFs of theoretical models of professional learning. This supported the PDFs involved in the study to improve their understanding of professional development and, further, to use these models themselves in their own practice with teachers. This engagement with theory for the improvement of practice points to a way in which professional learning for PDFs can be transformative (Kennedy 2014) or support a reimagining of practice (Sachs 2011).

Finally, we address a need for theoretical tools to design and research professional development facilitators' learning. In this study, we extended the use of the interconnected model of teacher professional growth (Clarke & Hollingsworth 2002) as a framework to analyse the learning of the participants in the programme and, as a result, we reflect on its utility in this new context.

In the next section, we consider previous research on professional development facilitators' learning needs. Following a description of the study's methodology and the 'developing the developers' programme, we summarise the outcomes of the programme, illustrated by the learning of three participants. We reflect on the learning needs of PDFs, the effectiveness of the programme in meeting these needs and our methodological approach for analysis of the programme's effectiveness. We conclude by considering the implications of this study for practice and further research.

The professional knowledge and skills of professional development facilitators
In this section we consider the professional knowledge and skills needed for professional development facilitation. This review of the literature informed the design of the 'developing the developers' programme.

In England, current policy agenda advocates teachers taking on the leadership of professional development (Husbands 2015, Boylan 2016a) but professional development facilitators (PDFs) are not exclusively teachers and few practitioners operate solely in the role of PDF. Some studies have identified facilitation of professional development as one of the roles of teacher leaders alongside wider activities such as the organisation and brokering of professional development programmes (Margolis 2012, Boylan 2016a, Fairman & Mackenzie 2014) and many PDFs have other roles including school leaders, university staff, researchers and independent consultants (Lange & Meaney 2013, Krell & Dana 2012, Margolis 2012,

van Driel et al. 2012, Jackson et al. 2015). As a way of distinguishing between these roles the concept of a 'second order' role (Murray & Male 2005) is useful. A 'second order' role is one which is one step removed from the classroom, such as an initial teacher educator. Some PDFs, such as university-based staff, are continually in a second order role (at least in relation to schooling), whereas teacher PDFs move between the first order role of teaching and the second order role of facilitation.

In developing a conceptual framework of PDFs' knowledge and skills, we begin by considering recent discussion of the relationship between the capacities needed for and developed by teaching and those needed for another second order role, initial teacher educator. This supports the development of an initial framework in which we suggest a categorisation of professional learning needs for PDFs. Our focus is on the different types of knowledge and skills needed for teaching and for facilitation. We acknowledge that a distinction between knowledge and skills is not unproblematic, particularly if a view of knowing in practice (see for example, Lave & Wenger 1991) or knowledge in action (Schön 1995) is adopted in which the difference between knowledge and skills blurs. We also acknowledge that these categories do not address other aspects of professionality such as values and identity (Loughran 2006). However, our framework is devised in relation to the types of professional learning identified through the study of the programme described in this paper.

Expertise in teaching is, we contend, a prerequisite for effective professional development facilitation (Byington & Tannock 2011). For PDFs to be credible, they must have and be able to demonstrate their knowledge of the subject matter of the professional development activity, including subject specific pedagogical content knowledge (O'Dwyer & Atlı 2015). PDFs must be able to make explicit their knowledge of how children learn their subject, such as being able to describe common student misconceptions and they must situate the learning of teachers in an appropriate context, demonstrating knowledge of educational frameworks such as curriculum content, assessment structures and the wider education environment (Byington & Tannock 2011). We suggest therefore that professional development facilitators need opportunities to develop and maintain their knowledge of the subject and how it is effectively taught. We recognise this need as *knowledge and skills for teaching*.

The importance of knowledge and skills for teaching in undertaking second order roles has been recognised in research on the role of initial teacher educators (Chauvot 2009; Field

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2012, Goodwin & Kosnik 2013, Selmer et al. 2016). One example is a three-stage model of knowledge acquisition for teacher educators (Field 2012):

- subject knowledge;
- knowledge of how to teach others;
- knowledge of how to teach others how to teach (your subject).

However, Field's second category 'knowledge of how to teach others' is not homogeneous. Following Shulman (1987) the different types of knowledge needed for the first order role of teaching have been much explored, especially in science and mathematics (see, for example, Settlage 2013 and Goos 2013). In relation to the second order role of teacher education, and specifically mathematics teacher educators, Chauvot (2009) draws on Shulman's framework, and Grossman (1990) and Murray and Male's (2005) notion of pragmatic knowledge of context, to draw distinctions between:

- subject matter content knowledge;
- pedagogical content knowledge;
- curricular knowledge;
- knowledge of context.

These forms of knowledge for teacher educators are related to but distinct from those for mathematics teachers. This approach could be adapted for teacher educators in other subject areas. Selmer, Bernstein and Bolyard (2016) develop the approach further, influenced by Goodwin and Kosnik's (2013) review of types of teacher educator knowledge. They propose a multi-layered model with three major elements: content specific knowledge, context knowledge and general pedagogical knowledge. These elements are divided into specific sub-elements and sub-sub-elements related to teaching and teacher education to give a total of 25 different categories.

Turning from teacher educators, for professional development facilitators (PDFs) the situation appears to be even more complex, since PDFs work with those who already know how to teach. Facilitation therefore encompasses multifaceted layers of interaction drawing on the roles of listener, expert, critical friend, coach, mentor, as well as teacher and workshop leader (Krell & Dana 2012, O'Dwyer & Atlı 2015). PDFs must know when and how to deploy these roles (Higgins 2008, Elliott et al. 2009, Stein et al. 1999) in response to the

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needs and expertise of the teachers in front of them (Lange & Meaney 2013, Ince 2016). Building on Field's (2012) stages of knowledge acquisition for initial teacher educators we therefore posit the need for an additional stage: knowledge of how to facilitate the professional learning of those who already are teaching the subject. Facilitation includes the ability to make explicit aspects of practice which for expert teachers may be tacit (Borko et al. 2014) such as through the modelling of good teaching (Margolis & Doring 2013). Different skills are needed for different forms of professional development. While some of these skills may be generic to teaching, such as those used in workshop facilitation, others, like coaching, are more specialised. PDFs therefore need opportunities to learn and practise these *facilitation skills and knowledge*.

Finally, in addition to knowledge and skills of teaching and facilitation, PDFs need to understand the professional learning of teachers who carry with them their own beliefs and experiences (Ince 2016). This 'learning community knowledge' (Borko et al.. 2014) encompasses knowledge of theoretical models of how teachers learn, the principles and benefits of different forms of professional development such as mentoring or action research and the evaluation of professional development (Stein et al. 1999, Linder et al. 2015). Some aspects of this are generic, such as understanding about different types of professional development activity. Other aspects are subject specific. For example, in science teaching an understanding of common scientific misconceptions may be important (Fischer et al. 2014) and so PDFs need to develop knowledge of teachers' relationships to student (and their own) misconceptions. This is encapsulated in the need for facilitators to have *knowledge about professional development*.

Our framework of professional learning needs for PDFs includes three categories of learning needs: knowledge and skills for teaching, facilitation skills and knowledge, and knowledge about professional development. For simplicity, and relevance to the video observation utilised in our study, this model does not encompass other aspects of the facilitator's role that sometimes may be applicable such as: organising and brokering of professional development programmes (Boylan 2016a), sensitivity to the micro-politics of implementing professional development activities in schools (Boylan 2016b, Fleet et al. 2016) or knowledge of context found in frameworks of (initial) teacher educator knowledge (Chauvot 2009, Goodwin & Kosnik 2013, Selmer et al. 2016).

The Developing the Developers programme: design and methodology

Background and context

The 'developing the developers' programme was funded through the National Science Learning Network (STEM Learning Ltd 2015), a government-funded initiative in England. The network was established in 2004 to provide science teachers with continuing professional development to improve their subject and pedagogical content knowledge to increase pupil attainment and progression into scientific career pathways. The pilot programme described in this paper aimed to support the professional learning, and so improve the practice, of the network's facilitators, who include teachers, university staff and independent consultants. The programme was developed, delivered and evaluated by Emily, one of the authors of this paper, who led one of the network's five regional centres. The funding of the programme supported its development, delivery and evaluation and included an honorarium to the participants.

Methodology

The study described in this paper followed the principles of action research (McNiff 2002), comprising a cycle of implementation and evaluation. The aim was to trial an intervention which addressed the lack of provision for the professional learning of professional development facilitators (PDFs) working in science education. The research questions which the study sought to address were:

- What activities are effective in supporting the professional learning of professional development facilitators?
- What can we learn about the professional development needs of professional development facilitators as a result of providing such a programme?
- Can the interconnected model of teacher professional growth be extended to understand the professional learning of professional development facilitators?

Programme design

Opportunities are rare for the induction or ongoing professional learning of professional development facilitators. Thus, in designing the developing the developers programme, there were limited models to draw on. Reported examples include a mentoring model through co-delivery with more experienced facilitators (White 2014), the creation of a community of practice to improve pedagogical skills such as questioning (Tack & Vanderlinde 2014) and

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the observation of live professional development sessions through a one-way mirror (Ince 2016). Borko et al. (2014) describe a programme in which the learning of novice PDFs was integrated into the facilitation of teachers' professional learning. This is a similar approach to one in an Early Years context of support by university staff who 'facilitate the facilitators' of practitioner enquiry (Fleet et al. 2016).

The design of the 'developing the developers' programme was informed by research on teacher professional development (for example, Desimone 2009) and the professional learning of science teachers (van Driel et al. 2012), based on a premise that, given the overlapping roles of teachers and facilitators, the professional development of facilitators might operate in a similar way to that of teachers. The programme structure and content was built around the following characteristics: active, collaborative and inquiry-based learning, of a suitable duration, coherent with participants' professional contexts, supported by employers and focussed on improving outcomes (van Driel et al. 2012). The overall aim was for a transformative model of professional development (Kennedy 2014) in which participants collaborated in professional enquiry into practice.

Modelling professional development for facilitators on what is effective for teachers does have limitations, particularly in the difference between the intended outcomes of professional development for teachers and PDFs. While effective professional development for teachers is focussed on improving student outcomes (van Driel et al. 2012), for PDFs the impact on student outcomes is mediated by the 'second order' nature of their role (Murray & Male 2005) which separates them from direct classroom impact (Parr & Timperley 2010). In the 'developing the developers' programme, therefore, the focus was on improving facilitation skills and knowledge, and knowledge about professional development and, where possible, in measuring that improvement through observation of teachers' engagement and learning.

In accordance with these design principles, participants were actively engaged over a number of months through varied activities and collective participation which allowed them to direct the focus of participation (Desimone 2009) in a supportive, constructive environment of critique and reflection (Schuck & Russell 2005). Video observation formed a key part of the programme. With teachers, video observation has been shown to add value to professional learning by providing a stimulus for reflection and discussion (Grant & Kline 2010). In this programme, we piloted an extension of the use of video to the professional learning of professional development facilitators. Participants recorded themselves facilitating

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professional development and then shared these videos in small groups. This provided authentic examples of practice for discussion, reflection and analysis (Coles 2013, Newton & Sorensen 2010, Sherin & van Es 2009). Involvement was supported by participants' employers and leaders, through consent where appropriate and honorarium payments, with financial support provided by the National Network of Science Learning Centres, which therefore offered a level of credibility and authority for the programme. The programme design also gave insight into which aspects of practice the facilitators felt were important, thereby signalling their professional learning needs.

Participants

An invitation to participate in the 'developing the developers' programme was sent by email to around one hundred professional development facilitators working for the network. The invitation detailed the programme's aims, content and structure and provided information about the research study.

Seven professional development facilitators (PDFs) chose to take part (Table 1). All had been facilitating professional development for at least four years. Ben was a 'hybrid teacher leader' (Margolis 2012), who combined classroom teaching of science with the facilitation of professional development for other teachers. All the other participants had been secondary science teachers and were now independent consultants, employed as short-term contractors by various organisations, or university employees, with two participants combining these roles. As mentioned above, one of the authors of this paper devised and facilitated the programme, and, as a PDF herself, took part in the video observation sessions. All participants had previously worked with or knew through professional networks at least one other participant. Given that the participants were volunteers for the programme, they cannot be taken to be a representative sample of all the professional development facilitators invited, who in turn are not representative of all professional development facilitators. This is a limitation of our study. However, whilst not statistically representative, based on our professional experience, the range of different roles and experiences accords with profiles of those engaged in this type of professional development in England at the time of the study.

Table 1. Programme participants

Through a written questionnaire, which was discussed in the first face-to-face workshop, the participants explained their reasons for joining the programme. These focussed on two of the

three themes of learning we proposed earlier: facilitation skills and knowledge, and knowledge about professional development. Around half the participants were aware of the increasing use of video observation for professional development in schools, and so wanted to experience its use for themselves, so that they could use it in facilitation. All participants wanted to improve their knowledge of professional development, including their own practice. A comment from Rose illustrates this: 'People tell me I'm good at what I do, but I don't know why. I've got no evidence and I don't actually know what I do that might be good.'

Ethics

Institutional ethical approval was sought and obtained. Consent was obtained from all participants, who were made aware that, because of the small scale of the study, anonymity could not be assured in reporting. In keeping with consent agreements their names have been changed for confidentiality. Within the programme, confidentiality between participants was agreed, in order to set up a trusting and secure environment for sharing of practice.

Given that the programme, was, as stated above, designed and facilitated by the leader of a regional centre which employed some of the participants as PDFs, power issues arise. Participants may have felt that participation was not voluntary or that their competence as a facilitator was being evaluated or exposed which could lead to reduced offers of work. To mitigate against these threats, ethical issues were explored in the first face-to-face workshop, allowing participants to share any concerns. Independence was assured in terms of participants' choice of which videos to share, and which features of their practice to focus on. Participants were randomly assigned to one of two groups in which to share videos. The author participated in the programme by sharing videos of her own practice with other participants in one of the groups, also randomly assigned.

Consent was obtained from all teachers who took part in the recorded professional development sessions.

Programme activity

Over five months, punctuated by face-to-face workshops and online discussions (Table 2), the PDFs recorded themselves facilitating professional development using a video or smartphone camera. The videos were shared with other participants using Iris Connect, an online environment which is widely deployed in schools (Iris Connect 2015).

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Table 2. Programme structure

By the end of the programme, eight videos had been shared from activities including one-off workshops, conference workshops, single workshops within multi-day programmes and individual coaching sessions (Table 3).

Table 3. Videos shared by the facilitators

The PDFs were supported in discussion of their videos through a series of online prompts (Table 4). They were not directed to focus on any particular aspect of practice, but instead were asked to note anything in the videos which they found significant or curious. Emerging issues were discussed during face-to-face workshops, online discussions and video conferences.

Table 4. Video observation prompts

The programme also included activities which focussed on improving the knowledge of professional development, including reading and discussion of four models of professional learning: the 'discipline of noticing' (Mason 2002), self-study (Berry 2009), appreciative inquiry (Giles & Kung 2010) and most significantly the interconnected model of professional growth (Clarke & Hollingsworth 2002). A number of the participants found this model particularly useful for thinking about their own practice, including Mike, who, as we describe later, shared the model with teachers in his own practice. The interconnected model was also used as an analytical tool in the research study (see below).

Data collection

Multiple sources of data, collected before, during and after the programme, were used to provide information about the study (Table 5). Each data set was analysed using a method appropriate to its purpose.

Table 5. Data collection and analysis

Data analysis

Descriptive statistics (see Table 1) were derived from the background information survey. Participants' discussions, online and face-to-face, of the video observations were analysed through an inductive process of coding and theming (Ryan & Bernard 2003) in order to identify what the participants felt was important to explore in their own practice.

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The outcomes of the programme for participants' learning and practice were investigated through the analysis of three data sets:

- written evaluations of the programme at its conclusion;
- semi-structured interviews with pairs of participants around four weeks later;
- a follow-up questionnaire approximately eight months later, which described initial findings and asked for further responses as appropriate, thereby providing participant validation.

The interconnected model of teacher professional growth (Clarke & Hollingsworth 2002) was used as a framework for analysing this data. The model is a tool for theorising, understanding and improving teacher professional learning and change. The model's conceptualisation of the change environment encompasses 'the teacher's world' (Clarke & Hollingsworth 2002, p. 950), within which are four domains: the personal domain, the domain of practice, the external domain and the domain of consequence (Figure 1). Two processes of enaction and reflection mediate change between the domains. The model goes beyond other learning pathway models (for example (Desimone 2009, Guskey 2000) in that it proposes a non-linear style of learning predicated on the view that learning is a continual and complex process which can take multiple pathways.

The interconnected model is widely cited, especially in mathematics and science teacher professional learning, reflecting its origins in theorising empirical studies of teacher learning in these disciplines. For example, the typology of the four domains has been used to categorise the aims of professional development interventions in science education (van Driel et al. 2012), and the model has been used to analyse coaching and mentoring, with an extension here to include the learning of the teacher mentor (referred to as the advisor (Hartnett 2011) or co-operating teacher (Rodriguez 2013)).

Figure 1. The interconnected model of teacher professional growth (Clarke & Hollingsworth 2002)

In this study, the model was used an analytical tool in two ways. Firstly, the model was used as an 'interrogatory tool' (Clarke & Hollingsworth 2002). Each comment from a participant which related to an impact or outcome of the programme was categorised into one of the four domains of change. For example, if a participant reported that they felt more confident in their understanding or knowledge of teacher professional development or its facilitation, this

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was situated in the personal domain. If they trialled a new technique in their practice of facilitation, this was classified as professional experimentation and located in the domain of practice. Further examples are given below. This analysis gave us a qualitative, evaluative snapshot of the impact of the programme.

Secondly, the interconnected model was used to trace 'change sequences' (Clarke & Hollingsworth 2002) describing the learning of individual participants. We identified participants' reported learning from the programme, located each outcome as above in the appropriate domain of change and then linked these changes together into pathways. This analysis allowed exploration of the ways in which the programme had operated for individual participants. By using the interconnected model in these ways, we were also able to reflect on its use in this new context: the learning of professional development facilitators. Outcomes of the analysis were shared with participants to provide an element of participant validation.

Professional learning outcomes

In this section we analyse the outcomes of the programme. Gathered from programme evaluations, follow-up interviews and follow-up questionnaires, each participant comment which related to an impact of the programme, was classified, as described above, into one of the domains of the interconnected model of teacher professional growth (Clarke & Hollingsworth 2002). The distribution across the domains is shown in the table below (Table 6).

Table 6. Outcomes of the programme classified into the four domains of change

Our findings relating to each domain are now presented in turn. These describe the outcomes of the programme, illustrate the framework of professional learning for PDFs we described earlier, and highlight our findings in the use of the interconnected model. We include our analysis of participants' video observations in the domain of practice and present individual change sequences from three participants to illustrate aspects of the study which relate to the personal, practice and external domains.

The personal domain

The most numerous outcomes were situated in the personal domain. We classified these into two further sub-categories (Table 7), based on the model of professional learning for PDFs

we proposed earlier: facilitation skills and knowledge, and knowledge about professional development.

Table 7. Outcomes in the personal domain

Mike's change sequence (Figure 2) illustrates the personal domain. His learning begins in the external domain by engagement, during reading and discussion in the programme's workshops, with the interconnected model itself (Clarke & Hollingsworth 2002). Mike subsequently trialled an activity in his own professional development sessions with teachers, in which he used the model to stimulate discussion of how teacher learning can occur through professional development. Through this, he noticed a salient outcome: his teachers appeared more engaged in their own professional learning. He felt that he had given the teachers a 'more accurate perception of how professional development should work', which in turn led to further change in the personal domain: a belief that sharing theories of professional learning with the participants leads to greater impact and engagement.

Figure 2. Mike's change sequence

In a follow-up interview, he said:

> I would use [the model] again… because sometimes my experience of delivering [professional development] is you get teachers coming and they sort of know what they want but they don't know what they need and I think this… is one way of me getting them to reflect on just how this day that they're spending here is going to impact on them.

For Mike, change in the personal domain, in his knowledge about professional development, is linked in a reflective cycle with a change in practice and with salient outcomes in the domain of consequence.

The domain of practice

Our findings in the domain of practice provide an insight into which aspects of facilitation the participants felt important for reflection and/or improvement. In Mike's change sequence, change in practice involved professional experimentation in trialling a new strategy for facilitation. However, for some participants, particular aspects of facilitation were simply noted and discussed, rather than changed, at least during the duration of the programme. This may be because of the way in which video was used in the programme, meaning that a

change in practice was not, perhaps, seen as crucial to participation. We extended the domain of practice to include these aspects of facilitation, even when they were not strictly professional experimentation, because they illuminate PDFs' professional learning needs in this domain.

Participants' concerns relating to the practice of facilitation centred around two themes: pedagogy and embodiment (Table 8). Both these themes fit into the category of facilitation skills and knowledge we proposed earlier. In the theme of pedagogy we located skills and knowledge which the facilitator used to generate a productive learning environment. Examples include formative feedback techniques, ways of organising groups and questioning strategies. The second theme, embodiment, encompasses the act of being a facilitator. It includes actions taken, sometimes unconsciously, by the facilitator to establish their competence and credibility, including being well-prepared, using humour and appearing relaxed, confident and knowledgeable. We also included here ways in which the facilitator used their physical presence in the room such as making eye contact and moving around to talk to all group members.

Table 8. Domain of practice themes emerging from the video observations

Liz's change sequence (Figure 3) illustrates change in the domain of practice. Liz reported that, when she facilitated professional development, the beginnings of her workshops were occupied with paperwork and took too long to get started. She recorded the start of a session to 'just see what it looked like' and, by sharing it for feedback, to 'know what… other people do'. The other facilitators, on one hand, offered some (unexpected) appreciation that what Liz was doing was more effective than their own practice and, on the other hand, provided tips on how they started their sessions. Liz tried out a new way of starting sessions – a change in the domain of practice – which she recorded and shared again. She felt that her new technique was an improvement: the teachers were more quickly engaged with their professional learning. This outcome led in turn to a consolidation of her belief about the best way to start sessions. Again, we see a cycle linking the domain of practice with the personal domain, this time including a link to the external domain through Liz's sharing of her videos with the other participants.

Figure 3. Liz's change sequence

The domain of consequence

Relatively few outcomes or changes corresponded to the domain of consequence. Those which did, like those illustrated by Mike and Liz, related to participants noticing an increased engagement of teachers in professional learning as a result of a change in practice. A lack of change in this domain may be attributable to the programme design, particularly its timescale, with only a few months available for implementation of change and evaluation of impact. Alternatively, it may be because of an inherent difficulty, discussed earlier, in identifying what constitutes, and how to measure, a salient outcome for professional development facilitators.

The external domain

In this study, we defined the external domain as made up of two components of the programme: learning from theory about professional development and learning from participants working together through discussion and video observation. These are changes in the sense of Clarke and Hollingsworth's (2002) original descriptions, in that they are new stimuli for the learner and drivers of change in other domains. Above, we discussed learning from theory about professional development, so here we focus on learning from working together. Participants reported that collaborative reflective enquiry was a key feature of the programme. As one participant commented, working together enabled the PDFs to 'see that what we see as key features of our own approach are shared by others' (Adam).

Our third change sequence illustrates this component of the external domain. Jack's change sequence (Figure 4) begins with Liz's video of the start of her workshop, described above. Watching this led Jack to also feel dissatisfied with the beginnings of his workshops and so he too decided to experiment with new practice to start sessions. As a result of this change in the domain of practice, he felt that his teachers were more quickly engaged with their professional development: a salient outcome. Jack's sequence moves in a linear fashion through the domains.

Figure 4. Jack's change sequence

In Jack and Liz's change sequences, the external domain is formed by the community of facilitators participating in the programme. Based on this, we feel a modification to the interconnected model is appropriate for collaborative professional learning activity, such as

the programme described here. In these scenarios, we propose that the external domain is better termed the social domain, thereby capturing the idea of learning in a community.

Discussion

In this section, we revisit the research questions of the study. We consider first what we have learned about the professional learning needs of professional development facilitators. Next we look at what activities can support the professional learning of professional development facilitators. Finally we reflect on our extension of the interconnected model to the new context of professional development facilitators.

Supporting the professional learning of professional development facilitators

In designing the programme described in this study, we drew on research into effective professional development for teachers (van Driel et al. 2012). We found that this was successful in building a programme which was effective for the professional development facilitators who took part in the study.

The programme structure blended face-to-face and online activity to generate a supportive environment which allowed a collaborative reflection, discussion and sharing of experiences (Schuck & Russell 2005). Participants engaged in reflective enquiry (McNiff 2002) which, as illustrated by Liz's change sequence, was reminiscent of many teacher action research studies, with learning starting from a question about one's own practice. While Jack's linear change sequence is similar to many teacher learning pathways (see Guskey 2000) for example), Mike's illustrates how the second order role (Murray & Male 2005) of a PDF leads to a more complex set of learning needs, different from that of a teacher, with an interlinking of theory, practice and modelling (Krell & Dana 2012).

Key enabling activities in the programme were collaboration with peers, the use of video observation and engagement with theoretical models of professional learning. The opportunity to collaborate with peers was valued by all participants and identified as a rare activity in their role as a PDF, which may have been a driver for these PDFs to participate in the programme. As a result of this collaborative activity, most participants trialled a new skill in their professional development practice, and a few also reported evaluation of these changes. These new facilitation techniques were learned through observations of and suggestions from other participants, as well as engagement with theory.

We found that video observation was effective, as it is for teachers (Coles 2013, Gaudin & Chalies 2015, Grant & Kline 2010), in supporting the professional learning of PDFs. The use of video provided a structure in which participants could share authentic examples of practice for reflection and discussion through which to explore their experiences of facilitation and ideas for improvement (Grant & Kline 2010). Discussions of the videos were lively, with PDFs comparing their own experiences with the practice observed. Gentle advice-giving was more common than critical analysis, with comments tending towards the descriptive and complimentary. This suggests a potentially superficial type of learning, in the style of Sachs' (2011) metaphor of professional development as 'retooling', a tinkering with practice through uncritical sharing of practical skills for delivery. The 'retooling' through video observation was true even towards the end of the programme, by which time it might have been expected that the participants would be more confident to challenge each other. However this is also true of the early stages of programmes which use video observations for teachers (Rosaen et al. 2008) and so, over a longer time period, participants may have felt more confident to interrogate each other's choices.

Engagement with theoretical models of professional learning enhanced the learning through video observation, taking the programme as a whole closer to a transformative (Kennedy 2014) or 'reimagining' form of professional development (Sachs 2011) in which participants recognised changes to their beliefs about effective facilitation rather than simply taking away new practical ideas for immediate implementation. Learning about theory led to increased understanding of the creation of opportunities for teacher learning and to explorations of the PDFs' own attitudes to learning, both vital components of effective facilitation (Ince 2016). In some cases, illustrated by Mike's change sequence, engagement with theory led in turn to improvements in practice which corresponded to changes in beliefs about practice.

Our findings show that a combination of collaborative reflection on practice and engagement with theory has the potential to offer an effective model of professional learning for PDFs which meets the learning needs identified earlier. Video played a role in this programme in stimulating reflection initially, but may not be essential in providing prolonged opportunities for learning.

The professional development needs of professional development facilitators
There has been little previous research addressing what constitutes the equivalent of pedagogical content knowledge or subject matter knowledge, or interaction between these,

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for PDFs. Above we outlined an initial framework to consider this through three interacting categories: knowledge and skills for teaching, facilitation skills and knowledge, and knowledge about professional development. In the 'developing the developers' programme, participants selected for themselves which aspects of practice to explore and analyse. Our findings therefore shed light on what PDFs identify as professional learning needs.

In our study, we found little evidence that professional development facilitators felt a need to explore their knowledge and skills for teaching. Subject-specific content and pedagogical content knowledge were never discussed. The reasons for this are unclear. It may be that the structure of the programme did not support discussion of this aspect of facilitation. Alternatively, we could speculate that the PDFs took for granted a level of expertise in teaching which meant that teaching knowledge and skills were not considered appropriate for discussion. Based on these findings, it is interesting to consider whether or not PDFs need to be given opportunities to explore and improve their knowledge of teaching, and, if so, how these opportunities could be provided.

Next, we proposed that the 'second order' role (Murray & Male 2005) of PDFs requires facilitation skills and knowledge. The PDFs in this programme focussed their enquiries on the pedagogy of facilitation including the use of video, questioning and, as described in Liz and Jack's change sequences, the first minutes of workshop sessions. They also reflected on their embodiment as facilitators through their physical presence in the room, such as the use of humour or making eye contact. Their focus was on sharing and comparing strategies for particular facilitation scenarios; there was little interrogation into the choice of strategy or how different facilitator roles might be enacted, such as when it is appropriate to move from the role of expert or coach to that of listener or mentor (O'Dwyer & Atlı 2015). Even with this arguably superficial level of reflection, the change sequences we describe illustrate how these discussions led to changes and improvements in practice.

Finally, our study suggests that knowledge about professional development is a significant area of learning need for PDFs. Participants in the programme were aware of a lack of 'learning community knowledge' (Borko et al. 2014) and were eager to improve it, identifying that this would improve their understanding of their role in enabling teacher learning. In this programme, the PDFs focussed on theoretical models of professional learning, illustrated by Mike's change sequence in which he improved his practice by adopting the interconnected model (Clarke & Hollingsworth 2002) for use with teachers.

Mike shows the value here of supporting facilitators to improve their knowledge about professional development.

In summary, the PDFs in this study identified professional learning needs in two areas: facilitation skills and knowledge, and knowledge about professional development. They felt less need for learning in the area of knowledge and skills for teaching. These findings reflect the 'second order' (Murray & Male 2005) nature of the role of a PDF, differing from the professional learning needs of teachers, which naturally focus on knowledge and skills for teaching.

Extending the interconnected model of teacher professional growth

In describing the methodology of the study we pointed to the limitations of the specific context of the study, such as the participant sample. These are less relevant in relation to our extension of the interconnected model of teacher professional growth (Clarke & Hollingsworth 2002) to professional development facilitators. The model offered an evaluative utility by going beyond linear models such as that of Guskey (2000). We used it to categorise outcomes of the programme and to identify learning through individual change sequences. We found that the model was effective in supporting an analysis of the outcomes of the programme, and in using it in this way we identified some areas of further investigation for the model's use with PDFs and, in some cases, with teachers.

We located the greatest number of outcomes in the personal domain. In Clarke and Hollingsworth's model, this domain contains a complex set of attributes (knowledge, beliefs and attitudes). We divided this domain into sub-categories relating to professional learning needs: facilitation knowledge and skills, and knowledge about professional development. The personal domain is complex for teachers as well as for PDFs, and so we suggest a need to re-examine this domain in order to provide greater clarity over its constituent parts and their interactions.

Our study illustrates the interactions between the personal domain and the domain of practice, by which gaining knowledge of new skills in the personal domain becomes professional experimentation of the domain of practice and reflection on this experimentation leads to change in beliefs about those skills. This is true for teachers and for PDFs. However, what constitutes 'practice' for PDFs is more difficult to define because it combines aspects of both teaching and facilitation. In this study, we identified two interacting sub-categories in the

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domain of practice: pedagogy, the deployment of particular facilitation techniques, and embodiment, the act of being a facilitator. To use the model effectively with facilitators, further clarification may be needed for this domain as well.

In the external domain, we located activities which stimulated change in the other domains, including engagement with research and input from colleagues. This classification of the external domain is effective for PDFs as well as for teachers. However, we suggest that, in collaborative models of professional development such as that described here, the external domain is better identified as 'the social domain', in order to encapsulate the idea of learning together. This notion of learning through observation of or working with a colleague is important for teachers, and may be even more so for facilitators, since the most common way of learning the role of a facilitator appears to be through observing others in practice. In making this change we locate external influencers, such as school structures, curriculum and assessment issues, and government policy, outside the 'teacher's world', or school environment, (Clarke & Hollingsworth 2002, p. 950) of the four domains of change (Figure 1).

In this study, there was a notable gap relating to the domain of consequence, which involves changes in 'salient outcomes'. For teachers, these changes are observable in student learning, motivation or classroom relationships. What constitutes a salient outcome is embedded in the teacher's existing value system. As Clarke and Hollingsworth point out, an increase in classroom talk may be perceived as either a negative or positive outcome depending on the teacher's values or aims. However, in extending the model to the second order role (Murray & Male 2005) of professional development facilitators, the question is raised of what constitutes a salient outcome. It may be possible to discern a change in the knowledge or skills of the teachers a PDF works with, but it is difficult to know whether this in turn prompts a change in teachers' classroom practice or professional beliefs and even more challenging to identify whether it ultimately leads to a change in pupil outcomes. We suggest that further work is needed here, not just in relation to the interconnected model, but more widely in order to understand how to identify or measure a salient outcome in professional learning for PDFs.

Conclusion

In this study we offer a model of a programme of professional development for professional development facilitators. The programme was built around collaborative enquiry using video

observation and engagement with theoretical models of professional development. Although the study was limited in scale, the outcomes suggest that similar programmes will be suitable for facilitators working in varied contexts and at different stages of their careers. Given the established power of video as a professional learning tool with teachers, this is perhaps unsurprising, but is nevertheless a novel finding.

We presented a framework which conceptualises the learning needs of facilitators through three strands: knowledge and skills for teaching, facilitation skills and knowledge, and knowledge about professional development. The 'developing the developers' programme allowed facilitators to learn about two of these strands: facilitation skills and knowledge and knowledge about professional development. Learning led to changes in practice and in turn changes in beliefs about effective professional development. Our study illuminated the complex professional learning needs of this group of professional development facilitators as they perceived them. They tended towards descriptive and complimentary commentary on each other's practice, with gentle advice-giving more frequent than interrogation of pedagogical choices or critical evaluation of the professional development being observed. This suggested that video supported professional learning which, to use Sachs' (2011) typology, leaned towards 'retooling', that is, the acquisition or strengthening of specific practical skills rather than deeper learning or change.

Further, we have demonstrated that models of teacher professional learning, including research about effective professional development and the interconnected model, can be effective when extended to facilitators. The interconnected model was used successfully as a frame for analysis. We found that, with some adaptations, the model was useful in evaluating the outcomes of the programme, and so it is effective in this new context. Further, we also suggested an adaptation for its use in collaborative types of professional development by reconsidering the external domain as the social domain. This is potentially applicable to teacher professional development in addition to the professional development of PDFs described in this study and needs further research to establish the utility of this adaptation in this context.

Regardless of such theoretical and methodological considerations, what it is clear is that, with the increasing importance of professional development facilitators in the education system, it is important to develop opportunities for facilitators to collaboratively reflect on, analyse,

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understand and improve their practice. The 'developing the developers' programme offers one model for this.

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Tables and Figures

Table 1. Programme participants

Participant pseudonym	Role	Experience as a facilitator
Adam	independent consultant	11 years
Liz	independent consultant	11 years
Sarah	independent consultant	10 years
Rose	combined role of consultant and university lecturer	8 years
Mike	combined role of consultant and university lecturer	7 years
Jack	university lecturer	4 years
Ben	hybrid teacher leader	4 years

Table 2. Programme structure

Month	Activity	Throughout the programme
1	Face-to-face workshop 1	• Video observation • Self-analysis • Analysis by other group members
2	Online discussions and video conference	
3	Face-to-face workshop 2	
4	Online discussions and video conference	
5	Follow up interviews	

Table 3. Videos shared by the facilitators

Participant	Video(s) shared
Liz	In-school twilight session; in-school departmental workshop
Adam	Conference workshop
Sarah	individual coaching session with science subject leader
Rose	No video shared
Mike	Workshop within a multi-day programme of professional development
Jack	Conference workshop
Ben	Conference workshop
Emily (author)	Workshop within a multi-day programme of professional development

Table 4. Video observation prompts

Analysis for video owner	Analysis for other group members
• Watch the video of yourself and then note one or two features of your practice you think are interesting, whether that's because they are effective or less effective (in your view). • What made you notice these features of your practice? • What questions would you like to have answered about your practice, whether this relates to the current video or to a future professional development episode? • If you have any other reflections from watching the video, note them here. • What do you think these features of your practice mean in terms of your effectiveness as a professional development facilitator?	• Watch the video which has been shared with you and then note one or two features of the professional development facilitator's practice which you think are interesting. • What made you notice these features of their practice? • What do you think these features of their practice mean in terms of their effectiveness as a professional development facilitator? • What questions would you ask the professional development facilitator about their practice, having watched the video? • If you have any other reflections from watching the video, note them here.

Table 5. Data collection and analysis

Data	Purpose	Timescale	Collection	Analysis
Background information on participants	To record prior experiences and expertise of the participants	Before the programme	Online survey	Descriptive statistics
Participants' analyses and discussions of videos	To identify participants' professional learning priorities	During the programme	Inspection of responses to online prompts and video-recorded discussions	Coding and theming
Evaluations of the programme	To understand the impact of the programme	At the end of the programme	Questionnaire	Analysis using framework of interconnected model of professional growth
Follow-up interviews		Four weeks after the end of the programme	Interviews with pairs of participants	
Follow-up questionnaires		Eight months after the end of the programme	Questionnaire	

Table 6. Outcomes of the programme classified into the four domains of change

Reported outcomes	Domain of change			
	personal domain	external domain	domain of practice	domain of consequence
Tally	22	6	6	2

Table 7. Outcomes in the personal domain

Personal domain sub-category	Sample participant comment
Facilitation skills and knowledge	- Shown me the huge potential of use of video to develop self-evaluative skills in teachers, something I believe is fundamental for sustained, long term development of practice. - I have become more aware of the need to be more challenging of participants, rather than simply 'giving' ideas to teachers that they take away. - Has definitely clarified the subtle skills used by effective professional development providers and some of the differences with teachers.
Knowledge about professional development	- I am aware of the need to ensure that participants have an understanding of the learning they are doing so that it is more likely to impact their own practice. [I am now] more reflective, more critical about the way I am delivering CPD. - My knowledge of pedagogies relating to learning has been enhanced.

Table 8. Domain of practice themes emerging from the video observations

Theme	Examples
Pedagogy	- use of questioning - working in groups - allowing discussion time - modelling a classroom activity - beginnings of sessions - gathering evidence of learning
Embodiment	- seeming knowledgeable, confident, relaxed, or prepared - using humour and building a relaxed atmosphere - making eye contact, standing or sitting - verbal habits such as saying 'um'

Figure 1. The interconnected model of teacher professional growth (Clarke & Hollingsworth 2002)
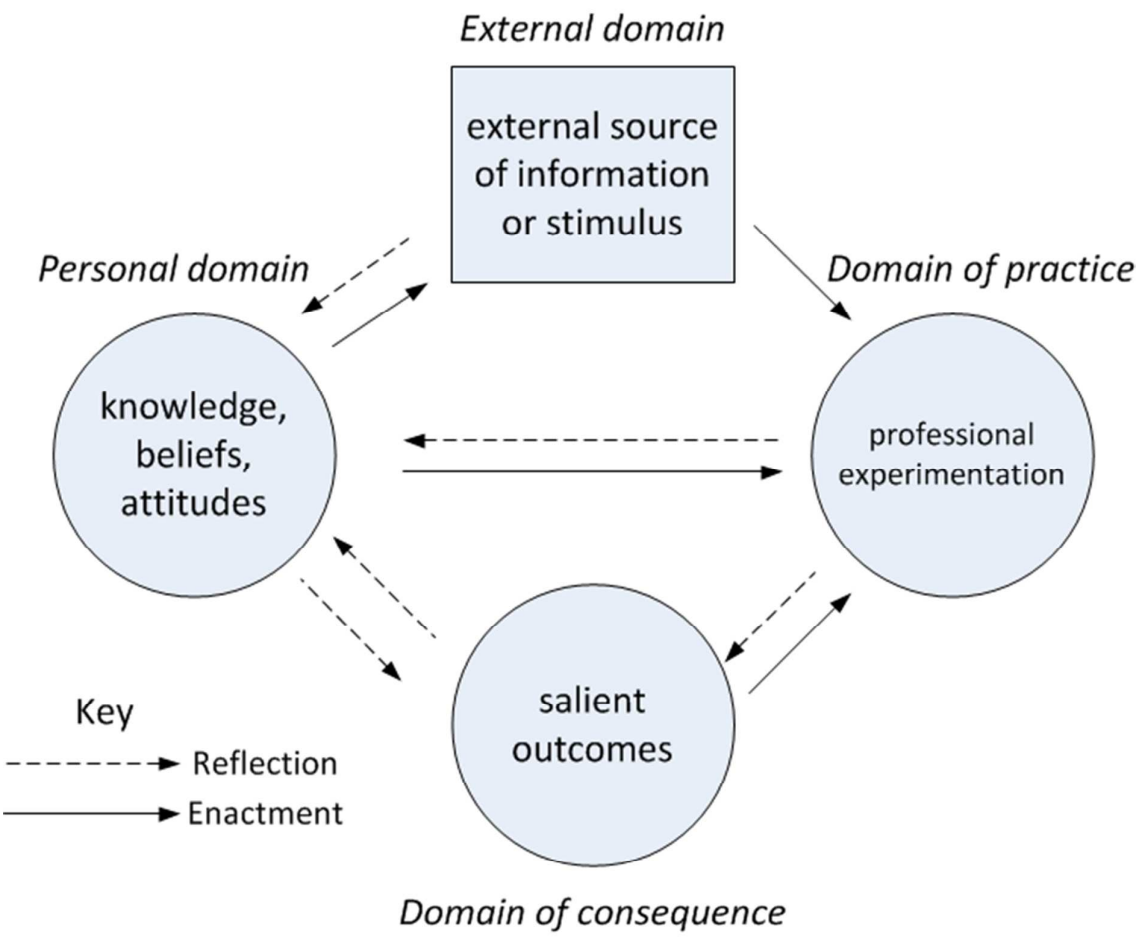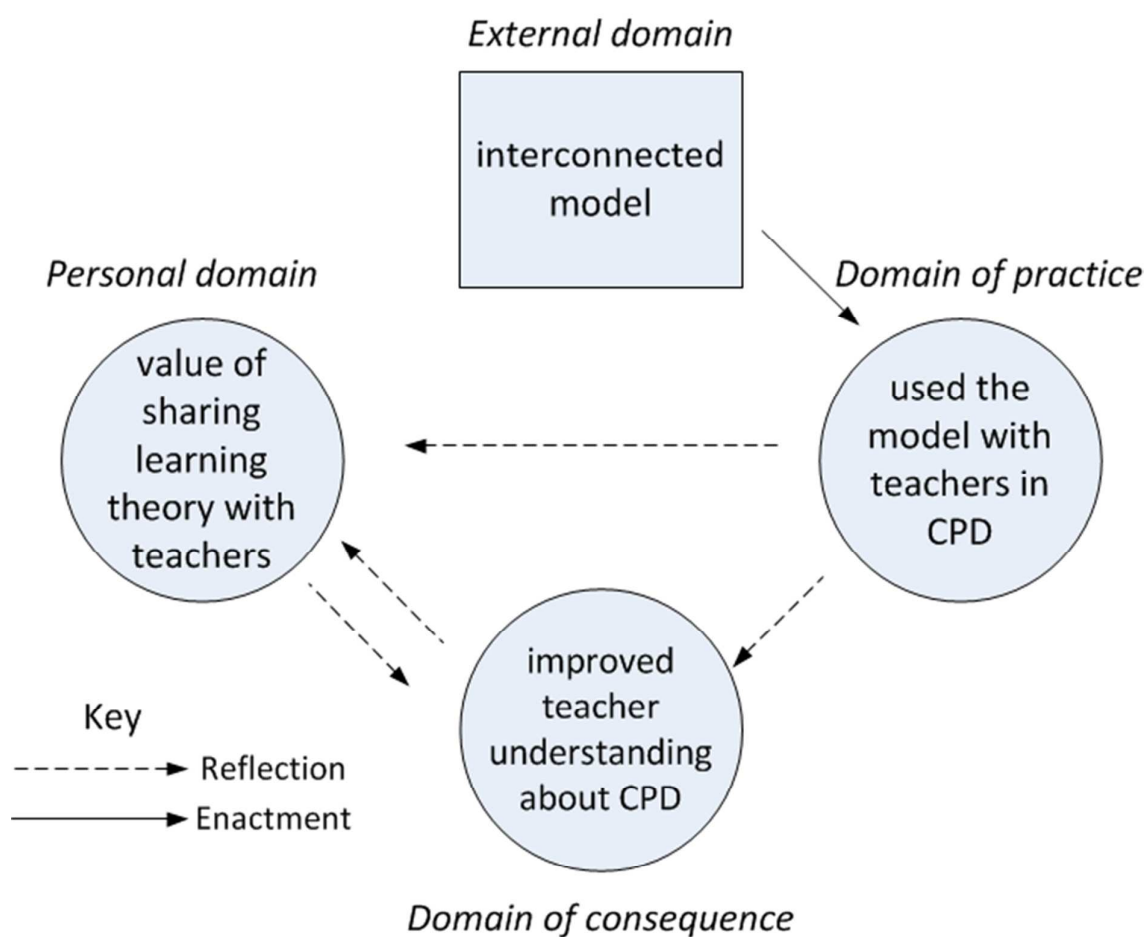
Figure 2. Mike's change sequence

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External domain

input from critical friends

Personal domain

the best way to start CPD sessions

Domain of practice

changes starts of sessions

teachers more quickly engaged in activity

Domain of consequence

Key

------ ▶ Reflection

───── ▶ Enactment
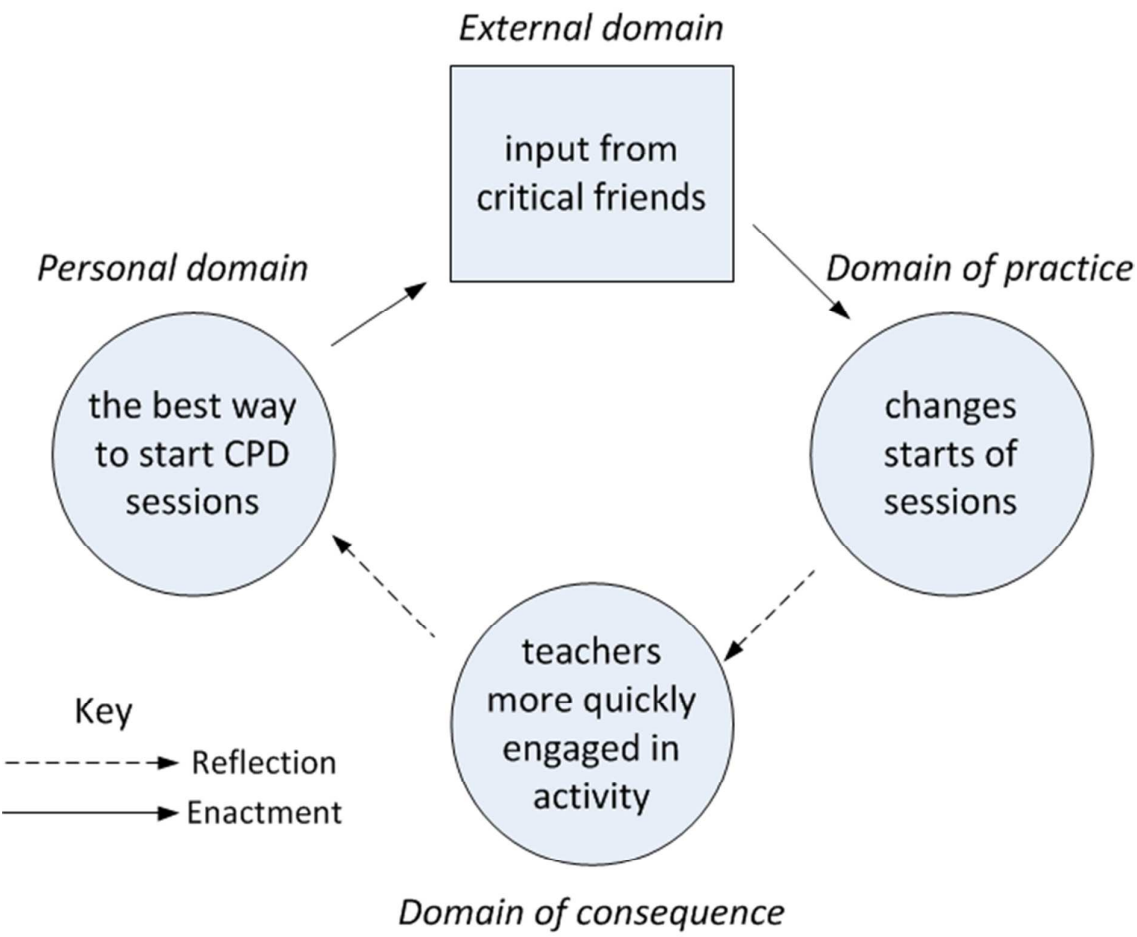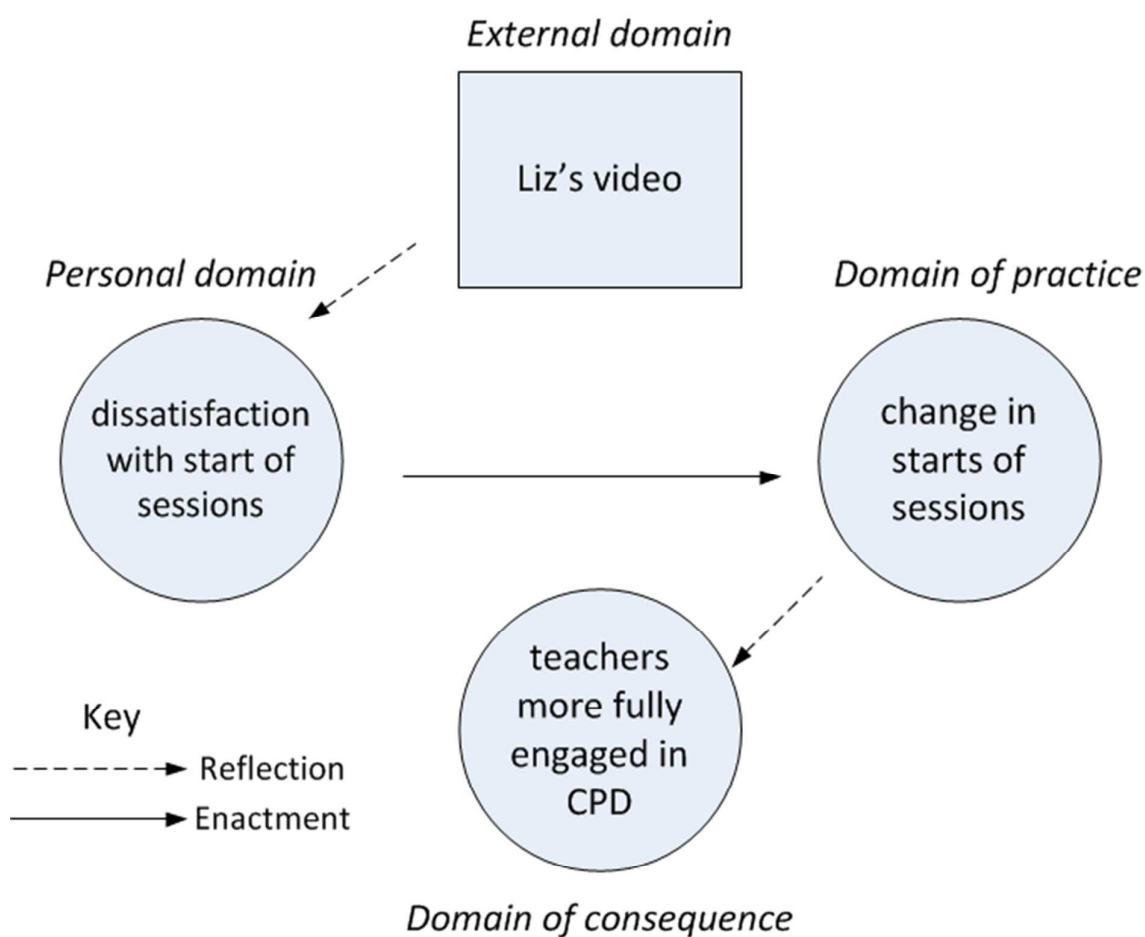
Figure 4. Jack's change sequence

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Table 8. Domain of practice themes emerging from the video observations

Figure 1. The interconnected model of teacher professional growth (Clarke & Hollingsworth 2002)

Figure 2. Mike's change sequence

Figure 3. Liz's change sequence

Figure 4. Jack's change sequence