“It is a case of changing your thought processes, the way you actually teach”: Implementing a Complex Professional Learning Agenda in Scottish Physical Education

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Abstract

**Background:** On a global level, it has been proposed that increased attention needs to be paid towards designing quality continuing professional development (CPD) opportunities for practising physical education teachers (Bechtel & O'Sullivan, 2006). This call has been echoed in the context of Scottish physical education, where professional and policy making groups have called for 120 minutes of quality physical education to be delivered each week by staff trained in local or national physical education CPD programmes (Scottish Government, 2004; AfPE, 2008). Consequently, the Developmental Physical Education Group at the University of Edinburgh has embarked on significant CPD efforts which dovetail with a 3-14 physical education foundation programme (Jess, Dewar & Fraser, 2004; Jess & Dewar, 2008).

**Purpose:** This paper investigates curricular resources and pedagogical strategies which have been disseminated to physical education stakeholders through the creation of professional learning communities. Since 2001, these professional learning communities have been organised to include teachers, ‘Active Schools’ co-ordinators, tutors, and physical education specialists; at times, these learning communities have been structured in ways that reflect both behaviourist/linear and complex/collaborative learning principles.

**Findings:** Drawing upon interviews, survey data, and field notes, we illustrate how practitioners have engaged with several incarnations of the DPEG CPD over the past eight years. During the initial phase (2001-2006), members of the learning community were enthused by the reflective and critical emphasis to physical education provided by the DPEG in CPD workshops and courses. Also, these members felt that the detailed and sustained provision of CPD opportunities in both local and centralised locations improved on the normal traditional one-day and one-off approach. A model of CPD thus emerged which resembled a community of practice (Wenger, 1998), with the sharing and critical interrogation of key knowledges around the body, movement, and teaching practices. However, as the programme increased in popularity and expanded to a national level, CPD took on a more “empty vessel” (Morrison, 2008) approach, whereby practitioners were delivered course material in a few select national-level workshops. Negative feedback from practitioners suggested that this “top down” approach would not sustain learning communities at the local level, as many of those “in the field” felt isolated and devalued in their practice.

**Conclusion:** In our most recent CPD efforts (2007-present) we have returned to a more collaborative and distributed approach which also takes into account the “nested” nature of physical education structures. That is, we now conceptualise physical education as a collaborative endeavour which involves complex interactions amongst and between children, teachers, head teachers, local authority managers and policy makers. In this view, learning emerges through the diverse and shifting relationships that develop between these constituent groups. This view supports the need for CPD opportunities which integrate and pay close attention to the experiences and needs of practitioners; as such, we recommend that PE CPD must be loosely-structured and de-centralised, in order to foster a collaborative and reflective professional learning environment.
Introduction: A rationale for sustainable and quality CPD in Scottish PE

In Scotland, the concept of creating a “Teaching Profession for the 21st Century” was introduced by the Scottish Education Department (SEED). After a period of consultation with unions, teachers, councils and other members of the educational community in Scotland, this initiative was produced as part of the “McCrone Agreement”. This agreement heralded the creation of a national framework of continuing professional development and addressed the issues of teachers’ morale, professional autonomy, and public accountability as part of enhancing the quality of Scottish education (Pickard & Dobie, 2003).

Arguably, the “McCrone Agreement” initiated a much needed change to the structure for professional development of teachers in Scotland, and it has introduced new standards (Bryce & Hume, 2003). In the context of physical education, the Scottish curriculum framework “A Curriculum for Excellence” (ACfE) has targeted the childhood years as being increasingly critical to developing a foundation of lifelong physical activity, health, and well-being (Scottish Executive, 2006). At the same time, however, several Scottish government reports have demonstrated from a lifelong learning perspective that most physical education programmes are inconsistent, de-contextualized, and irrelevant to children and their local communities (HMIE, 2001). Current physical education strategies in Scotland have thus been characterised as being insufficient to fostering children’s lifelong engagement with health and physical activity. In response, “The Report of the Review Group on Physical Education” (RRGPE) (Scottish Executive, 2004) has recommended that all children receive two hours of quality curricular physical education. Furthermore, it was proposed that an additional 400 teachers of physical education were needed to support the delivery of a quality curriculum by 2008. Crucially, it was recommended that clearer advice and better support for teachers to develop confidence and skills in teaching physical education was necessary to improve the current state of practice.
Thus, the issue of developing teachers’ professional knowledge about physical education was seen as vital to enhancing the quality of Scottish physical education.

According to Fullan (2001), teachers play a key role in bringing about educational change in long-term and sustainable ways. Fullan (2001) notes that “educational change depends upon what teachers do and think- and it’s as simple and complex as that” (p.115). Fullan adds that significant educational change occurs when teachers’ beliefs and styles are reflected upon and re-evaluated; critically, this involves the personal development of the teacher in professional learning contexts. Yet, in the context of physical education, it has been demonstrated that traditional forms of professional development are most often inadequate, unsystematic, and superficial, in many instances leaving teachers dissatisfied and cynical whilst contributing little to their learning and development (Armour & Yelling, 2004; Wright et al., 2008). From this position, Armour (2006) argues that improving the quality of teachers’ career-long professional learning is pivotal to raising the standards of physical education. She highlights concerns about the quality of teacher professional development, noting that these views are shared around the world and across curriculum subjects. Furthermore, Armour suggests that traditional forms of CPD provision are unlikely to result in effective teacher learning; that is, traditional sporadic one off, one day, off site courses contradict everything known about the ways in which people are most likely to learn. Taken together, the above criticisms demonstrate the specific problems surrounding the provision of CPD in physical education, as it generally lacks coherence, relevance, challenge and progression and is delivered out of context (Armour & Yelling, 2003).

Arguably, professional learning opportunities which are structured in collaborative contexts provide an important means for physical education teachers and other deliverers to improve their practice and thus advance the state of physical education in their local schools and communities (Armour, 2006). Duncombe and
Armour (2003) contend that the wealth of research available to us on effective CPD supports the view that CPD is best when it is active (Day, 1999), reflective (Hay McBer, 2000), on-going (Day, 1999) situated (Lave & Wenger, 1991) and collaborative (Smyth, 1999). Wright et al. (2008) similarly propose that the professional development of physical education teachers is most effective when “shared understandings and common language sustain innovations and reduce the stress of change” and when teachers are allowed to reflect upon their practice (p.51). However, while the recent literature reminds us of the benefits of professional learning opportunities which are collaborative in nature, we also suggest that learning communities do not operate in linear and predictable ways, and as such, should also be conceptualised in terms of complexity. In particular, we suggest that learning communities evolve in “messy” and non-linear ways, relative to various stakeholders involved in the physical education landscape.

Using complexity theory to envision collaborative-oriented physical educational learning communities

In the following quote, Kuhn (2008) outlines the ways in which educational structures, practices, and participants can all be understood in complex ways:

Complexity and education may be brought together because in the language of complexity, such human cultural settings, productions and institutions as educational endeavour are complex and dynamic. Individual human beings (learners, educators, and administrators), various associations of individuals (classes, schools, universities, educational associations)… are multi-dimensional, non-linear, interconnected, far from equilibrium and unpredictable. (p.182)

This complex view of education signals a break from behaviourist notions of cause-effect and linear predictability which have long held currency in education. A complex perspective involves the replacement of these latter principles with a logic
that views pupils, teachers, head teachers and policy makers as being inextricably
linked in a dynamic and multi-faceted educational system. Morrison (2008) suggests
that this understanding has significant implications for learning. Arguably, from a
complexity perspective, learning emerges through the complex relationships that
develop between these inter-connected or “nested” groups, which are considered
shifting, dynamic, and diverse in themselves. As such, the process of learning is both
“emergent” and unpredictable, rather than a linear transmission of set knowledges to
pupils who are viewed as isolated, decontextualised, and “empty” vessels (Morrison,
p.25). Following on, then, professional learning communities can be structured in
ways that support “rich” and flexible interactions (Cillier, 1998) amongst various
stakeholders and, in this way, come to support the emergence of “new patterns” of
practice (Davis and Sumara, 2006, p.5).

The complex approach to CPD advocated above strongly contrasts with
behaviourist learning theories which have long held currency in physical education.
As noted by Light (2008), “Although physical education teachers may not necessarily
articulate clear beliefs about it, their practice invariably rests upon basic,
unquestioned beliefs about learning… and that assume it to be an explicit linear and
measurable process of internalizing knowledge” (p. 22). As such, the prevailing view
of those teaching games and sport is that “knowledge is conceived of as a preexisting,
‘out there’ entity and learning as being a process of internally representing this reality
in the mind of the learner (Varela, Thompson, & Rosch 1991)” (p.22). Recently, the
behaviourist approach has been called into question for providing fixed skills and
knowledges to teachers in “top down” manner, ultimately rendering them “docile”
(Wright, 2004). O’Sullivan and Deglau (2006) argue that physical education teachers
involved in professional development “should be treated as ‘active learners’ who
construct their own meanings and understandings from active participation” in
learning communities (p.446).
Yet, we also propose that the notion of collaborative learning communities can be enhanced by incorporating key aspects of complexity theory. Indeed, Armour (2006) has argued that “teaching is an infinitely complex, fluid and dynamic process” (p. 203). As such, we propose that collaborative learning structures need to also instigate “noise” or “dissonance” (Phelps & Hase, 2002), in order to provoke an “emotional stir up” and break “the shell of complacency” (Lewin, 1947/1951, p. 229). By seeking “openness” and instability, indeed to seek “the edge of chaos” (Rayner, 2008, p.42), learning communities might not only provide for states of information sharing and collaboration, but can also promote more reflective, critical, and creative teaching practices. This view is held by Morrison (2008), who argues that “the closer one moves towards the edge of chaos, the more creative, open-ended, imaginative, diverse, and rich are the behaviours, ideas and practices of individuals and systems, and the greater is the connectivity, networking and information sharing (content and rate of flow) between participants (Stacey et al., 2000, p. 146)” (p.22). As professional learning communities move towards the “edge of chaos”, then, the group’s connectivity and collaboration is enhanced. Crucially, this “chaotic” or “messy” understanding of emergence means that CPD providers (such as the DPEG) are simply one “nested” element involved in physical education, and do not hold power and “expert” knowledge. According to Morrison (2008), “knowledge is not centrally located in a command and control centre. Rather, it is dispersed, shared and circulated throughout the system” (p.21). PE learning communities, in this view, can be conceptualized as “nested” entities which involve CPD providers such as the DPEG, teachers, head teachers, local authority managers, physical education specialists, and pupils; within and across each level, knowledges and practices are taken up and shared, and even “stirred up”, disrupted, and challenged (Diagram 1).

The Study
This paper reports upon the implementation of a professional learning programme that was designed to support the curricular and resource development efforts of the DPEG at the University of Edinburgh. The study of this programme involved investigating the link between professional development and change in physical education through examining the impact of the basic moves professional development programme on fourteen teachers working in physical education. A particular emphasis was made on the teachers’ perceptions of the professional learning programme, relative to their knowledge and professional practice as well as the impact of change within their schools. The study used two forms of data collection including a questionnaire for background information and semi-structured interviews. The criteria for selection was that all participants had attended several professional learning courses, including Basic Moves National Training (level 1 and level 2) and Level 1 Tutor training; the latter course was designed to help those with Basic Moves National Training work as mentors in the field.

**Phase One (2001-2004)**

*Introducing Basic Moves CPD into Scottish Physical Education*

Since its inception in 2001, and in tandem with its curriculum and pedagogy developments, the DPEG has been engaged in an increasingly complex professional development project involving a diverse range of individuals (e.g. teachers, head teachers, and volunteer tutors), institutions (e.g. primary and secondary schools, nursery schools, and universities), and agencies (e.g. Sportscotland). During this period, the project has passed through two phases. The first phase primarily involved the development of primary teaching resources through the Basic Moves project. Basic Moves was designed to provide an alternative early years physical education curriculum (e.g. children aged 5-7 years) which set out to help all children acquire a basic movement foundation to support their current physical activity engagement and also to scaffold their future physical activity participation (Jess, 2004). As part of supporting the implementation of Basic Moves curriculum in primary schools across Scotland, a CPD programme evolved which included various workshops and courses
held at the University of Edinburgh, as well as in various local authorities across the country.

The Basic Moves curriculum was designed to address the pedagogical shortcomings of the traditional “block model” of teaching which usually incorporates decontextualised elements of sport within inauthentic and culturally irrelevant settings (Kirk, 2004). Basic Moves was first introduced in University-based Basic Moves clubs for children, and ultimately became integrated into seven primary schools in Edinburgh and East Lothian local authority. Accordingly, CPD opportunities were set up to support the delivery of Basic Moves. Pilot CPD training courses were run by DPEG staff based at Edinburgh University for undergraduate students and specialist physical education teachers, class teachers and support staff who worked in the pilot primary schools. Although not explicitly framed by constructivist, collaborative and complexity theory principles, the CPD was delivered to practitioners in a way that emphasised the sharing of knowledge alongside the flexible interpretation of course materials within emerging learning groups comprised of various physical education stakeholders. This approach was in line the emerging national curricular guidelines set out by the Scottish Executive at the time (Curriculum for Excellence), which were designed to foster teacher adaptation and creativity. During the workshops and courses held at the University of Edinburgh and on-site in various local authorities, participants were expected to reflect upon their practice in group settings; presenting in front of one’s peers was also common. According to one teacher, the content and approach of the CPD lent itself to a reflective form of pedagogy, which resulted in knowledge and practice sharing across the different “nested” levels of her school:

Int: I know it is probably a very big question to ask but has this whole process changed or affected your views on CPD?
Wilma: I think it has affected me greatly on my changed opinion of the process of my continuing professional development. I think teachers need to be encouraged to be reflective practitioners and some other experiences in in-service courses or CPD courses does not encourage in reflection. It shares information, it perhaps offers suggestions of ways forward because it doesn’t necessarily require you to be the reflective practitioner that Basic Moves does.
I think the collaborative approach is a two-way process. Everybody gains from it, in fact a three-way process, everybody gains from it, including the children, the class teacher, the specialist. In fact the school as a whole has a better ethos a greater understanding of what is going on within a small part of it’s curriculum to the point where the parents have been reached as well. Class teachers share with parents, nursery teachers share with parents. It goes out in the newsletters. Children encourage their parents to come in a watch them taking part in a Basic Moves lesson so the collaborative approach has reached many people and is huge. Whereas other types of CPD do not have such a far ranging effect.

Wilma thus speaks to the “nested” structures inherent to teaching physical education: schools, parents, teachers, head teachers, Active Schools coordinators, physical education specialists, and children were all considered as key groups within a “nested” and proliferating learning community. When teachers began to reflect upon their practices and share their experiences with other individuals from these interconnected groups, Wilma noted, the entire school benefited. This collaborative approach within a “nested” educational system or learning community supported impacts that were “far ranging”. Wilma contrasted the effects of this collaborative and “nested” approach with traditional one-off CPD courses which delivered information to teachers in a more straightforward behaviourist manner and, she believed, had little impact on changing the whole school culture. Another teacher spoke to the collaborative and reflective nature of Basic Moves CPD when she noted that “we were not ‘fed’ information- there was interaction, discussion and sharing experiences”.

A teacher named June also compared the Basic Moves CPD, which was offered over several courses, with traditional one-day and off-off professional learning opportunities. Underpinned by developmental movement learning theory, Basic Moves CPD emphasised that teachers should support children’s generic and creative movements, rather than focusing on the performance of idealised or “gold standard” movements (Jess & Collins, 2004). June went on to comment that:

the depth of theory and practical work… gave it (Basic Moves CPD) a higher standing I think in folks’ view, than anything that had previously been on
offer, which probably was a two hours session, or on the odd occasion an afternoon, or indeed in some cases, a whole day on a Saturday.

June noted that by outlining various developmental movement theories (Bredekamp & Copple, 1997; Gallahue & Ozmun, 1999) and making them explicit through practical examples, Basic Moves CPD made her feel “a million miles a way now from thinking that we need lesson plans”. Another participant, Jenny, similarly added that she eventually came to “bin” the block system and its associated pedagogical strategy of teaching of skills and games as a result of participating in this CPD programme. A physical education specialist named Jo commented that the Basic Moves CPD programme was different from typical opportunities because it encouraged innovation rather than adherence to prescribed lesson plans:

Int: was there anything else about it that made it different from other programmes that you’ve been on?
JH: It wasn’t as prescriptive with regards to- usually you go on courses – there’s your lesson plans or there you go – there’s the cards that you’re going to use – have a lovely time with it!. It was very much making sure you understood the nuts and bolts of it, to then go away and create the course yourself almost – that’s going to work in the space that you have, the equipment that you have and it started on a blank sheet, which is really nice.

Taken together, these comments suggest that instead of encouraging teachers to teach in linear and subject-centred fashion, as often expected within the block model of physical education, the Basic Moves CPD training encouraged participants to teach pupils’ movement learning in flexible, reflective, and creative ways. This also meant that teachers were expected to share their practices, knowledges, and experiences with peers, as well as various other stakeholders in the pupils’ physical education. Rather than rendering teachers as de-skilled and “docile”, then, the Basic Moves CPD encouraged teachers to become active participants in constructing their own pedagogical practices. As noted by Marion, this approach was “a lot more thought provoking – as a PE specialist it made you turn things on its head… I think it was just the approach that it took that made you sit up and think”.
Subsequently, participants who came together through Basic Moves CPD became actively engaged in an emergent learning community which began to develop a shared vision of early years physical education. With encouragement from the DPEG staff, the group began to teach physical education in their schools based on the sharing of their prior knowledges, their developing knowledges, and their collaborative applied experiences (Rovengo & Dolly, 2006, p. 242).

However, even as many participants initially embraced the new information offered to them and became increasingly involved in the learning community, the emerging learning community also witnessed unsettling “edge of chaos” experiences. Many group members had developed set ways of teaching physical education over the years, and the new knowledges and practices were sometimes not easily taken on board. Marion commented that the learning community “had basically turned everything I had done for the last seven years on its head”. Another teacher named Jan noted that she even resisted the CPD training as she felt that her direct teaching style was adequate:

Int: Was it quite hard for you to accept there was still that you didn’t know?  
JMc: I think if I was going to be really honest I probably was initially quite resistant and thought I was delivering quite well in the early years.

Often, discussions and meetings proved to be chaotic and issues were hotly debated as a variety of viewpoints and practices were presented. In particular, because Basic Moves CPD provoked teachers to reconsider the traditional linear and mechanistic pedagogical approach which had underpinned their previous teaching, a series of awkward and unplanned meetings took place as teachers raised concerns about the “unstructured” and “non-prescriptive” pedagogies advocated in the CPD training.

Nevertheless, whilst it took the members of the group a period of time to grapple with and adjust to the notions of collaborative, reflective, and critical teaching practices, significant progress was made during this early period, and a small learning community of professionals emerged with a desire to change the state of traditional
early years physical education in Scotland. This transformative impact is exemplified in the following quote, which describes how Jan eventually moved away from a direct teaching approach, which had been honed through years of working in isolation as an unsupported physical education specialist visiting schools, and eventually came to accept more constructivist and collaborative methods:

But for me as a teacher I tended to, not be very domineering in terms of, “I want you to (do) this, I want you to do that”…. (through the CPD training) I was more readily able to say, I really do need you to take this station, would you be prepared to do that? Whereas it was something that I really didn’t do before. I tended to get on with it myself. (contextualise this quote more?)

Wenger (1998) defines a community of practice as a group of people who are mutually engaged in a joint enterprise and use a shared repertoire of skills, discourses and artefacts. Within this community, the concept of “legitimate peripheral participation” describes the diverse positionings and dynamic practices by which individuals come to engage with their learning communities; the comments above illustrate how teachers can even take up resistant positions within a learning community, even as they sometimes embrace core shared understandings. Essentially, teachers who are new to a learning community initially engage in shared practice and develop expertise by participating in “legitimate and acknowledged activities” (Paechter, 2003, p. 71). Participation in shared practices and knowledges featured in Basic Moves CPD provided individual teachers such as June, Jan, and Wilma with key understandings of the particular learning culture.

Wenger (1998) notes that participants cannot always maintain full engagement with the shared practices and knowledges of the learning community; “non-participation is an inevitable part of living in a landscape of practices” (p.165). Jan and the others who expressed dissatisfaction and even resistance to the dominant group norms set out by the DPEG took up peripheral learning trajectories within the Basic Moves CPD group; however, it is crucial to note that their non-participation in
the dominant practices also provided significant opportunities for learning. Wenger notes that these partial participants are considered to be on an insider learning trajectory that eventually leads to full participation in the future. That is, these individuals who reflect upon and critique the dominant shared practices learn by contrasting their own beliefs with those of their peers.

Arguably, then, the collaborative and “nested” set up of these learning communities ultimately instigated “edge of chaos” learning experiences; by bringing together a wide array of individuals with diverse teaching and specialist backgrounds, and asking them to discuss and debate “best” practices in open-ended fashion, growth and meaningful participation ensued. The CPD system self-organised and new and “rich” knowledges and practices emerged. Indeed, all members of this initial CPD experience continue to participate in DPEG activities today; several of the participants have become Basic Moves practitioners and even CPD deliverers themselves. However, as we will discuss in the next section, some of our subsequent CPD developments failed to build on these early successes. As the Basic Moves project expanded, a “top-down” professional development approach was sometimes taken on board because of logistical and practical considerations, often to the detriment of participants.

**Phase Two (2004-present)**

**Expansion of the Basic Moves National Training Programme: Class Teachers, Specialist Teachers and Active Primary School Coordinators**

From late 2004, when Basic Moves began to move beyond the University of Edinburgh and the local Edinburgh community, more complex issues of professional learning began to emerge. During this period Basic Moves CPD was extended to a wider professional audience: a traditional “top-down” national approach was thus implemented. Although the traditional “top-down” model has been strongly criticised
throughout this paper and others (see Armour & Yelling, 2004; Wright et al., 2008), there were a number of compelling reasons to take on board this approach as part of the dissemination process in the early stages of the national project. In particular, given the traditionally marginalised status of early years physical education, it was decided that efforts should be made to raise the national profile of early years physical education in line with the recent coverage of Basic Moves and young children’s movement which had received significant attention in government documentation (HMIE, 2001; Scottish Executive, 2003).

Subsequently, following the success of the first Basic Moves National Conference in 2003 and the pilot of introductory Basic Moves courses with Active Primary School coordinators\(^1\) from around Scotland, the professional development component of the DPEG’s work expanded on a more nation-wide scale with the introduction of The Basic Moves Training Programme in March 2004. This programme consisted of two-day courses (Level 1 & Level 2) which aimed to move beyond the “tips for teachers” approach which had long dominated physical education professional development. In particular, the Level 1 course, with its accompanying manual (Jess, 2004), explicitly set out to challenge teachers’ perceptions of early years physical education before offering pedagogical advice about the delivery of Basic Moves.

Although these University-based courses attracted in excess of 200 practitioners in a short period of time and initially received positive evaluations from most delegates (Dewar, 2007), it soon became apparent that too much reliance was being placed on a “top-down” CPD model. Teachers, usually individually, attended

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\(^1\) “Active Primary School coordinators” are part of the Active Schools Programme managed by sportscotland, the national agency for sport. The main remit of the Active Primary School Co-ordinator is to develop ways to get children participating in regular physical activity. This includes activities like walking to school, play, dance, sports and games. These positions are full-time, with each co-ordinator responsible for a ‘cluster’ of primary schools and associated pre-five establishments. (sportscotland, 2005)
off-site courses and were expected to return to their institutions to personally apply and then “cascade” their new learning to colleagues. Often, this meant that delegates returned to their own community and school contexts without on-going support. In many instances, the lack of support coupled with the open-ended and non-prescriptive nature of the Basic Moves curriculum meant that some of the delegates who went back to schools encountered resistance. From one physical education specialist named Jo:

Int: And did you find that they (peers in the field) were positive about it or were they quite sceptical?
Jo: Specialists: very sceptical (…) one or two were sceptical with regards to “well, there’s no lesson planned so how on earth can I go and do this when I’m not PE trained myself,” which has changed now I think. One or two were very “that’s not for me, that’s not prescriptive enough” – they wanted everything on a plate.

Another teacher, Marion, similarly noted that many class teachers and specialists were sceptical of the Basic Moves programme. Her comments suggest that implementing a new approach to pedagogy in order to change the local school culture was difficult:

Int: Did you share your experience with others?
Marion: A lot of class teachers and specialists were quite sceptical about Basic Moves; about change – it was just about change – people are quite backward at change.

The comments above suggest that the Basic Moves’ alternative pedagogical approach was often met with criticism in the field from teachers and physical education specialists who had previous experience in teaching games and sports in the multi-activity model. Basic Moves CPD had taught participants to be flexible and to be more attuned to social, emotional, and cognitive development in addition to collaborative learning strategies; as such, when isolated delegates went back to their schools their agendas were considered not “prescriptive enough” and failed to provide “lesson plans”. In this version of CPD, in contrast to the initial offering, teachers were left relatively unsupported as they had only opportunities to take one-off national courses and rely upon a teaching manual for guidance. As a result, it was
reported that numerous delegates discontinued referring and teaching Basic Moves to their peers as they felt isolated being the only teacher in their school using the programme, and did not have enough support from the DPEG.

While some teachers and physical education specialists came forward to become Basic Moves tutors and lead successful local authority initiatives which continue to this day (Youth Sport Trust, 2006; Dewar, 2007; Jess et al, 2007), others were less supportive and a small number were overtly dissatisfied as expressed in both verbal and written feedback. On one occasion, a specialist teacher, who was also a local authority manager, was so enraged with the training approach she pointedly stood up in the middle of a lecture session and left the course without a word. This was followed by a formal letter of complaint (personal correspondence) and follow up meetings. On two occasions, specialists became so enraged with the training approach that “clear the air” meetings were held which indicated that the learning community was at the brink of falling apart. In this instance, then, moving towards the “edge of chaos” and creating “dissonance” amongst teaching professionals almost worked to shut down the learning community completely. While many of the issues raised by the specialists were similar to those discussed in the early and ultimately successful DPEG development meetings, the one-off and “top-down” nature of the course rarely created the context for these issues to be thoroughly discussed and “ironed out”, with the result being that many members of the emerging learning community felt marginalised. The linear model of delivering CPD offered in the national programme meant that many participants became entrenched in marginalised learning trajectories, rather than taking part in full or partial ways as had happened with the early DPEG participants. The controversy surrounding the national training programme and the dissatisfaction expressed by some participants highlights the ways in which a curricular and pedagogical strategy which attempted to instigate “chaos”
and self-emergence was insufficient without a support network at various “nested” levels in place.

Fortunately, despite moments of “chaos”, during 2004 and 2005, all the Basic Moves courses delivered at the University of Edinburgh were oversubscribed and helped raise the profile of Basic Moves throughout Scotland and the rest of the UK (Scottish Executive, 2004a). Course evaluations, particularly from generalist class teachers, the main deliverers of primary physical education across Scotland, were often positive (Jess, 2004b, 2005) with both the developmental focus and the depth of the course content resonating with many teachers, particularly as much early years PE-CPD was reported as being limited, superficial, and watered-down from secondary PE (Jess et al, 2007). One physical education specialist teacher noted, “… my experience of going to CPD opportunities up to then had certainly been geared towards the upper age-groups of school and if we chose to deliver at the younger age-group then we had to make the adaptations and view all the thinking behind it ourselves.” Taking supportive comments such as these on board, as well as more critical feedback, we continued to work towards creating national-level professional learning communities that would be sustainable and enriching for participants.

Current Development of the Tutor Network in Schools, Communities & Local Authorities

Currently, concentrated efforts have been made to create and support more ‘nested’ and collaborative professional learning initiatives within local contexts. Key to this complexity-informed development has been the setting up of DPEG supported but self-organising “Basic Moves Learning Community” (BMLC) projects which were created following a series of strategic meetings with senior local authority managers. Key local professionals such as physical activity specialists, even those marginalised during Phase One, were offered the opportunity to attend on-site tutor
training and, subsequently, to deliver and support Basic Moves within their local authority. With on-going resource and curricular support from the DPEG, BMLCs emerged and evolved in these local authorities; these learning communities were delivered by local teachers and specialists, with tutor mentors who had participated in DPEG CPD training courses offering guidance. This “nested” and collaborative approach has been well-received and has encouraged one basic Moves tutor to comment that “…Effective CPD comes from a co-ordinated, collaborative approach in developing partnerships with schools, teachers and other professionals. This then enables meaningful support to be given when needed post-course, which is vital in sustaining the development of new and ongoing programmes” (Dewar, 2007).

Critically, this approach acknowledges that BMLCs are context and situation specific and, therefore, emerge and self-organise in different ways in line with local needs and aspirations, local attitudes and local educational structures and networks.

The diverse and locally-specific nature of these BMLCs has been evident in two pilot projects run in East Lothian, Scotland (Jess et al, 2007) and Sunderland, England (Youth Sport Trust, 2006) where different approaches have been taken given the distinctive “nested” conditions. National education systems (Scottish and English), local authority management structures, prevailing curricular and pedagogical approaches, and unique staffing expertise within each authority have required that local based tutor networks remain in place. Tutors working in this support network often mentioned that collaboration with peers was a key feature which enabled them to enhance their knowledges and practices. From June:

**Int:** Has working in this way affected your views on effective CPD?

June: I think so. Because through Basic Moves – and not only Basic moves but other pockets of things that have happened, we see the worth of that CPD opportunity, and how it can lead you to become a better teacher, a more knowledgeable teacher, all of these things. But also it means that you’re communicating with people on a number of different levels as well so if it’s your tutor or fellow delegates, or whoever happens to be - it’s that kind of shared kind of experience…
Another teacher named Emma, who became a tutor in East Lothian, went on to describe how with the tutor network in place, “we have quite a good support mechanism in place… it’s PE specialists, after schools coordinator and we train them, we offer support physically if they want us to come along.” She came to feel valued and supported by working with others in this supportive and collaborative way. In her role as a tutor mentor, she instigated “noise” or “dissonance” by directly encouraging local teachers to critically reflect upon and re-evaluate their practices:

… candidates think more about what they were actually teaching the children… It wasn’t just a case of “Oh right, I’ve got of practice, let’s go off and do them.” You actually had to stop and think because to take it on board, it was a big undertaking because what we were having to do was we were really having to say, “I’m not going to do that anymore,” and it was a huge thing for teachers.

Tutors felt more empowered when their work was perceived as influencing a range of “nested” stakeholders in the local context, as noted by June in the following exchange:

Int: … how did it (the “nested” network) then impact on your practice?
JM: …. that allowed me to influence things in a wider sense because not only could I still have input in a curricular way, but there was also the Active Schools side of things we were looking at after school and community clubs, and also a lot of Active Schools work is coordinating what’s going on out there, so, speaking to loads and loads of people about this new programme that is here.
Int: So in terms of your practice you were in a different context?
JM: A different context so I was able to practice in all of these levels in a curricular way, in an after school way and also in a community setting – and did all three.

As noted by Burnes (2004), this non-hierarchical approach CPD which emphasises local support and practices promotes self-organisation and adaptation. In this way, teachers, physical education specialists, and tutor mentors are all able to innovate locally and consequently come to feel both supported and empowered in their work across various levels. We suggest that this “nested” and “self-organising” approach meant that those involved in Basic Moves CPD took up “fuller” or “authentic” forms of participation within their local learning communities.
Discussion

According to complexity, the input of a new idea… into the system at any point can lead to dramatically different outcomes, outcomes that cannot be predicted (…) Where traditional managers may have wished to delete the extraneous, the complexity research educated manager may be attempting to cause the deliberate addition of noise at various places along the way (Lissack, 1999, p. 5)” (Phelps and Hase, 2002, p. 515).

Beginning in 2001, the DPEG has indeed attempted to instigate new curricular and pedagogical “ideas” in the Scottish physical education landscape. The first phase of the DPEG’s CPD work led to the emergence of a CPD project which passed through a series of non-linear but interrelated episodes oscillating between traditional “top-down” CPD courses and the creation of more collaborative learning communities. Despite early success with a model of CPD that, while not explicitly framed by collaborative and complexity learning principles at the time, provided a more “nested”, “chaotic” and constructivist approach to delivering physical education. However, despite initial success with this model, we then went on to implement the national training programme which incorporated a more behaviourist approach which positioned participants as “empty vessels” who need to be “filled” by the linear transmission of fixed knowledge in the context of one-off, one-day seminars (Morrison, 2008). This hierarchical model was closely linked to a “cascade” approach to CPD which envisages individual members of staff attending off-site, usually short, CPD courses and then returning to their institution to extend the “top-down” process by passing on the new knowledge to colleagues.

The isolation of delegates in their local contexts ultimately led to their dissatisfaction with this incarnation of Basic Moves CPD, and concomitantly we altered the project by reverting to more collaborative and complexity-oriented learning models. This experience, involving numerous uncomfortable “edge of chaos” moments, suggests that professional learning is most effective and long term when CPD participants are encouraged to innovate and teach within a supportive local
context. In this context, evidence suggests that physical educators thrive when they feel like full or partial members of a joint enterprise, negotiating and drawing upon a shared repertoire of skills, discourses, and resources (Lave & Wenger, 1991). These members “buy in” both professionally and personally to their roles as change agents (Ellsworth, 2000).

However, while acknowledging collaborative learning as an essential feature of effective and sustainable learning communities, we also propose that the educational change process is non-linear and unpredictable, and as such there is the need to accommodate or even provoke “edge of chaos” experiences (Rayner, 2008). Indeed, comments suggested that while CPD participants were initially resistant or “lost” when their previous knowledges and practices were deliberately turned “on its head”, they came to feel more empowered when they could reflect and re-evaluate based on these “chaotic” encounters. Furthermore, comments from tutor mentors working in local contexts illustrate how they took up full or partial trajectories when they encouraged local teachers and specialists to go through similar “chaotic” learning processes.

“Edge of chaos” conditions seemed to inhibit the development of learning communities only when delegates came to feel isolated and thus disempowered. That is, potential change agents who attended national level training during Phase One that was irregularly held and unsupportive at local levels were unable to effectively grapple with professional and personal change or “stir up”. As such, these participants were unable to reproduce alternative and even “edge of chaos” ideas and practices to their local peers when no support mechanisms were in place. This issue points to the need for a “nested” or connective model of CPD which reflects the “interlinked” and “co-dependent” nature of a learning community (Davis & Sumara, 2001) and its reliance on close collaboration between all relevant stakeholders.

Crucially, it is our belief that these “nested” or connective learning communities must
also encourage innovation (open-endedness and self-emergence), rather than simply the sharing of knowledge and practices amongst key educational stakeholders. Indeed, while “bonding” and the consolidation of content knowledge and existing practices was sometimes mentioned as a welcome occurrence for CPD participants, we also suggest that learning communities need to facilitate opportunities for group members to disrupt dominant knowledges and practices. This approach finds sympathy with notions of partial participation (Wenger, 1998) in which peripheral members of learning communities provide diverse and sometimes conflicting viewpoints as part of contributing to the evolution of new knowledges and practices. Following on, we argue that when “edge of chaos” experiences are encouraged and embraced, learning communities become even more sustainable as they regularly innovate, adapt and emerge in proliferating ways.

**Conclusions**

Jess and Collins (2003) acknowledge the growing consensus that, as we move into the 21st century, there is a need for change in both content and delivery of the physical education curriculum. Penney and Chandler (2000) encourage professional debate about the future of physical education and in particular the form that curricula should take in rapidly changing times. They propose a reorientation and restructuring of the subject to address educational needs and interests relevant to the 21st century. Kirk (1997) and others (e.g. Fernandez-Balboa, 1997; Wright, 2004) have likewise suggested that contemporary physical education is undergoing major changes due to the significance of postmodern values such as uncertainty, multiplicity, and contradiction. Wright (2004) proposes that knowledges and practices associated with the body, physical activity, and movement are not fixed; arguably, physical education must become more relevant and attuned to the needs of young people whose multifaceted lives are now marked by “profound social and cultural changes” (Wright, p.3).
Aspirationally, these recent calls for changing physical education suggest that physical educators come to view themselves as members of transformative learning communities which “could emerge, grow, and sustain themselves as a result of the interactions of constituents” (Horn, 2008, p.131). In these learning communities, we propose that physical educators need to destabilise existing practices, knowledges, and structures, which tend to be “imbued with order and fixed certainty” (Rayner, 2008, p.42). Arguably, narrow forms of CPD that adopt a technocratic and subject-centred rationale to achieve predetermined aims for professionals irregardless of context do little to support “good” practice. We take up Phelps and Hase’s (2002) proposal that the learning and teaching in the contemporary social world is a complex endeavour, with a variety of shifting factors and knowledges “at play” (p.514), and as such, the professional development of physical education teachers needs to accommodate for these conditions accordingly.
References


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