Summary document for The Place


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1. Executive summary

2. LearnPhysical interactive as a package

2.1 Aims of the programme

3. Research approach

3.1 A sociocultural framework

4. Research methodology

4.1 Data collection

4.2 Methodology and analysis

4.2.1 Sociocultural Discourse Analysis (SCDA)

4.2.2 Thematic Analysis

4.2.3 Video-Stimulated Reflective Dialogue (VSRD)

5. Contextual information on the three schools and classes

5.1 General comments

5.2 School 1

5.3 School 2

5.4 School 3

6. Commentary on the data

6.1 Cross-curricular approach

6.1.1 Dance/content focus

6.1.2 Timetabling the LearnPhysical interactive sessions

6.1.3 Cross-curricular approach summary

6.2 Multimodality, multisensory and multimediality
6.2.1 A ‘multisensory learning environment’ (Thomson, 2009) 26
6.2.2 Contextualising resources 28
6.2.3 Tools – the IWB 31
6.2.4 Tools – the PSPs 34
6.2.5 Group dynamics 38
6.2.6 Multimodality, multisensory and multimediality summary 39

6.3 Temporality, and connection building between learning concepts and experiences 41
6.3.1 Use of cumulative resources/improvable objects 41
6.3.2 Use of consistent resources 42
6.3.3 Use of complementary resources 42
6.3.4 Use of matched resources 44
6.3.5 Meaning-making trajectories 44
6.3.6 Temporality summary 48

6.4 Appropriating subject-specific discourses 50
6.4.1 Schools’ focus on language development and vocabulary, and teachers’ strategies to support this 50
6.4.2 Multicultural classroom, different experiences to offer to show understanding 52
6.4.3 Appropriating subject-specific discourses summary 54

6.5 Interactive teaching 56
6.5.1 Interactivity and the IWB 57
6.5.1.1 Using pupils’ work to demonstrate 58
6.5.1.2 The usual restrictions: time and pace, tendency for teacher-centred pedagogy 58
6.5.1.3 The usual scope: prepared resources free the teacher to be more spontaneous 60
6.5.1.4 Unexpected restrictions: literacy, and school focus on language 61
6.5.2 Unexpected scope: small class, open forum style of call and response 62
6.5.3 Interactive teaching summary 63

6.6 Dialogic teaching: talk as historical and dynamic 64
6.6.1 Dialogue and pupil involvement 64
6.6.2 Team teaching as dialogue 65
6.6.3 Dialogic teaching summary 65

7. Final comments 66
7.1 Practical issues 66
7.2 Technical issues 66
7.3 Adopting the programme 69
7.4 The model of LPI 69
8. Recommendations

8.1 Practical and technical issues
8.2 Teachers’ confidence, and CPD
8.3 The model of LPI

9. References

10. Notes
1. Executive summary
This report will illustrate and evaluate a teaching and learning approach called LearnPhysical interactive (LPi), based on observations from collected lesson data and grounded in literature from sociocultural psychology.

2. LearnPhysical interactive as a package
LearnPhysical interactive is an initiative designed to combine the strengths of subject and dance activities and content, alongside use of technologies, to explore different ways to approach teaching and learning material over an eight week series of topic lessons. Specifically it uses the interactive whiteboard (IWB) and Sony PSP handheld device with integrated camera, in introducing, capturing, and working with a combination of subject and dance material. These technologies are used in conjunction with other teaching and learning resources selected as appropriate by the teacher and dance specialist working together.

3. Research approach
The research evaluation was rooted in a sociocultural conception of talk and tool use as central to communication and meaning making in the classroom. Within this we have addressed the nature of classroom dialogue, and the use of tools including the IWB, PSP, and other resources and activities available, in mediating teaching-learning experiences. We adopted the metaphor of the teacher’s ‘toolkit’ (drawing on Wertsch, 1991), drawing in particular on concepts of multimodality, interactive teaching, improvable objects and meaning-making trajectories. We have used these theoretical constructs to demonstrate the range of resources and practices used by the teachers and dance specialists, and work done around them by practitioners and pupils, in and across learning activities and lessons. We provide further details on how the sociocultural framework is relevant, and frames our interpretation of the presented data.

4. Research methodology
We present our approach and data collection schedule involving three schools over the Autumn and Spring term of the 2009/2010 academic year. Data presented in this report are predominantly from the Autumn term, from a series of eight weeks of programme lessons. In preparing data for presentation in this and future reports we used sociocultural discourse analysis, thematic analysis, and video-stimulated reflective dialogue.

5. Contextual information on the three schools and classes
Before beginning our commentary on the data, we provide brief contextual information on the three participating schools. For reasons of confidentiality, all names of schools, teachers, dance specialists and pupils have been changed.
6. Commentary on the data

6.1 Cross-curricular approach

This is the first section of data presentation in this report. Li set out to promote a cross-curricular approach, using dance alongside physical, linguistic and technological resources as vehicles to support subject teaching and learning. This chimes with findings from the Rose Review (2009), which advocated use of cross-curricular methods in providing opportunities for pupils to apply their knowledge in different settings. Observed use in the lessons of the same or similar resources across the classroom and Li learning environments facilitated teachers and pupils in making and seeing links between the two types of lessons. This linking increased through the series of lessons as teachers took on more responsibility for planning both the classroom and Li lessons, building on the models demonstrated by the dance specialist in the earlier weeks, and as less support in providing content was needed from the dance specialist. It was found that cross-curricular links were more successfully made when the Li lessons were driven by addressing subject curricular criteria, rather than meeting objectives of the dance curriculum (which most likely would have been covered indirectly through the activities) – it was also found to be crucial that teachers and dance specialists were in agreement in their perception of subject objectives being covered. This enabled the Li programme to be seen by both teachers and pupils as an integrated part, rather than an add on, to their subject learning.

6.2 Multimodality, multisensory and multimediality

This section focuses on one of the central aims of the Li programme, to provide a ‘multisensory learning environment’, but also on the growing trend in school activities to utilise a widely varying array of modes and media through which to resource teaching and learning activities. Li aimed to offer such a multisensory learning environment, through use of dance and relatively new and potentially interactive technologies, alongside more traditional teaching and learning techniques and tools. Teachers commented how the physical nature of some tasks revealed which pupils had and had not understood a concept, and so where they needed to direct further support. This was particularly important in the schools with a high proportion of pupils with English as an additional language (EAL). Here teachers highlighted that the capacity to explore topics in a number of modes alongside the more traditional verbal or written modes of expression and explanation was very positive for their pupils, and supported their linguistic as well as their subject development. Effective use was made of activities and resources to contextualise learning concepts for their pupils in a way they could relate to.

The IWB and PSPs were used to present, capture and query new information, utilising both the large screen of the IWB and the small screen of the PSP, and modified live in class in line with pupils’ developing conceptual understanding. The ability to incorporate captured PSP images from the team-taught hall-based lessons within the teacher-led classroom lessons helped to consolidate the link between material covered in the two types of lessons, as it is commonly acknowledged that pupils do not always form links between learning events by themselves. Various ways were explored to find the most appropriate balance of teacher and pupil use of the PSPs and images and video taken on them. This negotiation also involved teachers and dance specialists considering which tool and approach was best suited to each teaching and learning event, and so the importance was noted that any tool should only be used where it supports learning. Thus the multimodal nature of Li is well-placed to
provide alternative entry points into learning subject content, which still fits within a sociocultural view of language as the central tool for meaning making.

6.3 Temporality, and connection building between learning concepts and experiences

We show in this section how the teachers and dance specialists adopted and adapted activities and resources, assisting pupils to see the topic lessons in the classrooms and halls as connected and cumulative. This was evident through creation of ‘improvable objects’, or cumulative resources, within and between lessons. Practitioners also utilised consistent resources across lessons to facilitate a sense of continuity in content and experience. Particularly in schools where language is an issue, such resources proved invaluable in quickly re-orienting key ideas. Complementary and matched resources were also used to offer different presentations of material or activities. These were often introduced to model or demonstrate a task, or to allow cumulation of pupil suggestions and so show that difference in pupil response to a task was not only allowed but actively encouraged. Such objects and resources were observed and worked with in the form of physical movements (dance and demonstration), tangible objects, and virtual representations (on the IWB and PSP screens). Through use of the various resources by teachers and pupils, meaning-making trajectories – how meaning around a concept is explored, negotiated and constructed over time – planned into activities by teachers were evident in terms of how learning experiences built on previous ones, and built towards future lesson content. Further analysis is needed to ascertain how the pupils used these resources as stepping stones toward cumulative understanding, and so whether the intended meaning-making trajectories planned by the teachers translated into actual meaning-making trajectories on the part of the pupils.

6.4 Appropriating subject-specific discourses

In introducing any new topic, in any subject, there are new concepts and often new ways of talking of which pupils will not have previously been aware. Developing pupils’ speaking and listening skills in general is a key objective within the national curriculum, and exploring new vocabulary and ideas is one way to encourage this development. We report in this document on subject learning in science, geography, history and mathematics, and how the LPi programme was adapted by the teachers and dance specialists to support learning objectives. Again this is in the context of localised agendas, such as a whole-school focus on developing language and literacy. Such a priority to focus on language and literacy is potentially difficult, as teachers try to encourage pupils to feel safe to experiment with linguistic resources. But equally this focus is important if pupils are to be able to understand, work with and communicate subject concepts.

This section shows, particularly in the classes where there were a high number of EAL pupils, teachers’ efforts to multimodally introduce subject-specific terms and concepts were very visible, and utilised a number of the elements of the LPi programme to good effect. Through this approach teachers reported that pupils’ grasp and application of subject terms was improved relative to sole use of traditional and classroom-based methods. But they also commented that the other means of exploring topic material in the LPi programme – through dance and interaction with other subject resources such as on the IWB – allowed the pupils alternative means to develop and express their subject understanding. Equally the opportunity for pupils to add their own context to learning events, by relating new lesson material to their own experiences, appeared to facilitate a more personal and meaningful use, negotiation and understanding of new issues and ideas.
6.5 Interactive teaching

In this section we address notions of ‘interactivity’, and how this is differently defined and interpreted in the context of LPi and more widely. Interactive teaching is used in this report to refer to where pupils’ contributions are invited and accepted, either in verbal suggestions, or physical activity with focal resources. Within LPi, ‘interactive’ also refers to the potential for physical interaction with technologies including the IWB and PSP, by the teacher and pupils. We review some of the benefits and potential issues that teachers and dance specialists faced in attempting to utilise ‘interactive technologies’, and in encouraging genuine ‘interaction’ from their pupils with the physical content of the lesson and the conceptual issues being addressed. Some of these issues have been reported previously in the research literature, whereas others appeared to be more specific to these schools and classrooms.

It is noted in the literature that recommendations and attempts at encouraging interaction or interactive teaching can often be in apparent competition with other recommendations that lessons maintain ‘pace’. This was certainly an issue the teachers and dance specialists faced. Some teachers addressed this by encouraging pupil interaction with images taken by the pupils, to allow the pupils more time to engage with the content while the teacher managed the practical issue of taking a photograph. Equally other teachers found that an occasional and appropriately-supported slowing of pace to allow pupils to add their contributions to an IWB slide, rather than the teacher writing for them, facilitated pupils in thinking about concepts and having confidence to know that their contribution is valued. Such an approach also supported pupils’ growing linguistic confidence and competence, which was a key issue at two of the three schools. Teachers employed a mix of offering information - posing as a source of authority - and gathering pupils’ views in a more interactive and dialogic manner – sometimes positioning themselves as having made an error for pupils to be in a place to correct. It was clear how use of focal images prepared and presented such as on the IWB could fuel pupils’ imagination and discussion, and also be used as a prompt for the teacher to modify or add detail as need arose.

6.6 Dialogic teaching: talk as historical and dynamic

The final data presentation section addresses a concept related, but not identical, to interactive teaching, in the form of dialogic teaching. Proponents of dialogic teaching would argue that this approach goes one step further than interactive teaching, to focus on how pupils’ contributions are worked with in class. The notion here is that pupil contribution leads to an extension and cumulation of the debate, rather than a closing point once a ‘correct’ or ‘appropriate’ answer has been given, or re-directed if a ‘wrong’ answer were offered. As well as more traditionally noted in pupils’ talk, this was also evident as the observed lessons progressed, where pupils were allowed more opportunity to interact with resources, modify or add their contributions to IWB slides, capture and view images and video on the PSPs. This shift toward more pupil contribution and in more forms was made possible as teachers and pupils became comfortable both with these tools for teaching and learning, and in knowing they were only using them where they enhanced the activity and learning potential. It is recognised however that less dialogic approaches, such as periodic use of ‘quick fire’ question and answer, can also be beneficial where used appropriately. It also became evident that the team teaching relationship between the teacher and dance specialist could be viewed as dialogic, and that effective management of this relationship...
can have an influence on effective planning as well as *in situ* teaching with the pupils, reinforcing the importance of the CPD element of the LPi programme.

7. Final comments
The ability to prepare, access and modify a range of resources in different modes and through different tools, to support a range of activities in the hall and classroom activities, were cited benefits of the programme, as evidenced in the teachers’ adaptation of the approach to suit their school and class needs. Time and the best way to use resources were recurrent issues of concern for teachers and dance specialists in planning and in the lessons. In this section we present a number of ways the practitioners found to address and minimise these potential barriers through the course of the LPi series of lessons, and how they were adopting aspects of the programme in their ongoing teaching.

Overall, the programme proved effective in the three schools in different ways and for different reasons, including:

- Using non-verbal activity and resources as a means to support general understanding as well as linguistic comprehension of concepts, and identify points of misunderstanding, was particularly valued in schools where language and literacy were of concern.
- Teachers’ enthusiastic engagement with the programme was more important than experience or confidence in teaching dance, or using dance vocabulary.
- It was not necessary to use all elements of the LPi programme in every lesson, and exploration of how best to apply the various tools and practices, as well as issues of pupil usage, tended to result in their more successful application and reception.
- Building an effective dialogue and relationship between teacher and dance specialist enabled the potential time pressures of engaging in a new enterprise to be lessened. Having established this relationship teachers more quickly understood the aims of LPi and were able to adapt it within, and expand their own teaching practice and curricular aims. This increased confidence in turn facilitated the teachers to see how the multimodal and participative model could be adapted to suit a range of topics, and reinforces the importance again of the CPD element of the programme.

8. Recommendations
We offer some recommendations, based on the findings reported here, for the future and wider dissemination of the LPi approach.

Practical and technical issues

- Practitioners should carefully consider which LPi elements are to be used in a lesson, and how they are used as a whole to provide an integrated learning environment;
- Teachers and dance specialists should reflect on how to make best use of the LPi elements, as appropriate to individual lesson aims;
- Consideration needs to be given to how best to use images and videos taken on the PSPs to support learning objectives;
- Consideration needs to be given to how IWB and PSP files are shared by teachers and dance specialists, due to file sizes.
Teachers’ confidence and CPD

- Teachers and dance specialists need to negotiate how best to co-ordinate lesson planning and preparation, and what their aims are for the programme overall and each lesson individually.

The model of LPi

- Programme developers should consider whether LPi is marketed as a programme to teach dance, or to use dance to teach other subjects;
- Consideration needs to be given to how LPi can be tailored to specific school needs;
- Programme developers may wish to consider whether an INSET or workshop for potential teachers might offer a valuable impetus for an action research approach to using the programme, and whether an action research approach would be beneficial;
- Programme developers may wish to consider making generic LPi lesson plans available, for teachers to customise and apply with their own class, and so reduce planning time and make the resources available to a wider audience;
- Consideration needs to be given to how to disseminate the LPi model and findings of this evaluation;
- Programme developers may wish to consider approaching teacher training institutions, to allow contact with a large number of qualifying professionals as they form their pedagogical practices.
2. **LearnPhysical interactive as a package**

2.1 **Aims of the programme**

LearnPhysical interactive (LPi) is an initiative designed to combine the strengths of subject and dance activities and content, alongside the use of technologies, to explore different ways of approaching teaching and learning material over an eight week series of topic lessons. A teacher works with a dance specialist in planning classroom and movement-based lessons on the topic for the eight week period. The dance specialist initially leads on the teaching in the movement lessons, with the teacher being supported to gradually take on more of the planning and delivery of the movement content through the course of the lessons. Through this, LPi is aiming to provide ‘multisensory opportunities for engagement with subject lesson content, with the application of technologies... as part of a participative learning environment’ (Thomson, 2009, p. 2-3). The particular technologies being utilised are an interactive whiteboard (IWB), present now in most classrooms in UK primary schools (and a growing number of secondary schools) and a Sony PSP handheld device with fitted camera.

In the LPi model presented, schools would ideally have an IWB in the classroom and in the hall where the movement lessons took place, to enable continuity of resource. The PSP (or PlayStation Portable) is a handheld device to play back media, such as video or images, on its integrated display screen. Fitted with a camera, as it has been for the purposes of LPi, it can be used to capture as well as display media, for taking images and video which can then be viewed immediately on the same tool. Images and video can then be displayed on the larger screen of the IWB, and so to the wider audience of the whole class, by transfer from the PSP’s memory card to the machine connected to the IWB. The PSP is more commonly a recreational technology, but this approach follows a growing trend to incorporate tools already within pupils’ out-of-school lives within the school activities, to build upon the knowledge pupils already possess of tool use, to assist their learning of new subject concepts (as identified by Brown-Martin [2009] and other speakers at the 2009 Handheld Learning conference, London). In the model of LPi, these tools are used to complement other resources within the learning environment, with all tools foregrounded and backgrounded as appropriate to the current learning goal.

LPi aims to facilitate ‘a participative, developmental and reflective learning experience’ (Thomson, 2009, p. 4). It also proposes to ‘evaluate and develop a model which aims to build teaching professionals’ literacy and independence levels in delivering dance/movement as an integrated part of a multisensory learning environment’ (Thomson, 2009, p. 4) through this research partnership. Thus the programme developers are keen to see how the various components of the learning environments (classroom and dance space) are used most effectively, and how teachers’ practice in this new teaching and learning approach develops across the series of LPi and regular topic lessons. Through the research element therefore, the aim is ‘to evaluate the potential of LearnPhysical interactive as a new teaching and learning model’ (author’s italic, Thomson, 2009, p. 2).
3. Research approach

This research evaluation was grounded in a sociocultural conception of talk and tool use as central to communication and meaning making in the classroom. Within this we have addressed the nature of classroom dialogue, and the use of tools including the IWB, handheld devices, and other resources and activities available, in mediating teaching-learning experiences. We adopted the metaphor of the teacher’s ‘toolkit’ (drawing on Wertsch, 1991), in considering how various resources were appropriated in pursuit of lesson aims.

Key features of the sociocultural approach in evaluating the proposed programme can be summarised as: an emphasis on observing interactions between teachers and learners, within the classroom context in which they occur; studying interactions as temporally based, and observing how resources, discussion and movement-based activities develop over time; the mediation of tools, and use of the IWB and movement in an innovative cross-curricular project; and sensitivity to how interactions happen, as socially and culturally situated. Viewing talk as central in meaning making, we have drawn on concepts of multimodality, interactive teaching, improvable objects and meaning-making trajectories, to address the range of resources and practices used, and work done around them by teachers and pupils, in and across learning activities and lessons.

3.1 A sociocultural framework

With our focus on meaning-making trajectories and knowledge building in the classroom, the work of Vygotsky is particularly pertinent to our research (e.g. Vygotsky, 1962, 1978, 1987). Vygotsky was interested in the development of ‘higher order abilities’ or ‘higher mental functions’ (found only in humans), which he considered to be predominantly influenced by social and cultural factors. Therefore analysis of the individual, by this view, must take place and be contextualised within the social, institutional and cultural environment in which the individual develops and experiences the world: for our focus in this project this would be the classrooms and halls where lessons took place, and beyond this the wider institutional school and socio-political context. Taking a Vygotskian perspective, development is said to occur on two levels, or planes: firstly on the social level, the intermental, and secondly on the psychological level, the intra-mental. Addressing development at the intermental level, Barnes (2008) stated that ‘Vygotsky (1962) was one of the first psychologists to acknowledge the role of talk in organising our understanding of the world’ (p. 9). Such an outlook on the development of pupils’ mental abilities has led others to develop concepts such as ‘socially shared cognition’ (Resnick, Levine & Behrend, 1991), whereby meaning is co-constructed and knowledge negotiated through dialogue and interaction between people, on the intermental level. Thus we were interested to explore how knowledge was constituted as a social construction, through classroom talk and activity, rather than a collection of universal, objective facts to be learnt. Some key sociocultural concepts have been developed to describe how knowledge is created intermentally, as will now be discussed.

Arguably one of the most widely reported concepts introduced by Vygotsky is the Zone of Proximal Development (ZPD: Vygotsky, 1978). The ZPD defines the difference between what someone can achieve in isolation, and what they can achieve with the assistance of a more-
knowledgeable other. With this it is suggested that we can achieve more when our efforts are supported and guided to understanding or task completion (though this does not imply merely being told the answers). This does not suggest the individual cannot achieve on their own, but that they can achieve more by being actively involved with others in exploring new understandings.

This notion of the ZPD was complemented and developed by Wood, Bruner and Ross’s (1976) concept of ‘scaffolding’. Scaffolding focuses on the pairing of a more and a less knowledgeable interactant, in stretching the novice’s learning potential. As we have addressed how continuity and cumulation of learning points are supported, the ZPD and scaffolding are useful concepts in viewing how teachers and pupils use resources and each other to co-construct knowledge. It has however been noted that we must exercise caution in using the term ‘scaffolding’ in educational research (Mercer & Littleton, 2007). In a similar vein to scaffolding, Rogoff (1995) introduced the notion of ‘guided participation’ as a means of recognising the teacher’s role in encouraging pupils to move from the periphery to take on greater responsibility for their learning. Others have since extended this argument to state that collaborating peers of similar developmental levels can achieve more than they would in isolation, by helping each other to consider their own and alternative views and understandings (Mercer, Dawes, Wegerif & Sams, 2004). For this evaluation it has therefore been important to collect teachers’ and pupils’ interpretations and use of scaffolding or guided participation.

‘Psychological tools’ is a metaphor that we have drawn on in considering how classroom talk can support development of ‘higher mental functions’. In Vygotsky’s work, tools (physical objects such as IWBs and PSPs, to which we will return) were described as ‘technical tools’, and signs (such as language, images) were referred to as ‘psychological tools’ (also called ‘cultural tools’). Vygotsky placed greater emphasis and value on signs, or psychological tools, in the mediation of human activity, and the importance of language in mediating human activity is strongly maintained by many researchers adopting a sociocultural approach. For instance a view of ‘the use of language as a social mode of thinking - a tool for teaching-and-learning, constructing knowledge, creating joint understanding and tackling problems collaboratively’ (p. 137) was forwarded by Mercer (2004).

This follows a view that the specific use of such tools is key to how a process is enacted, and ongoing learning and/or development. It was argued by Vygotsky that tools do not simply support something that would happen anyway, but significantly alter this process by being used and by how they are used. We were, for instance, interested in how teaching and learning processes were shaped by the use of technology and other resources. Such mediational means are said to be ‘the products of sociocultural evolution and are appropriated by groups or individuals as they carry out mental functioning’ (Wertsch & Tulviste, 1992, p. 552).

With an emphasis on the developmental process and appropriation of tools over the product of development, sociocultural researchers have advocated a need to address how higher mental functions are acquired (the significance of action), emphasising a need for a temporal analysis, rather than focusing on a static end product as a sign of achievement: ‘human mental functioning, even when carried out by an individual acting in isolation, is inherently social, or sociocultural, in that it incorporates socially evolved and socially
organized cultural tools’ (Wertsch & Tulviste, 1992, p. 551). Thus we have considered how such tools were used to mediate communication of new and developing understandings over time. This is a neglected area of research, but is an investigative strand being advocated by Gillen, Kleine Staarman, Littleton, Mercer and Twiner (2007), and Littleton, Twiner and Gillen (2010).

Within the metaphor of the tool, Wertsch (1991) introduced the notion of a ‘heterogeneous mediational toolkit’, comprising the various technical and psychological tools available for use in communicative acts. In this he utilised Tulviste’s (1986) term ‘heterogeneity’, intended to denote the variety of activities in which we engage, whereby mediational means are employed in ways specific to the social and cultural frame of intermental communication in which they are used. Therefore meanings constructed may differ from time and place, and in terms of with whom experiences are shared. Thus all activity, and communication in and about activity, is socioculturally situated:

action inherently involves cultural tools, and these tools fundamentally shape it. However, this does not mean that such action can be reduced to or mechanistically determined by these tools and hence by the more general sociocultural setting. Instead, such action always involves an inherent tension between the mediational means and the individual or individuals using them in unique, concrete instances. (Wertsch & Tulviste, 1992, pp. 554-555)

Therefore the role of talk, and specifically dialogue, in uncovering and alleviating possible tensions is considered to be of primary importance by many researchers adopting a sociocultural framework. Edwards and Mercer’s (1987) ‘common knowledge’ for instance described how concepts are referred to but not necessarily made explicit in talk, by building on already established shared meanings previously negotiated within the shared social context, that can be further shared and built upon. The situated and transactional nature of dialogue was invoked by Bloome and Egan-Robertson (1993) in asserting that ‘when language is viewed as part of an ongoing dialogue, as part of how people act and react to each other, then language is seen not as meaning per se but as meaningful, strategic action that is materially realised’ (p. 309). We have addressed use of the IWB and PSP as two tools within this toolkit which can offer visible forms of ‘material realisation’ for teachers and pupils to see and to consolidate exchanged ideas, while making the flow of ‘meaningful, strategic action’ observable to the researcher.

In the quest to create this ‘meaningful, strategic action’, the common educational challenge of how to support cumulation of understanding (Alexander, 2000) can be visible in teachers’ attempts to establish continuity between learning points and activities. Such attempts can be evidenced in references to previous and future shared activities, and use of physical tools and resources created, used by or familiar to the class (in our case including but not limited to work on the IWB). The view that ‘the continuous, cumulative, contextualisation of events and the creation of a “common knowledge” through discourse are therefore the very essence of education as a cultural and psychological process’ (p. 13) was summarised by Mercer (1997). He reiterated this line of thinking a decade later, stating that educators and researchers need to go beyond the content of the contained lesson: ‘from a student’s perspective, school work should ideally have a cohesive, cumulative quality in which specific activities and their goals can be seen to form part of a greater whole, as part of a purposeful educational journey’ (Mercer, 2008, p. 34). Within our data collection and presentation, how physical objects and dialogue (in combining technical and psychological tools) were introduced and modified over time within teaching and learning activities, by both teachers
and learners, has provided a valuable window onto how learning tasks can be connected into extended and cumulative experiences.

As mentioned, the IWB is one such tool that featured heavily in the programme and in our analysis, and so within our approach we drew on substantial research previously conducted around use of the IWB in education. Notably the literature around multimodality concerning classroom use of the IWB is particularly relevant to the proposed programme: using the IWB and handheld devices combined with dance and group discussion to explore curricular topics, potentially aligns and sequences a number of modes throughout lessons to maximise the benefits of each. A programme such as LPi is also rich in how notions of temporality in teaching and learning can be depicted, and this has been addressed in the presentation of data which follows. We have drawn here particularly on Baldry and Thibault’s (2006) notion of meaning-making trajectories, linked to issues of multimodality, to view how pupils’ developing understanding and acquisition of subject-specific discourses can be seen through the various resources and activities used, created and talked about over a series of topic lessons. Prior to data collection, the concept of meaning-making trajectories was an analytical tool that we had intended to utilise in addressing the data. This was one reason for such an intensive and continuous schedule of data collection, across all the topic lessons in both the classroom and hall settings, to enable us to see any meaning making that occurred or altered over time. This notion was then revisited in the context of the lesson data that we collected, and any meaning-making trajectories that could be observed.

How tools such as the IWB are used and perceived by the teachers and pupils, in terms of being interactive or allowing for interactivity, necessarily influences the roles the teacher, pupils and technology adopt or are ascribed. Here we have reviewed this scenario through the collected data, in addressing where pupils have actively created their own content, through discussion and dance, for whole-class viewing and discussion on the IWB. In this we utilised the notion coined by Wells (1999) of ‘improvable objects’, to denote how material is worked and re-worked such as in a physical dance movement performed by a pupil, captured on a handheld device, projected onto the IWB, and discussed and perhaps annotated and saved by the pupils and their peers. And through this, the nature and role of classroom talk from both the teacher and pupils has been explored in terms of how material and understanding are introduced, discussed and extended. Again this invokes the notion of a meaning-making trajectory as resourced by both psychological and technical tool use.

In reviewing practice within the hall-based LPi lessons and topic lessons covered in the school classrooms, this research element has aimed to address the dynamic of connection-building between learning concepts over time, but also to address this process from both teacher and pupil perspectives in action and in reflection. Thus analysis involved consideration of material from lesson observations, alongside interviews and focus groups with teachers and pupils (see details on data collected below).
4. **Research methodology**

4.1 **Data collection**

This report is based on observations of LPi in three London-based schools (see details below), over the Autumn and Spring term of the 2009/2010 school year. All schools had previously worked with The Place in similar projects, but not all of the teachers involved this time had worked on these previous projects. In two schools we worked with the same teacher over both the Autumn and Spring terms. In the third school we worked with a different teacher in each term, at the school’s request. Each teacher worked with a dance specialist to support them in implementing the LPi approach within their hall-based lessons.

Data collection in the first term was more intensive, with observations collected for each topic lesson over a series of eight weeks. For two schools this consisted of one classroom-based and one hall-based lesson per week. For the third school this was two classroom-based and one hall-based lesson for each of the eight weeks. This report is mostly based on observations from this first term. In the second term, data was collected in weeks two, six and eight of the programme, and only in the hall-based lessons.

Within the first term, we worked with teachers and dance specialists to collect the following data:

- Video recordings of classroom and hall-based lessons on a topic;
- Audio recordings of teacher talk in these lessons;
- Audio recordings of a group of pupils within each of these lesson;
- Field notes from lessons;
- Audio recordings of teacher and dance specialist interviews (separately) before, and after the series of lessons;
- Audio recordings of pupil focus group after the series of lessons;
- Audio recording of Video-Stimulated Reflective Dialogue (VSRD, see below) sessions with teachers and dance specialists (separately) after the series of lessons;
- Transcriptions of audio and video data.

4.2 **Methodology and analysis**

Our analytical framework draws on established practices from previous projects (Mercer, et al., 2006) adopting Sociocultural Discourse Analysis (see below) for the lesson data. We used Thematic Analysis in working with the interview and focus group data, and Video-Stimulated Reflective Dialogue (VSRD) with teachers and dance specialists to review some of the videos of their lessons and gain their thoughts about the pedagogy and lesson outcomes. The post interviews (after the series of lessons), focus groups and VSRD sessions took place during the Spring term but focused on lessons from the Autumn term, and so after the eight weeks of the programme lessons that were the subject of discussion.
4.2.1 Sociocultural Discourse Analysis (SCDA)

SCDA adopts a view of language as ‘a social mode of thinking - a tool for teaching-and-learning, constructing knowledge, creating joint understanding and tackling problems collaboratively’ (Mercer, 2004, p.137). It is based on the assumption of the central role of language as a cultural and psychological tool in making and negotiating meaning. This implies a focus on language within the social context in which it occurs, and so on the joint activity, content and structure of talk between interactants – in other words, how knowledge is being jointly constructed, negotiated or disputed.

Mercer (2004) argued that talk has a historical and dynamic aspect. We have aimed to capture some of the historical aspect by observing a series of lessons, in which the historical dimension of learning is built. The dynamic aspect was captured as the lessons progressed, to view how opinions and concepts were introduced, queried, adopted and developed, where new experiences and understandings became explicitly appropriated as part of the ‘common knowledge’. It was not possible to access the entire historical aspect of classroom talk, due to the vast experiences the class have of which we cannot be aware. Thus the dynamic aspect of talk, as interactants drew on the historical resources available and perceived to be salient to the ongoing dialogue, was our entry and window onto the common knowledge being used and developed.

SCDA offers a means to observe how interactants use talk to establish and maintain intersubjectivity, or common understandings about concepts. Therefore analysing the talk has allowed a view of temporal development, to plot any changes in talk patterns and content over time. Combining this with analysis of activities being done and talked about, has facilitated a view of how the subject and content of evolving discussions were manifest in the work pupils produced.

SCDA in particular emphasises the importance of talk. We also incorporated aspects of multimodal analysis (Bourne & Jewitt, 2003; Jewitt & Kress, 2003; Kress, Jewitt, Ogborn & Tsatsarelis, 2001), to acknowledge the multimodal nature of classroom interaction and the aims of the LPi programme. This has been addressed via the video data and field notes from lessons, and also the teachers’ IWB files used in the lessons. We have included in transcripts the communication via other modalities and use of resources. This has facilitated reflection on the multimodal nature of the classroom, and how the IWB and other resources were used to foreground and background other modalities alongside classroom talk.

4.2.2 Thematic Analysis

Thematic analysis is a ‘method for identifying, analysing and reporting patterns (themes) within data’ (Braun & Clarke, 2006, p. 79). The analyst has an active role in identifying and interpreting data, whereby themes do not ‘emerge’ from the data. The analyst must therefore be explicit about the assumptions and theoretical background in which data are interpreted. As mentioned, we adopted a sociocultural framework in analysing the data. Thus comments made in interviews and focus groups are interpreted as situated both within the discourses of the classroom practice that were the subject of the discussions, and also in the context of the research setting in which the discussions take place. The impact these physical (school) and psychological (research environment, being recorded) settings may have on the data generated are acknowledged in analysis.
We focused on the theme as unit of analysis, as a tool which ‘captures something important about the data in relation to the research questions, and represents some level of patterned response or meaning within the data set’ (Braun & Clarke, 2006, p. 82). Themes were identified when reviewing the data, rather than constructing them before. Themes were plotted where they were represented throughout the data, and kept within the context in which the themed data occur, so as to avoid Mercer’s concern of reducing talk to a ‘categorical tally’.

4.2.3 Video-Stimulated Reflective Dialogue (VSRD)

VSRD is a technique employed by researchers which aims to put practitioners in control of how they reflect on their own practice, stimulated by watching video footage of their teaching (e.g. Moyles, Paterson & Kitson, 2003). Teachers select extracts before the dialogue session that they want to discuss with the researcher. Teachers often select the lessons that they want to be recorded (depending on the broad research agenda). Researchers can use questions or prompts to explore the teacher’s reflections, but they are not there as the ‘expert’: both can learn insights into the practices they review and reflect on in the session. It is important that teachers see VSRD as a chance to explore and reflect on their practice, rather than as a test of how they have done.

Having introduced the methods of data collection and analysis, it is now pertinent to provide some background and contextual information on the participating schools.
5. Contextual information on the three schools and classes

5.1 General comments

All school, teacher and pupil names given in this report are pseudonyms. For ease, the schools have been referred to by number (school 1, 2 and 3). Teachers and dance specialists are referred to by name, and paired alphabetically (e.g. Adam and Beth), to make it easier to identify which teacher worked with which dance specialist.

Table 1: School, teacher and dance specialist relations

<table>
<thead>
<tr>
<th>School</th>
<th>Term</th>
<th>Teacher</th>
<th>Dance specialist</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Autumn and Spring</td>
<td>Adam</td>
<td>Beth</td>
</tr>
<tr>
<td>2</td>
<td>Autumn and Spring</td>
<td>Clare</td>
<td>Deb</td>
</tr>
<tr>
<td>3</td>
<td>Autumn</td>
<td>Emily</td>
<td>Fiona</td>
</tr>
<tr>
<td>3</td>
<td>Spring</td>
<td>Gary</td>
<td>Fiona</td>
</tr>
</tbody>
</table>

Before the programme started, all three teachers had been using an IWB in their classroom teaching since they qualified, so for three (Adam and Emily), and one (Clare) years.

All were enthusiastic and fairly confident users of the IWB, though mostly self-taught.

Cited benefits of the IWB in their practice included:

- To discuss and amend any mistakes, in the children’s responses and in the teachers’ prepared slides;
- To structure the lesson;
- To flip forward and back through slides as necessary – ability to keep lessons ‘pacy’ (management issue sometimes of maintaining ‘pace’ during pupil input with the IWB);
- To revisit material from previous lessons as a starter to subsequent lessons;
- High visual content that can be prepared and presented easily and quickly;
- Access to online content;
- Access to video files.

Emily and Adam had used some form of cross-curricular dance/movement activities before, but Clare had not.

5.2 School 1

A substantial majority of pupils at this school have English as an additional language (EAL), with pupils from 30 different countries speaking 27 different languages. The school has a
stated focus on literacy and language, through writing, speaking and listening activities, cited as one area in need of development in their most recent OFSTED report (November 2008).

Specific to the Y2 class:

- Languages spoken in the class: Albanian, Arabic, Bengali, Lingala, Portuguese, Somali, Tigringa, Yoruba, English
- EAL: 16/20, though none were new to English
- Number of pupils eligible for free school meals: 14
- SEN in the class: 5 - behavioural, Occupational Therapy needs, speaking/listening, reading/writing.

We will call this school, school 1. We will refer to the teacher as Adam and the dance specialist as Beth.

5.3 School 2

Since the previous OFSTED inspection, English and Maths standards had been addressed and reportedly improved at school 2. Science was identified in the most recent report (November 2008) as the next area of priority. This Church of England school also has a large proportion of its pupils with English as an additional language.

Specific to the Y4 class:

- Languages spoken in the class: Arabic, Bengali, Russian, French, Greek, Chinese, English, Other
- EAL: 20/25
- Number of pupils eligible for free school meals: 11/25
- SEN in the class: 6/25

We will call this school, school 2. We will refer to the teacher as Clare and the dance specialist as Deb.

5.4 School 3

Cross-curricular teaching and learning and linking learning to pupils’ real life experiences are specified aims at this Church of England school, as identified in the most recent OFSTED report (November 2006).

Specific to the Y3 class:

- Languages spoken in the class: English is the only language spoken in class (one of the girls has a French father and also speaks French)
- None of the children are EAL pupils
- Number of pupils eligible for free school meals: 1/30
- SEN in the class: None, though two are on the gifted and talented register.
In this school the dance specialist worked with a different teacher in the Autumn and Spring terms. We will call this school, school 3. We will refer to the teacher from the Autumn term as Emily and the dance specialist as Fiona. We will refer to the teacher from the Spring term as Gary.

Having introduced the LPi programme, research approach and participating schools, over the next few sections we will present and illustrate some of our key findings from the data. We will begin with the stated programme aim of the cross-curricular focus of the LPi lessons, and consider this through observed practices from lessons, and practitioner and pupil responses.
6. Commentary on the data

6.1 Cross-curricular approach

One of the stated aims of LPi was that it adopted a cross-curricular approach, utilising dance and movement as a different entry into learning a range of subject material, and through this gaining awareness of dance terminology and building confidence in creative exploration of movement. In doing so the programme was in tune with an influential document produced on the future of the curriculum – the Rose Review (2009) concluded that ‘from the standpoint of young learners, making links between subjects enriches and enlivens them’ (p. 3). It also claimed that ‘subjects will be complemented by worthwhile and challenging cross-curricular studies that provide ample opportunities for children to use and apply their subject knowledge and skills to deepen understanding’ (p. 10). The report specifically highlighted a role for dance and drama as used to reinforce learning from a range of subject areas, although the links highlighted by Rose for use of dance were to physical education and music, rather than to the broader curriculum as a whole. Thus there appears to be a new role for dance in the context of cross-curricular learning within the LPi approach, which will be explored in this report.

6.1.1 Dance/content focus

Within shared planning sessions between the teacher and dance specialist, practitioners discussed how to use the sessions to cover the curriculum and required learning objectives, and also how the content would be linked between the classroom and hall-based sessions. Use of vocabulary between the two learning environments was one key way of reinforcing this link. In her pre-interview, one of the teachers (Emily, I = interviewer) commented that:

E: her (dance specialist) first dance lesson is going to be about the water cycle. They’re gonna be acting it out, and then using the vocabulary like evaporation, condensation, all of that. So, before that lesson, we’ll, I will introduce, we will discuss it. So we will, when we make our models, ‘OK so where does the river come from?’ That kind of thing. And, we’ll start talking about the water cycle. Get a few things from them. Then I’ll be teaching the vocabulary so they’ve got an idea
I: So you’ll be using the same vocabulary
E: Yeah, and I’ve got all what she’s using. So they’ve got a, they’ve got an idea of what it is, so that when they go in, if she says it they’re like, ‘ah, I know what that is’. But then they’re going to be acting it out with her, or dancing, dancing it I should say. Then when they come back in, to me, then they would have, had the vocabulary introduced, had a rough idea of what it is. They’ve then danced through it. And then I can then say, right, we can get it on paper. So within groups they can make a large diagram of the water cycle.

This correspondence between new vocabulary and movement activity was noticed by the same teacher at a school trip after the series of lessons, thinking about the LPi lesson and topic week the class did on pirates. She made the following comment in her post-interview:

E: the actions was, was much better and when we went, to, the maritime museum, they remembered all of their, words from the pirates, and they were in the middle
of the museum and they were doing all their actions trying to remember which, who did which job on the pirate ship.

In the focus group with pupils from this class, memory of this topic was evident, and the process of learning it clearly enjoyed: ‘I liked the bit when we got to act out the sand dune thing for Blackbeard’.

The dance specialist working with this class (Fiona) also commented positively about this approach to teaching and learning in her post-interview:

I love the cross-curricular stuff. I think it’s, planning-wise it’s, ... it’s quite full on. But it, it’s so sensible. It makes so much sense. And it’s, it gives dance a new status. And I think that’s very positive.

With the teachers playing a more active part in the dance lessons toward the end of the eight weeks, more verbal links were being made between the two types of lessons to support pupils in seeing consistency of content, and more resources were shared across the two settings. There was still, perhaps inevitably, less use in the class lessons of movement or images of movement taken in the dance lessons (on the PSPs), than there was of new subject vocabulary used in the hall-based lessons. Teachers were at times though attempting to incorporate pictures and images from the PSPs in the content and structure of their class lessons (particularly Adam, teacher at another of the three schools). The reciprocity of multimodal learning stimuli flowed more easily as the lesson sequence progressed.

Emily was the only teacher at the end of the eight weeks of the first term to have used video from the movement lessons in her class lesson. She felt however that more successful or efficient use could be made if she had the opportunity to review all the pupils’ videos first to find good ones to talk about. Deb (dance specialist working with another school) approached this issue by trying to watch what pupils were capturing as they were taking the photographs, to identify at that point which would be good to draw on with the whole class. In sharing some pupils’ videos or images, pupils inevitably want to see their own work, though it is rarely practical to show them all. Deb and Clare (dance specialist and teacher working together) recorded images and video of whole class work, whereby this was not an issue as it showed them all. There were also issues (raised with pupils at the time of recording) of how usable pupils’ videos are, such as through shaky camera work or being distracted and not capturing work at all.

6.1.2 Timetabling the LearnPhysical interactive sessions

Teachers and dance specialists had slightly different views on how to interpret this cross-curricular focus, and specifically where the sharper focus should be. This was evident in the teachers’ stated aims of how to use the LPi lessons, and also in how they accommodated the hall-based lessons within their already full timetables.

For those viewing the LPi lessons as a means to address subject criteria, there was a concern that pupils might miss the subject learning and focus on the physicality of the lesson and dance content. For instance, Adam (teacher) in his pre-interview revealed:
The anxiety that I have is that the children might not make that link. Erm, they might not see it as, anything to do with the topic. They might just get into the movements, which is still good but, you know that’s, we do that in PE anyway. It’s not really gonna be productive unless they’re getting something from it, er, that they can use again, in the classroom, or at home or, if they’re not applying the knowledge independently, outside of erm, outside of er, erm, a learning environment or, you know, a setting like the dance setting, then there’s no point really. The main thing is that they, they get it, and they use it, and they understand it.

This particular teacher whole-heartedly embraced the physical and movement-based approach to subject content learning of LPi, and he reflected in post-interview on the benefits he had observed as his class participated in the LPi lessons:

And it’s a lot easier because you’ve got, you know I’ve found one of the key things was, for me, doing it through physical activity when children don’t get it they stand out. They really stand out. If they don’t know what they’re doing it’s so much easier to pinpoint who, you know, who doesn’t understand what they, you know what they’re supposed to be doing. And erm, that makes it a lot easier to target them and help them.

It is notable from these quotations that Adam was not using the LPi lessons to focus on the dance curriculum. However the dance specialist he was working with (Beth) stated in her post-interview that the class would have met the curriculum criteria for dance through what they had done in the hall-based lessons anyway, therefore meeting both subject and dance requirements.

Alternatively, Emily used the LPi lessons within a PE slot on her timetable in order to cover the dance curriculum, commenting in her post-interview that:

it’s more their movement skills cos I wanted to keep it as PE, really. Cos they have to do the elements of PE. So I was trying to, trying to keep it, trying to address the dance elements they have to cover, and assessing them on the dance ability, because that’s what we needed to do.

This perception of how to use the LPi lessons was at slight odds to the dance specialist’s (Fiona’s) perception, who had been attempting to focus on the subject content and to use the dance activity as a means to teach and learn the subject. She reflected in her post-interview:

I think that, because the emphasis isn’t, it’s not in my head and perhaps I need to work on this, but the emphasis is about the learning content. It’s about the science, it’s about the, and that’s what has to be communicated through movement. Yes it’s really important that they point their toes, they stretch and they’re being creative, erm and they’re thinking about the different body parts... But I am, not, erm, it’s not that I’m not concerned about it, but, the priority is the knowledge they’re retaining. And obviously the dance goes hand in hand with that. But, I delight in the fact that they learn, something that’s really important. Well, obviously the dance is really important too. They sit really well together.
In the second term Fiona worked with a different teacher at the school. Gary, the second teacher, despite working at the same school as Emily, adopted a different view to the timetabling of the LPi lessons. He used the sessions as part of his weekly science teaching, but thought perhaps they would have been better every fortnight to allow more time for physical experimentation in the classroom. He was however happy to introduce scientific concepts and terms in the classroom or hall-based lessons, thus placing trust in the capacity of the hall-based lessons and the cross-curricular approach of the LPi programme to effectively facilitate learning of the scientific material. Fiona stated in her VSRD session:

what (Gary’s) doing, he does refer things back, to science, cos that’s where his head is. That’s what he wants, them to achieve. He wants them to walk away, erm, with scientific knowledge that they didn’t have before they walked in... it makes a lesson far richer, far more exciting, far more, erm, they love unknowns, and as things unfold you have their interest cos it’s stuff they don’t know. And no-one’s sitting, sitting there thinking ‘done this, I know this’.

On reflection by the dance specialists, this agreement in perception was important in determining a feeling of success about the LPi lessons and the partnership they had with the teacher. Indeed for the third pairing, the dance specialist (Deb) noted in her post-interview how it became apparent that the LPi lessons were not only an innovative way to cover subject content, but also to meet criteria for different curricular areas in the one lesson (making the same point as mentioned for Adam and Beth above):

Deb: I think because they’re doing a cross-curricular, because it’s cross-curricular they’re understanding but actually they’re ticking two boxes of doing dance and doing the topic as well so, that seems to work quite well cos they’re really believing now that the children are learning something from it. I think they think that. Erm, so it’s not just an extra session, to squash into their timetable.

Understandably time was an issue that many teachers raised, as will be returned to later, and so the potential success of LPi in being embraced by schools partly rests on it being viewed as an integrated rather than additional element of the timetable.

6.1.3 Cross-curricular approach summary

LPi set out to promote a cross-curricular approach, using dance alongside physical, linguistic and technological resources as vehicles to subject teaching and learning. This chimes with findings from the Rose Review, which advocated use of cross-curricular methods in providing opportunities for pupils to apply their knowledge in different settings. It also however goes one step further than recommendations in the Rose Review, by using dance in combination with subjects other than PE and music. Observed use in the lessons of the same or similar resources across the classroom and LPi learning environments facilitated teachers and pupils in making and seeing links between the two types of lessons. This linking increased through the series of lessons as teachers took on more responsibility for planning both the classroom and LPi lessons, building on the models demonstrated by the dance specialist in the earlier weeks, and as less support in providing content was needed from the dance specialist. How best to use video or images from the LPi lessons in subsequent lessons was an issue teachers and dance specialists addressed together in their partnerships, and a number of solutions were explored as relevant to the specific needs of each teacher and class. It was found that cross-curricular links were more successfully made when the LPi
June 2010

Lessons were driven by addressing subject curricular criteria, rather than meeting objectives of the dance curriculum (which most likely would have been covered indirectly through the activities) – it was also crucial that teachers and dance specialists were in agreement in their perception of subject objectives being covered. This enabled the LPi programme to be seen by both teachers and pupils as an integrated part, rather than an add on, to their subject learning. One teacher felt the LPi lessons would have been more beneficial on a fortnightly rather than weekly basis, to allow more time for other classroom activities such as scientific experiments. This is something that could perhaps be negotiated at the local level between teacher and dance specialist, again to be responsive to the specific needs of the teacher and class.

As well as covering different elements of the curriculum, the programme strongly emphasises the potential power of utilising different modes and resources available to teachers and learners, in proposing a multimodal, or multisensory approach to learning, as will now be addressed.
6.2 Multimodality, multisensory and multimediiality

A consideration of multimodality can be used to view how teaching and learning experiences are contextualised by the various modes and materials drawn upon in the progression of the teaching and learning activities. Here we draw on Jewit’s (2009) definition of ‘multimodal communication’ defined as ‘where there are degrees of combinations of different modes’ (p. 301), combined with other definitions provided by Bearne (2003) and Jewitt and Kress (2003). Thus mode can be considered as the form of the content, such as visual, audio or movement. An often complementary term to mode is that of media, in light of increasing attention to notions of multimedia communication and entertainment within 21st Century Western society, whereby media would be the vehicle through which information is transmitted, such as a book, television or website (Twiner, Coffin, Littleton & Whitelock, accepted for publication).

In the context of LPI, much research has considered the place and possible uses of the IWB in providing and orchestrating a multimodal learning environment (e.g. Littleton, Twiner & Gillen, 2010; Moss, et al., 2007). In terms of multimodality, rather than isolated modes therefore, it is the combination, sequencing and easy alignment of information presented in different modes, resulting in a composite text, that the IWB can add to the classroom in addition to that provided by previous technologies. What the innovatory programme developed by The Place adds to this is a dimension where the movement, or static image, on the screen can be mirrored, re-created and re-defined in dance and movement off the IWB, and then re-captured on handheld devices for exploration of pupils’ own activity and ideas.

6.2.1 A ‘multisensory learning environment’ (Thomson, 2009)

In combining all the various physical, technological and psychological modes and resources available and used by teachers and learners in their lessons, we can view how the different elements work together to offer a more holistic understanding of phenomena. For teachers this can be used to identify where there is misunderstanding, or to recognise where teaching points need to be made explicit in order to get the most from any exploration of an object, concept or activity. Such an issue was exposed in the VSRD session with dance specialist Fiona, watching the class work through their dance sequence about the process of oil changing to plastic, and specifically the stage of ‘melting’ (figure 2):

Fiona: You see there’s a level issue there isn’t there. It’s very difficult to melt, from being down.

Figure 1: Teacher introducing the concept of ‘melt’, as part of the process of oil changing into plastic. This is resourced through the IWB image, which the teacher (Emily) moves to reveal the keyword, and through action.
Emily: ‘What happens to something when it gets hot?’

Figure 2: Pupils creating movement around the idea of ‘melting’
Here we see the combination of pupil physical activity, with the pictures and new vocabulary displayed and worked through previously on the IWB (remaining visible on the IWB as they work through their dance phrase). This is then framed in hindsight in the VSRD session, with the potential role that teacher talk, or pupil discussion could have in consolidating the science learning of ‘melting’ as explored and exposed in the dance phrase. This relates to the point made earlier of how misunderstanding can be evident in physical activity.

In other cases imitation of misunderstanding, illustrated by physical resources, has been used by teachers to unpick phenomena and explore error as a way to modelling scientific knowledge. Within the post-interview with Gary, the interviewer commented on some of his and Fiona’s use of props within the lessons - he had been posed as someone who could not make a cup of coffee, or a slice of bread, due to misunderstanding soluble and insoluble substances, or the role of the microorganism yeast in making bread:

I: And I know in some previous lessons you’ve had sort of, bread and coffee and those
G: Oh yes
I: taken on characters and things. Do you think that sort of approach
G: I think that was fantastic for the children. Really, really kind of, erm, loved the idea that I kept mucking up and fouling up. I couldn’t cook and I can’t clean and it was great, that kind of joke. That worked really well
I: Do you do similar things in the classroom?
G: Yeah, I mean we joke around. I normally (laughs) it’s very bad, but I normally use a child and say ‘oh, so and so can’t do this’. Erm, so yeah they like that approach. Erm, and seeing it wrong, to make it right. So they’re seeing the errors to make it right.

The importance here of course in unveiling the error, is that all participants need to feel that they were in a safe environment to explore possible scientifically ‘incorrect’ understandings. How participants then work together to construct a scientifically ‘correct’ understanding will likely involve a mixture of authoritative, and non-interactive discourse from the teacher of the accepted conventions of scientific knowledge (Mortimer & Scott, 2003), such as that prepared in advance for working through on the IWB, and pupil input and questioning of both the ‘correct’ presented material and the humorous ‘errors’ or misunderstandings.

Benefits of such a multisensory learning environment were also highlighted by teacher Clare, as she commented in her post-interview:
C: Generally, like I think most children, and certainly specific groups of children, you learn better when you do things than when you say things. It’s more of a kind of assault on all of the senses, when you’re actually doing it, we’re showing them pictures on the whiteboard, we’re writing the word down, and saying the word. And I think that’s the best chance that a lot of children, particularly children who have English as an additional language, it’s the best chance they’re gonna get at learning it. And it is, language is a real, issue

I: Right

C: Sort of the literacy is a real issue, erm, in this school and in this class, and those children, who it isn’t an issue for, I guess some of the words were quite complex so, they will take, they will grasp all the words. Some of the other children will at least get some of them I think. And the fact that you’re going over it and saying, ‘oh look, er angle, angle’ you know ‘look at this’ and showing them what you mean constantly. And I think that’s something I could get better at as well as using the words more and more and more. So instead of just going round and just going ‘oh yes that’s a nice diagram’, so to try and use the, the language a bit more, that we’ve been using. That they’ve been using.

For two of the three schools, language and literacy were particular issues and foci, largely due to the high proportions of pupils with English as an additional language. In this context a multimodal or multisensory teaching and learning environment is proposed as especially important, in offering other avenues and entry points into linguistic competence and grasp of subject terms and understandings. Through this approach, new words are learnt in a meaningful and accessible context.

6.2.2 Contextualising resources

In learning about the topic of India, combined with a dance entry point of balance, pupils at school 2 learnt about how some people in India carry things such as water on their heads. The pupils also tried carrying a basket on their heads in their classroom lesson. This offered the pupils an abstracted notion of balance as a dance concept, and a chance to explore different ways of balancing, as well as a contextualised means of thinking about and trying for themselves an aspect of life in India. There is a strong sense in the research literature
that learning is more effective if it can be personally meaningful (Scott, 2008), and also if pupils are allowed to interact conceptually as well as physically with the content (Hargreaves, et al., 2003).

A pupil from the focus group after the series of eight lessons on India commented:

J: It was really fun when we were looking at some of the things that they do, how they carry and balance baskets on their heads. And we tried it out how to balance them on our heads

Interviewer: Mmm, and that was fun was it trying out how they do things?

Group: Yeah

K: (Teacher’s name) said that we could try it out with water but so far we ain’t done that.

This class exercise was re-contextualised in the dance space, and the dance specialist noted this in her VSRD session:

Deb: one of the main things we were looking at was balance. So that was really, it’s a clever way of, of basically linking the movement back to the topic. Cos again it could become a bit abstract, erm, and we don’t want to dramatise it too much. But I think by looking at these pictures, it’s a, it’s a way into talking about balance.
In a similar pursuit, and being mindful of the need to support language development, teacher Adam used a timeline on his IWB slides at the start of each lesson on the Great Fire of London (see figure 7 below). He saw the importance for his particular pupils of contextualising number and value, and also linked the new material being introduced with material they had already covered, thus re-working and maximising the value of the common knowledge already available:

A: with the timeline, the whole, the main thing for me was to get them to understand that it happened a very, very long time ago. Cos they, not all of them have a good concept of number yet. You know some of them are really good at it, but there are quite a few who, know the number and know the name, but they don’t necessarily know the value or the timespan, or how long that amount of time is. So by saying, and, but luckily a few weeks before this we did do erm, a little bit of work on Guy Fawkes cos it was erm, I think it was bonfire night.

I: I know you mentioned that in there

A: Yeah, yeah. I kind of did that on the spot, that wasn’t planned. But when erm, we had er, when I was saying 1666 I thought well they know about Guy Fawkes. We talked about it. They could see the dates, 1605, so that these things happened about the same time. And they have seen pictures of Guy Fawkes and you know the, London at the time for those sessions so, I was just trying to give them something to, hold on to, you know something to refer to, while we were doing the timeline.
With each successive use (over four weeks), Adam annotated the timeline to include the present day, and also marking where the Great Fire of London occurred relative to the present day. In doing this he also reinforced the notions of past and present, which was one of their learning objectives. This use of the prepared IWB slide can be considered as an ‘improvable object’ (Wells, 1999), re-worked and edited to current purpose and with the addition of the growing knowledge around the issue.

6.2.3 Tools – the IWB

Observed functionalities of the IWB being used included:

- Prepared information and pictures on slides – to prompt and give information/instructions;
- Screen or block reveal – with hidden information revealed by teacher/pupils;
- Playing videos;
- Writing and highlighting onto slides/annotating pictures (mostly teachers doing writing, but opportunities for pupil writing on the IWB increased during the eight weeks);
- Moving things to correct places on prepared slides (teachers and pupils);
- Playing games or simulations from external sources (teachers and pupils);
- Re-sizing images to fit the screen, or temporarily to focus on key points.

As in the above example of the timeline, the IWB was in many cases a key resource and focus of attention within lessons. Adam, as with the timeline mentioned above, used IWB slides from previous weeks to recap at the start and end of lessons, moving through them more quickly each time. As well as a recap for pupils, these slides also acted as a prompt for him of what he needed to cover: showing where they had come from and linking into where they would be going in each lesson. Again being mindful of the need to focus on language, the repeated presentation of slides offered sentences for the pupils to practice reading out loud. The combination of relevant pictures and descriptive sentences on prepared IWB slides, with teacher modelling and pupils practicing reading the sentences out loud, offered different ways for pupils to access, contextualise and practice the material. In the research
literature, Alexander (2008) cited Mercer (2000) to underscore the value of such practice, commenting:

> on the repertoire of interactive techniques – recapitulation, elicitation, repetition, reformulation and exhortation – on which teachers daily draw ‘for building the future on the foundations of the past’ (p. 15).

Use of the IWB was something that the dance specialists reportedly came to feel more at ease with through the course of the programme lessons, in this sense often learning from the teachers. The IWB was an addition to the previous incarnation of LearnPhysical, whereby this was a relatively new tool for them. In this respect there was a levelling and sharing of expertise: between the dance specialist’s knowledge of dance terminology and how to use movement in a cross-curricular frame; and the teacher’s knowledge of the specific curricular area and the predominantly classroom technology of the IWB. Equally the addition of the PSP offered an opportunity where the pupils could also be experts, with many of them having previous experience of similar devices. In reflecting on use of the IWB, Beth commented in her post-interview that:

> It doesn’t feel so much of an addition. So when I was first planning, I was sort of planning in the way that I would have for, the sessions before we started using the technology. And then instead of, having kind of cards I’d have it up on the whiteboard. But now I think I’m thinking about all the options and possibilities of actually having the whiteboard and, making use of those a bit more... It feels a lot more integrated.

Similar comments were made by Fiona in her post-interview:

> I see, so much value in it. And when I’m laminating and putting cards up on the wall for the hundredth time and the new learning objectives that I’ve typed out and laminated and it’s only used for one lessons. It just seems ludicrous when you can have everything at the touch of your fingers. And there are so many, erm, dimensions to learning that can be, introduced and developed with a whiteboard that you can’t really, well you can do it but it’s much harder work for the teacher, and erm, more time-consuming, when you can, use that time, for dancing, moving and creating.

Again here we see the recurrent issue of time, a valuable resource for teachers.

The benefit of this new addition however was questioned, of using the IWB within hall-based lessons, by Emily in her post-interview. As identified by Gillen, et al. (2007), the affordances of any tool are only valuable if they are perceived as such by the users:

> E: It gave a good focus and a starting point. And in some cases it furthered their learning as well. And it did, obviously when they were making up their dances, it had the visual images on there for them to refer to, and to remind them, what they were doing. And when they were doing the story dance, making up the sequences, it was good to have it there on the board. Again to prompt them and remind them of what they were doing. And I think because they’re not used to that, a lot of them didn’t, refer to the board, because they’re not used to having it on in dance

I: Right, OK
E: Probably why a lot of them couldn’t remember where they were up to or what they were doing. Because they had forgotten, and they didn’t think ‘oh I’ll look at the board’ cos they’re not used to having that one there.

This is not to say that such a use of the IWB is not beneficial, but it does raise the need to think about how any tool is used, and why. The notion of scaffolding (introduced by Wood, Bruner & Ross, 1976) outlines how learning can be furthered by targeting support where it is needed through availability of more knowledgeable others or resources. If pupils are aware support is there for them, in the above case in extra information on the IWB as a form of scaffold of ideas for them to draw on, they may increase their capacity to utilise all available sources of support in extending their dance explorations and subject knowledge.

In preparing a resource on which to draw, however, and with the ever-present constraint of time, the affordances of the IWB again come into question. As an interactive whiteboard, resources presented on them stand capable of in situ modification. However, as a teaching resource, they tend to be viewed as a source of authority, thus not open to alteration, and many researchers have identified the tendency for IWB use to inadvertently perpetuate a teacher-centred pedagogy (Kennewell, Tanner, Jones & Beauchamp, 2008). Dance specialist Fiona noted in her VSRD session, admittedly with the advantage of being able to sit, watch and reflect rather than act in the real-time of the lesson, a particular point where she felt the teacher’s introduction of material was too long (in the lesson they were team teaching), possibly related to the prepared amount of material visible on the IWB that she intended to cover:

F: Or maybe, maybe she thought that was the best way to consolidate, the ideas, but to repeat them in the warm up, again, it’s you know verging on, too too much but

I: Do you think the whiteboard maybe hindered her there as well? I mean she’d obviously, with having all those pictures there she had to get through all of those

F: Mmm

I: points I guess didn’t she

F: Mmm. Yep. Yeah, it was too, dwelt on for too long. Erm, yeah and I think you’re right.

This identifies a sense in which the prepared resource can potentially hinder the teacher’s sense of flexibility. A different teacher, Clare, in her post-interview however identified a spontaneous use of the IWB’s capacity for editing, which had not been planned prior to the lesson:

C: (Deb) did a really good thing last week, erm, which we were gonna do again this week but because the whiteboard was so off

I: Yeah

C: erm, we didn’t, where she took pictures, put them onto the whiteboard, and then drew the angles on. So you know they were doing like foil and stuff

I: Oh OK yeah
C: and sort of drew with the pen, erm where the angles on their bodies were. And they were, you know ‘what shape can you see?’. So you know she saw the triangle shape before, well actually drawing it in.

This example of spontaneous modification of the resource demonstrates the teacher appreciating and harnessing this affordance of the IWB, whilst also incorporating a form of pupil participation in using pictures of them on the IWB to demonstrate key points. In pursuing the multisensory and participative aims of the LPi programme overall, such practice evidences the cross-curricular use of the dance activity, combined with the PSP to take images and IWB to show them back, and in doing so drawing out the Maths concepts by annotating the captured image.

Specifically use of the PSPs by both teachers and pupils will now be addressed.

### 6.2.4 Tools – the PSPs

The Rose Review (2009) claimed that ‘ICT is a creative tool for communication, used to locate information and to create, improve and present work’ (p. 157). Teachers overall felt the use of the PSPs offered benefits to teaching and learning. As the Autumn term progressed, there was more use of images and videos that had been taken in lessons – both in the same and subsequent dance lessons and in the class-based lessons:

- Adam used the images in his IWB slides to reinforce key words, vocabulary and concepts in the topic;
- Emily played some of the videos to encourage evaluation of movements, and linking back to topic concepts being explored;
- Clare had produced a wall display using some of the images, to illustrate some of the concepts they had been learning about, and how they had been exploring them through dance. We are unsure to what extent this was put together by Clare or the pupils, and whether it was referred to in lessons (not in the ones we observed).

![Wall display on India topic](image_url)
In spite of this increased use of the PSPs however, including more pupil use of the devices, there remained contention over how much use should or could be in the hands of the learners. One voiced and perhaps unsurprising reason for this was the issue of time. There was also the factor of young children’s need for everyone to ‘have a go’, conflicting with a resourcing need for children to share the PSPs. This was mentioned in Emily’s post-interview:

E: it was nice for the children to use the PSPs and, have something else to experiment with. It’s just I think, the main problem was just the time really. Erm, because, and the amount of PSPs. I mean, if they had one between two, it would have been so much better because then they would have been able to film each other, and then sit together and watch it back and talk about it amongst themselves. And that would’ve, and then they would’ve had much more of a go on the PSP, been able to use it properly as individual assessment. Just having the six wasn’t enough.

I: Right.

E: And there was a lot of ‘I didn’t use it last week, I only held it for five minutes’ and that kind of thing. Whereas one between two would’ve been much, much better.

In Fiona working with two teachers, firstly with year 3 and latterly year 6 however, this offered the comparative reflection that pupil use seemed to be less of a concern with the older pupils. In an attempt to lessen the learning load in the LPi sessions, the year 3 pupils had a short lesson beforehand on how to use the PSPs, whereas there was no time for a similar session with the year 6 class. Fiona commented on this difference (in her post-interview) in pupil age and opportunity or not to ‘play’ with the devices before the lessons, and how it manifest itself in the LPi lessons:

I think it’s been better because they (year 6 pupils) know the rules, in that you press it once, you stop it, and you look and you focus on what you see. It’s not about being funny, it’s not about, I don’t, I think by allowing the children to play with them, and I understand why, it’s good that they had a chance to play with them and use them in one respect, but, they then thought that that’s what you do in the dance space. Where the year 6’s respect it completely, respect that it’s just, and they know to take turns, and they erm. Because we did a three, not even three minutes, on, of talk about it, erm, and you’re not allowed to keep pressing, you’re not allowed to
talk while it’s on. All those things were established very, very quickly. And they were the right rules (laughs) you know. And I think that made a difference with the quality of the images that I was, that we could use last week. There were loads of them. The quality was really, really good. Because there weren’t hundreds of, of ears or, you know someone falling over and sticking their tongue out. Cos it wasn’t a game, it’s not a game with these students. Whereas with, I think it had been established as, something to have fun with, which is great, good, but, not appropriate for these sessions.

Again from this we see the importance of the perception of any tool’s affordances, in this case whether the PSPs are seen as a device to play with, or with which to record learning activities. Indeed in the focus group with the year 3 pupils, the boys mentioned more than once that they would have preferred to use the PSPs for playing games. It is highly plausible then that they were distracted from the device’s learning potential by knowledge of its gaming potential.

A further potential distraction of pupils using the PSPs was raised by Deb in her post-interview, whereby use itself and concentrating on focusing the device on the activity to record, may hinder them from seeing what they are filming:

    But I think when they film they don’t watch it properly. They erm, they watch it properly when we look at it back on the board. But when they’re filming they’re not necessarily taking in, what they’re seeing, they’re so enjoying filming, and using the PSP.

All of the teachers and dance specialists in some way wrestled with how best to use the PSPs, and particularly how any pupil involvement with the devices and/or images taken on them could be orchestrated. They found that if they gave the actual device to pupils to use, they did not know how the pupils would use it. And equally they could not know what pictures they would get back if they put the images or videos up on the IWB, particularly if showing to the whole class. They therefore had to deal with the quandary of how much freedom to allow the pupils, and how much they needed something to work with after.

In some cases teachers and dance specialists were dealing with this issue by encouraging pupils to work with the printed images taken from the hall lesson in the class lesson. In this way they were still enabling pupils to work with their own image, but ensuring that every pupil had something to work with. Such use also served to reinforce the link between the hall-based and the classroom-based lessons. It is an acknowledged issue in classroom life that pupils do not always automatically make the links between related concepts or learning experiences (Alexander, 2000), and so making this explicit is a common and key educational goal. Fiona mentioned this use in her post-interview, talking about the year 6 class:

    I think what’s really nice with what’s going to happen this term is, he has the pictures, they’re printed out. He’s got them, they’re gonna label them in their books, so it doesn’t get lost.

There is a notion here of holding on to, and not wanting knowledge to be ‘lost’. In physically reproducing and re-working the image, their physical exploration of the concept, captured image of it and subsequent annotation on paper show the progression of an improvable object, contextualised with subject vocabulary. It has clear personal relevance by being an image of themselves, serves to bring the subject content back into awareness, and becomes
available for revisiting and revision in the future through its permanent placement in the pupil’s book.

Teachers found other ways to address the issue of pupil use, often favouring pupils’ indirect involvement, in considering how best to secure potentially realisable benefits of using the device. Deb, in her post-interview, commented that:

I’m finding one of the best ways to use them is actually me taking pictures of them and then showing them straightaway, and then them, erm, er, sort of working on the quality of their movement or, looking, seeing why they’re doing their movement. ‘Is it clear that you’re a mountain or is it clear that you’re showing the swirl of the sari?’ Or something like that. And that’s working almost better at the moment, than them taking pictures.

In this approach she is trying to balance the perceived need for teacher use of the PSP by showing the images immediately back to the pupils, so that they have a sense of using it, they also get to view themselves on the screen, and can take advantage of having an outside view of their work. As Deb mentions, by showing the pupils the image immediately and on the PSP screen, pupils have the opportunity to make any amendments to what they are doing there and then. She did however acknowledge that there can be a trade off between time taken and value of pupil use of the PSPs, also commenting in her post-interview:

Deb: And it’s also hard because you have to (laughs), if like two pairs are taking pictures of each other, it takes quite a long time, than me just going round snapping pictures. But then it’s important, and I think when they use the PSPs in a group, it’s all about sort of leadership and sharing and social skills and that’s very important. So that’s a whole, load of other skills that they’re learning as well. So maybe it’s just easier for a teacher to go round and take pictures but actually it’s good for them to learn how to do it as well.
6.2.5 Group dynamics

This comment in particular raises the issue of social skills and group dynamics, which perhaps become more apparent or necessary within tasks involving physical activity and contact. Deb recognised the potential of LPi with this regard in her pre-interview, in stating:

there’s a huge social, erm, side of things I guess, where they’re working with each other, they’re. I think it’s all very part of PSHE is to work in groups and leadership and, all those kind of things which are, which are quite hard to do in the classroom sometimes. So actually standing up and, either being in charge or, making decisions is, a huge part of growing up, especially at that age. So that’s very important I think. And not a lot of other programmes would do that. And I suppose even in PE and things you wouldn’t necessarily do that. For swimming or gymnastics are often quite individual, erm subjects.

Two different views in particular on how this aspect manifested itself in the lessons were raised, firstly by Fiona in her VSRD session when considering how the year 3 pupils were working together:

F: So with that it would have been better not to have put such small children in such a big group, that might have helped. Erm (pause) because obviously (coughs), working in, fours and fives, were they in groups of fours and fives?
I: Yes
F: Erm, that’s, potentially too many leaders. And er, kids’ opinions get lost in that sized group.

and also by Gary in his post-interview, when reflecting on how his year 6 class had worked together and how they had considered the work of other groups:

G: some of the groups work particularly, you know, very impressively well, erm, boys more than, I was more shocked about the boys working, and actually one of that group was definitely the best
I: They’re very strong actually aren’t they, you know in the dance side
G: Yeah, they’re not embarrassed about doing it. They were just, you know they were twirling like ballerinas half of them, they were just doing it, didn’t care. Erm, because they were all doing it. And it wasn’t like they were being singled out. So that was really good to see. And I mean also, I’m not sure if you’re aware, but the boy this morning that said they worked really well as a team, he’s autistic, and he was able to see that, and he, in previous weeks he’s made really silly comments about things, and he came out, without any prompting, with a really sensible thing about how they really worked well as a team.

Some of these issues of course cannot be planned for or predicted. Thinking more directly about the nature of LPi, Emily for instance commented in her post-interview that group dynamics were better when pupils were paired according to ability. In contrast, Adam found that the ability range within the classroom was used to good effect when whole class activity or physical demonstration enabled some pupils to model appropriate responses to their classmates. He also commented that the physical nature of much of the work in the LPi lessons encouraged pupils to participate and feel safe in their participation, who were perhaps more shy about contributing in a traditional, language-dominated lesson. Clare made a similar point about pupil interaction with learning material and with each other in her post-interview, stating that:
all those sort of barriers, that are normally inside the sort of social interaction of
children seem to go out the window a little bit, once they get started, I think.

Thinking about group dynamics and the place of the teacher and dance specialist in this, Deb
noted in her VSRD session that pupils responded well when she and the teacher physically
demonstrated something to the group together, to identify themselves also as participants
in the developing shared knowledge.

Figure 11: Clare and Deb demonstrating ‘mountain’

The VSRD session was intended to offer teachers and dance specialists the opportunity to
see and reflect on some aspects of their lessons in more detail, that perhaps they do not
have the time or space to consider in the real-time flow of the lesson. Equally by seeing or
thinking about what they consider to work well or not work so well, it may enable them to
capitalise on this knowledge of their class in action, and potentially foster and build on
positive group dynamics in future lessons.

6.2.6 Multimodality, multisensory and multimediality summary

Focusing on multimodality and multisensory learning allows us to consider the various
resources and activities employed to introduce and explore learning content. LPI aimed to
offer a multisensory learning environment, through use of dance and relatively new and
potentially interactive technologies, alongside more traditional teaching and learning
techniques and tools. Teachers commented how the physical nature of some tasks revealed
which pupils had and had not understood a concept, and so where they needed to direct
further support. In such an approach teachers need to be aware of and manage the
potential risk and fear of error pupils face in publicly displaying their level of
mis/understanding. This was particularly important in the schools with a high proportion of
EAL pupils. Here teachers highlighted that the capacity to explore topics in a number of
modes alongside the more traditional verbal or written modes of expression and explanation
was very positive for their pupils, and supported their linguistic as well as their subject
development. Effective use was made of activities and resources to contextualise learning
concepts for their pupils in a way to which they could relate. The IWB was used within this as
a tool on which to present and query new information, and develop common knowledge.
held by the class. It was also used by the teachers in preparing slides as an advanced
organiser, to remind themselves of planned lesson structure in the real-time of the lesson.
Such prepared slides were often used as a source of authoritative information, but also as a
resource which could be modified and opened to debate.

Equally the PSPs were used to capture and create representations of pupils’ developing
knowledge, which were then re-worked on either the small screen of the PSP itself or on the
IWB. Various ways were explored to find the most appropriate balance of teacher and pupil
use of the PSPs and images and video taken on them. This negotiation also involved teachers
and dance specialists considering which tools, technological or otherwise, and approach
were best suited to each teaching and learning event, and so the importance was noted that
any tool should only be used where it supports learning. Images captured on the PSP were
often incorporated within classroom lessons on prepared IWB slides, which helped to
consolidate the link between material covered in the two types of lessons, as it is commonly
acknowledged that pupils do not always form links between learning events by themselves.

Thinking about how to connect past lessons, and looking to future lessons is one way to
consider how lessons link together, and notions of temporality and ‘connection-building’
(Gee & Green, 1998) will now be addressed.
6.3 Temporality, and connection building between learning concepts and experiences

6.3.1 Use of cumulative resources/improvable objects

The concept of an improvable object (Wells, 1999) can again be applied when addressing how objects or activities are built upon in the same or subsequent lessons. Deb and Clare used this method to link learning across two of the hall-based lessons, by asking pupils to devise a dance phrase in one lesson, and then improving and extending it in the next. This was related to two aspects of life in India that were being covered over the two weeks in the hall and classroom-based lessons. They resourced this by presenting a flow chart of the dance elements on laminated cards on the wall in the first lesson (due to having to have the lesson in a different space without access to an IWB), for pupils to put together their own interpretations of the required elements (figure 12 below). This was then presented as an extended version of the same flow chart, but on a prepared IWB screen in the second lesson (figure 13 below). Thus the static flow chart display, despite having two different presentations in the two lessons, acted as a cumulative resource of the previous and new elements for pupils to include in their dance phrases. The created dance phrase also became an improvable object, as a physical means to explore the abstract but linked concepts represented by descriptive terms on the mounted and IWB resource.

Outside of the LPi lessons, and so making the link back to the school environment and even out of the timetabled topic lessons on India, Clare’s class used some of the moves from the LPi lessons to put together a piece for school assembly to show what they had been learning. To do this they considered the concepts they had learnt together with the movement content they had created across the various weeks of the topic lessons, in developing an improvable object to represent their accumulating knowledge of one element of the geography curriculum.

In a similar vein but still within the LPi lessons, Fiona and Emily also asked pupils to extend a dance phrase from one lesson to the next, showing development of themes covered. They used this activity to depict development of theme and how to represent this within development of movement, to represent the change from the upper to the middle course of a river.

And across the four weeks learning about the Great Fire of London, Adam and Beth developed the use of a line of pupils as the buildings, with another pupil as the fire moving
over, under, around and through them. This activity was re-worked many times to explore how and why the fire spread and also how it was stopped, to include:

- running through pairs of pupils making arches to explore the concept of ‘through’;
- moving along a line of pupils standing at different heights to represent the buildings;
- moving along the line of pupils in different ways to explore variety of movement;
- more than one pupil moving along as the fire to represent speed of it spreading;
- and individual pupils as buildings falling down to represent ‘firebreaks’ and how the fire was stopped.

These various activities show how teachers and dance specialists have been working with their pupils to develop cumulative object and movement resources, to emphasise links between material learnt in different lessons. As well as developing resources, the practitioners often drew on the same resources or structure of resource and activity across the lessons to indicate correspondence of content, as will now be shown.

6.3.2 Use of consistent resources

Throughout the term Adam recapped previous lessons’ IWB slides before extending into the current lesson’s new vocabulary or issue, to offer both cumulation and consistency of form and content. He also incorporated similar circuit-type warm ups and equipment when he started to take on the teaching of the hall-based lessons: to maintain the link to the topic learning of the Great Fire of London, he related the warm up movements to ways to describe how the fire moved through the buildings.

Such sharing of resources across lessons and across the hall and classroom-based lessons was also highlighted by Deb in her post-interview, in saying:

And bringing resources, I still think bringing resources from the classroom to the, dance space, I think links, links the, well links the topic and helps the children understand that it is the same, subject. Just because it’s moving, they’re hopefully still understanding that they’re learning the same things, just in a different way.

Thus the resources can offer context in which to build new and build on current, common knowledge. Particularly in schools where language is an issue, such resources can be invaluable in quickly re-orienting key ideas.

6.3.3 Use of complementary resources

Through the dance activity, subject content, use of IWB and PSPs as well as other resources in the classroom and hall, the teachers and dance specialists often employed different means to access the same learning point. As mentioned in the section on multimodality and multisensory learning earlier, this was seen as a key way to explore the same content in different forms, and to assess pupils’ understanding by asking them to take knowledge learnt in one mode and re-present it in a different mode. Adam commented on such an approach in his post-interview, stating:

A: getting them to think about why the fire spread, through pictures and physical, you know resources like that. And then when the dance came in, you know, that really helped lay down, you know, embed all this knowledge. So I think it was really
useful having the dance there. I’m not sure how much they would have remembered if they only had the classroom side of it

I: OK
A: which is really interesting for me because, erm, you know with regards to things like firebreaks and, erm, the other key vocabulary that we, we were using at the time, they, I don’t feel like they were getting it as much as when erm, as much as after we’d done a dance session on it as well. So that reinforced to me that you know this side of it was very important too.

Again in the quotation above we see the importance in this school of emphasising and exploring the key vocabulary. Adam commented also in his post-interview how this focus affected his use of resources and opportunities for pupils to work with them, (this time referring to numeracy LP/ lessons in the second term):

I: How are they with talking about what they see up there (on the IWB) and sort of evaluating?
A: Yeah. Erm again, the more able will come out with all sorts of really good ideas. But my main aim is to get, get the middles and lowers with limited language to really use the visuals as an opportunity to explain themselves. To, you know have a go at, you know speaking and listening basically. They need as many opportunities as possible, which is, which is again why erm today there was a lot of speaking and listening going on when they were trying to come up with the numbers. I wanted that to happen. Even if they’re not coming up with exactly the right idea, the fact that they’re speaking, they’re listening, they’re engaging is, you know is a big deal for us. We really want them to, er try. And you know, if there’s an adult there they can help them with their language as well as with the learning, you know. It’s just, the learning just becomes a, you know a context for them to do the talking within.

Solomon and Black (2008) asserted that one role of the teacher is to allow opportunities for pupils to learn through talking, and support pupils in learning how to use talk to learn (not just the eager responders). In this light, within Adam’s description we see the complementary use of the subject content, visual resource and the talk around the two. In this frame, orchestrated by the teacher, the visual illustrates and resources a consideration of the subject concepts, through the modelled and experimenting verbal suggestions which are scaffolded and supported as necessary by the teacher. This demonstrates simultaneous use of complementary resources, but this is not the only means of employing this approach.

Adam and Beth also incorporated complementary resources across the lessons on the Great Fire of London, in particular to explore different ways to think about Samuel Pepys’ diary of the Great Fire of London, and the act of keeping a diary and recording events. One learning objective that had to be covered was to address how we observe things, and so Adam and Beth included many ways, through the topic material, to consider this. For instance:

- In the class, having learnt about Samuel Pepys from resources prepared by Adam on the IWB, pupils wrote their own description of the Great Fire as if they had been there themselves, focusing on the key notion of an ‘eyewitness’;
- Also in the classroom pupils painted a scene from the Great Fire, with buildings of different heights, and the fire moving through them;
June 2010

- This was re-worked in the hall lesson, where the class were being the buildings at different heights and a pupil moved along them as the fire, while one pupil and Adam painted the scene;
- This complemented Beth recording the pupils’ movements on video on the PSP as they depicted the scene.

These activities and tools were also used to explore the recurring concept of past, present and future, and how this affects the mode of recording, or how we can tell when something was recorded.

6.3.4 Use of matched resources

Similar to complementary resources is the notion of matched resources (Hennessy, Deaney, Ruthven & Winterbottom, 2007: described in the context of demonstration on an IWB in preparation for pupils’ individual off-IWB, usually paper versions) ‘for manipulation or annotation by all pupils... by providing a bridge between activity within the public arena and private learning spaces’ (p. 297). This concept refers to where a resource is available in different forms, modes or media. For instance, this was seen in the lessons where worksheets were demonstrated on the IWB, with annotation onto the IWB version of the work to be done individually by filling out a few early statements or questions for all the class to see (Adam). Examples of worksheets on the IWB were not always an exact copy of the worksheet pupils were then given to fill out themselves, and responses written publicly onto the IWB were intended as suggestions, rather than answers for copying. This adopts a form of interactive and dialogic teacher talk (Mortimer & Scott, 2003), where suggestions are taken from the class, there can be more than one correct or acceptable response, and these suggestions are used to modify the prepared resource. Within her lessons, Clare drew an example of the kind of work she wanted the pupils to do individually (see figure 14 below), or things she wants them to think about in doing their work. Again this public resource was employed as a stimulus for thought rather than to be copied.

Figure 14: Teacher drawing example of work to be done

6.3.5 Meaning-making trajectories

Although use of matched resources tended to occur in one instance, development of theme and cumulation of knowledge was evident in the use of and response to cumulative,
consistent and complementary resources. This can be observed by considering Baldry and Thibault’s notion of a ‘meaning-making trajectory’.

Such a trajectory can be used as a tool to view how pupils worked with and appropriated subject understanding, through their interactions with cumulative (improvable objects) and consistent resources and activities across lessons, and use of complementary and matched resources within lessons, as above. This was often supported by:

- repeated and contextualised use of new terms – through pupils saying the words, saying the words in sentences or explaining them in their own words;
- labelling diagrams and identifying the terms/places on maps or diagrams;
- dance interpretation;
- and evaluation of other pupils’ dance phrases from activity or captured activity on the PSP/shown on the IWB.

In plotting such trajectories, teachers and pupils frequently made reference to activities already done, and use of new information that they were going to make at a later stage, in order to locate new knowledge within pupils’ existing knowledge base and the common knowledge available within the class. Teachers encouraging and testing that such links and trajectories of meaning-making were being built, could be seen through activities on the IWB to test pupils’ knowledge and memory of previously learnt terms. In some cases these involved direct pupil interaction with the IWB, while others were pupil instructed or suggested and teacher enacted. Such activities within the series of lessons included:

- Block-reveal – which is the correct block to reveal for the question being asked/what is the term written under the block at a certain place on the picture?;
- Matching/drawing line between pictures and words;
- Moving pictures into correct categories;
- Labelling terms against pictures/maps;
- Recognising deliberate mistakes on the prepared slide (e.g. correspondence of pictures and words).

Much pupil input in these activities was funnelled between a small number of options, and checked by teachers before any pupil interaction with the IWB, rather than pupils’ independent contributions, explorations or creations. Again, given the time-limited nature of a lesson, and teachers’ attempts to have pupils active rather than sitting and listening where possible, perhaps pupil exploration occurred more in small group work, rather than in whole class where most of the IWB activities took place. (More detailed examination of group work in the lesson data is needed to determine whether or not this was the case.) Such activities do however have potential value: they can provide both teacher and class with an overall picture of understanding or misunderstanding, and revision of key concepts being covered, often making concrete and explicit links between concepts introduced over a period of time to assist pupils in seeing correspondence of content.
Efforts to orchestrate and resource development of meaning making were frequently referred to by the dance specialists and teachers. We noted the comment earlier by Adam that he was concerned for pupils to see the link between the classroom-based and hall-based lessons. Beth suggested in her post-interview that it was possibly more work for teachers when dance specialists were planning the LPi sessions (predominantly in the first half of the first term), in terms of trying to link the classroom and hall lessons together:

Beth: All I can comment on is the fact that in the second half of the term, he was leading more on the planning. So erm, that was probably a lot more organic for him than the first half of the term where, I kind of laid out what I was going to be doing over the four weeks, and maybe it didn’t have the same sort of progression or continuity as the second half of the term.

Adam agreed in his post-interview that he found it easier when he was planning both the classroom and hall lessons each week. In spite of this however, he did state how his practice had developed and been enriched by having the input, and sharing the teaching and planning in the first half of the term:

A: there’s a wealth of knowledge that she’s brought in with the dance aspect of it, travelling movements, erm making, different shapes with your bodies, making different levels. All sorts of things that I’d never thought of before, you know really, in such details. And erm, I think you know, I think it’s been really positive cos erm, er, I had like all the subject knowledge, and erm, she had er, all the movements that we needed to get done. And all the ideas on that side. And I think when we came together, at first you know, erm, she was doing more of a physical thing, physical activities. And as we went on then it became more and more, er subject-based, you know, as well as linked with the dance. And when I took over then, when I became more confident with the, with the bank of dance ideas I had, erm, I was able to, you know that’s, that’s why I’m basically able to deliver these sessions now, myself mainly. You know to be able to plan them and deliver them, because I’ve had that input from her in the first place.

In considering the various inputs and approaches to the topic of the Great Fire of London, we can observe a trajectory of the meaning-making activities that were orchestrated by Adam and Beth across the lessons.

1. In leading exploration of the concepts of past, present and future, he introduced hand movements for past (left), present (middle), future (right), modelling these each time he used the terms, and encouraging the pupils to do the same;

2. They looked at examples of photographs versus paintings, and more generally modes of recording events (diary, painting, camera, video);

3. They looked at what was depicted in the photographs or paintings, such as clothing and hairstyles, building materials and spacing between buildings – this was oriented to pose the question, what clues are there in the collected evidence of when The Great Fire took place (i.e. past, present or future)?;

4. Adam located the Great Fire on a timeline. This was a prepared slide on the IWB, of a blank timeline which he annotated with each use, and so reversing the temporary changes made to the resource after each lesson ready to be re-worked for its next presentation;
5. He used pupils to demonstrate the concept of a firebreak and how the fire was stopped, by having some pupils standing in a line, and one being ‘knocked down’ (as the firebreak) to show a break in the line and a break in fuel for the fire;

6. They looked at photographs and paintings, and pupils creating their own painted records of the Great Fire (in both the hall and classroom-based lessons);

7. The learnt about one of the main sources of information about the Great Fire, in the diary of Samuel Pepys, and writing their own diary of the Great Fire as an eyewitness at the time would have done.

Of course this identifies the activities orchestrated by the teacher, but closer analysis of the lesson discussions around these activities is needed to ascertain whether meanings were actually made by the pupils. Within these activities, we can see Adam’s re-use and extension of IWB slides to check learning in subsequent lessons, of:

- Adding in the date of the Great Fire to the timeline each lesson– pupils were encouraged to call the date out, through which Adam intended to check pupils’ memory of the date, and position the historical event relative to the present day;
- How and where the fire started;
- Differences between photographs and paintings, and using this to be able to tell from the evidence that the fire occurred in the past;
- Why the fire spread;
- How the fire was stopped;
- Who wrote the diary.

Adam used the classroom painting activity by the pupils for them to show what they had learnt about the Great Fire:

- Buildings were close together;
- Buildings were different sizes;
- Fire went over, under, around and through the buildings;
- Fire was spread by the wind (shown by fire leaning in one direction).

Equally, the movement activity of fire spreading through buildings was used in a similar way to the painting activity, with pupils acting as the buildings, and one pupil as the fire (see figure 15).
As already mentioned, this activity was recorded by painting, and by video on the PSP, to link back to issues of past and present.

The activity in the classroom of writing the diary was also used for pupils to re-produce what they had learnt, including information about:

- Date the fire started;
- Where the fire started;
- How people felt when the fire started;
- What people did when the fire started, and as it continued to burn through the city.

In line with the school’s concerns with language, this involved the pupils in putting what they had learnt into sentences, and presenting the Great Fire as a sequence of coherent events and experiences about how and why things happened as they did, as well as the act of practicing their writing. As cited earlier, for Adam, in terms of both speaking and writing, ‘the learning just becomes a, you know a context for them to do the talking within’. Therefore creating a context in which to learn key topic vocabulary was considered crucial to pupils’ successful understanding and application of new terms.

6.3.6 Temporality summary

We can see in this section how the teachers and dance specialists adopted and adapted activities and resources, assisting pupils to see the topic lessons in the classrooms and halls as connected and cumulative. This was evident through creation of improvable objects, or cumulative resources, within and between lessons. Practitioners also utilised consistent resources across lessons to facilitate a sense of continuity in content and experience. Particularly in schools where language is an issue, such resources proved invaluable in quickly re-orienting key ideas. Complementary and matched resources were also used to offer different presentations of material or activities. These were often introduced to model or demonstrate a task, or to allow cumulation of pupil suggestions and so show that difference in pupil response to a task was not only allowed but actively encouraged. Such objects and resources were observed and worked with in the form of physical movements (dance and demonstration), tangible objects, and virtual representations (on the IWB and PSP screens). Through use of the various resources by teachers and pupils, meaning-making trajectories – how meaning around a concept is explored, negotiated and constructed over.
time – planned into activities by teachers were evident in terms of how learning experiences built on previous ones, and built towards future lesson content. Further analysis is needed to ascertain how the pupils used these resources as stepping stones toward cumulative understanding, and so whether the intended meaning-making trajectories planned by the teachers translated into actual meaning-making trajectories on the part of the pupils.

How the pupils responded to and adopted the key terms and concepts within their growing subject discourse would be one way to consider this, and their grasp and contextualised use of subject vocabulary is an issue we will now address.
6.4 Appropriating subject-specific discourses

6.4.1 Schools’ focus on language development and vocabulary, and teachers’ strategies to support this

One thing that had not been anticipated at the outset of data collection was the focus in two of the three schools on language and literacy, and how this influenced their classroom practices. The need to develop speaking and listening skills has been promoted in official documents, such as in the Rose Review (2009):

In the new curriculum children should learn to develop and apply their speaking and listening skills to suit a variety of audiences and for different purposes. They should tell and listen to stories and explore ideas and opinions in both formal and informal settings. They should have opportunities to express themselves creatively in improvisation, role play and other drama activities. (p. 59)

Thus the schools’ efforts in this regard are responding to both their local pupil intakes, and to national agendas and issues. This supports Solomon and Black’s (2008) claim that learners take on ‘different learner identities and ways of engaging with knowledge through their participation and non-participation in classroom discourse’ (p. 74), whereby pupils engaging in verbal, reading and writing activities within subject contexts can help to foster an identity of participation in classroom practice as well as within the subject discourse. For Adam, this pursuit was an issue of complementary skill development, commenting in his pre-interview:

The verbal skills help the reading skills, the reading helps the writing. And you know I think doing the dance thing will, will help them to embed everything.

This could lead into a discussion of the literature around kinaesthetic learning and learning styles. For instance, a report by the Department for Education and Skills (2004) stated that ‘Research indicates that in general 35 per cent of people are mainly visual learners, 40 per cent of people are mainly kinaesthetic and only 25 per cent are mainly auditory’ (p. 4). It is unclear however what ‘research’ is referred to here. Other researchers feel that the popularity of a learning styles approach to teaching and learning has been enhanced by its potential relevance to the Government’s advocacy of ‘personalised learning’, as highlighted by Hastings (2005) in a newspaper article for the Times Educational Supplement. For those teachers wishing to consider their pupils’ learning styles in their classroom practices, such an approach is generally considered to be more effective when teachers orchestrate activities across a range of visual, auditory and kinaesthetic resources, amongst others, to provide a multimodal or multisensory learning environment (British Educational Communications and Technology Agency, 2005). This approach is generally favoured over directly targeting each individual pupil’s learning style with either matched (e.g. visual resources for visual learners) or mismatched (e.g. visual resources for auditory learners) learning resources.

As highlighted above, LP/hall-based lessons alongside classroom-based lessons have the potential to incorporate material in a variety of modes, or styles, selecting the most appropriate to the task and topic at hand. In her post-interview, Deb highlighted how in joint planning herself and the teacher (Clare) had tried to think about the best ways to cover subject content and to multimodally support learning of new subject vocabulary:

Deb: the topic geography was only the second or third time I’ve used that. And erm, so I was a bit worried because with topics like science the vocabulary’s very, very clear. But with this it was much harder, words like climate and, erm, if they’re talking
about clothes, or people, or physical features, things like that. And that doesn’t, that was quite a challenge to put that to movement. So straight away (Clare), the teacher and I had to think quite closely about that. Erm, but actually (Clare) said that she found it easier to plan for the geography unit than she has the science so far. So that’s been quite an interesting development. We’ve obviously only had a few sessions this term of science. Erm, but we found, yeah some creative ways in, of, to sort of work the topic.

This combination of vocabulary learning with the dance activity, and finding the best way to emphasise and work with new terms, was also mentioned by Adam in his post-interview:

A: I think the only thing I’d er, for this school, as I’ve said before, one of the main things is vocabulary. And erm, you know maybe, but then I’m happy to have had the input on the, on the vocabulary side of it. I think sometimes I forget about it, because there’s always so many other things to remember. But erm, at the end of the day I mean, when you get key vocabulary I think that’s the main thing. And I’ve tried to, as we went, I think at first, erm I let (Beth) do a lot of the talking. And then as I was taking over, then I was telling the children to, you know, use this language while you’re doing the movement. And I’ve tried to keep that going, basically til now.

I: I was gonna ask about the learning of new vocab and how the dance helped or affected the learning?

A: I think, we didn’t touch upon it until quite late on actually. You know we’re always talking about, ‘OK they need to say this while they do this’, but I think only when we did the Great Fire of London (from week five of eight) did we really start to use the vocabulary while we, were doing the movements. And I think that was really interesting to see cos erm, you got some children who, some children in the class are really quiet and they don’t like you know shouting or talking or whatever, they’re just really erm, er, closed off. But I think, when they were doing the movements, they were running around and having so much fun, they were saying and repeating themselves. Like there’s this one child, (child’s name), who I remember was going around in, he was being the fire running around some buildings, and he was supposed to say ‘around’. And at first he was just running in circles and then I said, I tried to prompt him and said ‘use the, say “around” if you’re going around’. And then he just did it with such happiness, you know ‘around, around, around, around, around, around, around, around’.

In reviewing the lesson in her VSRD session, Beth reinforced Adam’s attempts and intentions to encourage the pupils to use the subject terms at the same time as doing the dance explorations:

Beth: I think (Adam) was really encouraging them here to use their voices as well, to say ‘over, under, around and through’ (at the same time as doing the movements).

In reflection, Adam felt that this multisensory learning had helped the pupils to contextualise and appropriate the new subject vocabulary, and that it opened up a way for those less proficient in English language and literacy to demonstrate and develop their understanding. He commented in his post-interview:
They’re not necessarily, not all of them, even though a lot of them have English as an additional language, they don’t, that doesn’t necessarily mean that they don’t have erm, the, you know the knowledge or the capacity for understanding. That’s an issue with a lot of our children, especially in this school, where all, they’ve all got a really good understanding, mostly, but they, they fail to express themselves. They fail to express their understanding through you know, just standard English. They find that really difficult. There’s a lot of slang, there’s a lot of erm, you know, lots of erm, plurals where they shouldn’t be, erm just things like that. And this gives them an opportunity to, you know to, just erm have a go. And especially with an adult there, they’re always safe.

This latter issue of managing pupils’ risk and fear of error whilst encouraging them to publicly try things is no small consideration (Gillen, et al., 2007), and a challenge that teachers face in trying to allow pupils to experiment with their ideas and understandings in the public, whole class domain. Beth commented in post-interview on the shared nature of this endeavour between the teacher and herself, in how they were using vocabulary and pupil participation to introduce new concepts as well as assess understanding of concepts already covered:

Because language and vocabulary is so huge at this school, I’m very aware of that now, and use that as kind of a tool in the sessions but also as a kind of a marker to see how much they’re understanding and learning, and how much they’re participating. It’s good that (Adam) gets everyone involved, it’s really good, asking everyone questions. Erm, but I hadn’t really considered that so much. It used to be, I’d asked them questions and they’d answer. But it seems to me that they’re giving a lot more verbally, which is good.

This approach or intent focus is perhaps specific to this school, but a more general honing in on key scientific terms was shared between Fiona and Gary, as she commented in her post-interview:

Fiona: And he used words like predict that I could then pull out and use, ‘I want you to predict’ so that I could use the same sort of language that he’s using in the classroom. And just little things like that, subtle things that show that there’s a link between what we’re doing is really, really important.

Just as the teachers tend to be the introducers of new subject terms, trying to find ways of making them meaningful to pupils, what pupils can bring to lessons from their own personal experiences proved to be particularly influential within one of the three class’s topics, as will now be described.

6.4.2 Multicultural classroom, different experiences to offer to show understanding

In studying the topic of India, and through the teacher’s orchestrated and planned use of pictures on the IWB to illustrate some of the ways of life in India, some pupils raised their own similar experiences or observations whilst in other countries. Some talked about their home countries, others about places they had perhaps visited.
Within the focus group at school 2, pupils discussed a particular image that they had seen both in the classroom and hall-based lessons (as shown in figure 16):

K: And when we looked at that picture in the studio, where there was like this bike and loads of white stuff on top of it, that looked quite hard to me. But then I thought, how could he carry like so many bags in like one hour?

?: Yeah

?: Could have had two, could have had two or something

J: Yeah, it’s like in Bangladesh cos we do have in Bangladesh, we have something else that is like erm, it’s like an Indian rickshaw but we have one where two can. We have one called (inaudible), and one is like erm one bike with this thing like

L: Yeah

J: chair on it and covered and

K: Like a net?

J: Yeah

L: (inaudible) is like erm, it’s a like a car but it has like erm this erm

J: Yeah they have it

L: a leather like roof

Interviewer: Oh OK

M: I think it would be very hard, I think you would have to train to do that. And I think they had very special bikes. You know that they made these big, and they put these bags of potatoes and food on the bike, I think they sort of stuck it on together, because, if a man was riding a bike, and then he had a pile, which was coming, well falling, he would have to stick it, otherwise if he did not stick it, it would all suddenly just fall off.

For those in the group who had personally experienced or seen something similar to the bike in the picture, they were able to contextualise this aspect they were learning about, with the two pupils re-constructing the experience together for the others. And for those who did not have their own experience to draw on, they seemed to try and work their way to understanding how the bike would operate.
A further example of trying to understand something they had learnt arose later in the same focus group, with the pupils questioning a ‘fact’ they had been told, and as a group relating this to their own experiences, or perhaps other facts they knew about different countries.

K: In India it’s hot as well, really, really hot. And I don’t know why but, if, in India, I don’t know why boys should wear long sleeve and stuff and long shorts cos it’s so hot

?: Yeah

Interviewer: That would be interesting to find out

J: Sometimes these man, they wear this thing where it’s like a skirt, but in Bangladesh it’s called a (inaudible) and then, it’s just like they wear no pants. They just wear like a skirt, it’s kind of a skirt that is, it’s like (inaudible) but it’s thick

?: Just like Germans

L: Some men wear like the skirt thing

M: Yeah, in Scotland

?: in Scotland

K: And it’s like

M: Because, Scottish people wear skilts

?: Kilts

Interviewer: Kilts

M: Yeah kilts

Interviewer: That’s right, yeah

K: At Greece it’s hot as well and some people still wear long sleeves and long

Interviewer: I think that’s because of the sun isn’t it? To stop the sun getting to them, so they wear light

K: Yeah but you can put on some sunscreen. Usually everyone, every single day goes to the beach.

In this way the pupils independently and as a group found ways to make sense of what they had learnt, or to query some of the ways of life that they had been told about in their lessons. Solomon and Black (2008) argued that ‘the construction of knowledge is dependent on the ability to make connections, to explore, to think aloud, to be able to make errors and to be able to develop an agentive learner identity’ (p. 84). All of these issues have been raised through teachers’ and dance specialists’ efforts and pupils’ comments, in terms of exploring vocabulary and subject content through the multimodal and multisensory learning environment fostered in the LPj lessons, and their corresponding classroom lessons. Through this we can see the importance of pupils actively engaging in the knowledge they construct, elaborating and questioning ideas, in making learning meaningful to them and in allowing them to see links between new and established conceptual understanding.

6.4.3 Appropriating subject-specific discourses summary

In introducing any new topic, in any subject, there are new concepts and often new ways of talking of which pupils will not have previously been aware. Developing pupils’ speaking and
listening skills in general is a key objective within the national curriculum, and exploring new vocabulary and ideas is one way to encourage this development. We have reported here on subject learning in science, geography, history and mathematics, and how the LPi programme was adapted by the teachers and dance specialists to support localised and specific, as well as nationally-stipulated, learning objectives. This section has shown how, particularly in the classes where there were a high number of EAL pupils, teachers’ efforts to multimodally introduce subject-specific terms and concepts were very visible, and utilised a number of the elements of the LPi programme to good effect. It is possible that such efforts could be equally beneficial in working with pupils with broader language difficulties, not necessarily restricted to an issue of first language. Through this approach teachers reported that pupils’ grasp and application of subject terms was improved relative to sole use of traditional and classroom-based methods. But they also commented that the other means of exploring topic material in the LPi programme – through dance and interaction with other subject resources such as on the IWB – allowed the pupils alternative means to develop and express their subject understanding.

Equally the opportunity for pupils to add their own context to learning events, by relating new lesson material to their own experiences, appeared to facilitate a more personal and meaningful use, negotiation and understanding of new issues and ideas. This relates to the following consideration, of how interactive and active engagement with learning material can be fostered through the teacher’s orchestration of lesson resources and activities.
6.5 Interactive teaching

Before delving deeper into issues of interactive teaching, two important considerations should be raised: firstly the similarities and distinction between interactive and dialogic teaching (we will also address dialogic teaching separately in the next section); and secondly the use of ‘interactive’ within the programme title ‘LearnPhysical interactive’. Addressing the first of these issues, interactive teaching refers to where pupils’ contributions are invited and accepted, either in verbal suggestions, or physical activity with focal resources. Proponents of dialogic teaching would argue that this approach goes one step further than interactive teaching, looking at how pupils’ contributions or other sources of information (outside of the teacher’s personal knowledge or contribution) are worked with in class rather than simply inviting them (Scott, 2008). The notion in dialogic teaching is that pupil contribution leads to an extension and cumulation of the debate, rather than a closing point once a ‘correct’ or ‘appropriate’ answer has been given, or re-directed if a ‘wrong’ answer were offered. Thus successive contributions build on earlier ones, to form a coherent chain of knowledge-building.

In terms of the second issue, use of ‘interactive’ within LearnPhysical interactive, this programme is a development of a previous programme (LearnPhysical) which offered the same aim of covering a range of curricular subjects via dance and movement activities, but without access to or availability of potentially interactive technologies such as the IWB or PSP. Thus the programme title refers to the ‘physical’ aspect of learning through movement linked to curricular content, with the addition of the ‘interactive’ element of using potentially interactive technologies new to and established within the learning environment.

To return to the research base, the concept of interactive teaching, and often interactive whole class teaching, has been a recurrent theme through decades of educational discourse, research and policy. At face value it is portrayed as an approach to teaching and learning that all should aspire to, and that few would question the value of. However, digging deeper into the origins, implications and implementations of such an approach reveals a much more contested domain: the less it is defined, the more it is employed as a ‘hooray word’ (which everyone believes is good but no-one defines) by politicians whilst practitioners struggle to know how to implement it; the more that is said, and the more attempts there are to define what constitutes interactive teaching, the more it has been seemingly pulled apart for what is missing from a tightly prescriptive method.

In framework documentation for the introduction of the National Literacy Strategy by the Department for Education and Employment in 1998, the government voice on education stated that:

The most successful teaching is:

- discursive – characterised by high quality oral work;
- interactive – pupils’ contributions are encouraged, expected and extended;
- well-paced – there is a sense of urgency, driven by the need to make progress and succeed;
- confident – teachers have a clear understanding of the objectives;
- ambitious – there is optimism about and high expectations of success. (p. 8)

Thus one aspect of this ‘successful teaching’ was that it was interactive, which the DfEE defined in terms of the nature of pupil talk within the classroom. This can be related to the first point of successful teaching identified as discursive, both of which suggest a classroom vibrant with pupil input which is built on in dialogic exchanges between teacher and other
pupils. It has however been argued that these two criteria potentially conflict with the third, that ‘successful teaching’ be ‘well-paced’, with a ‘sense of urgency’ – again raising the recurrent issue of time – which more likely suggests a closing down of pupil response, than an opening up of pupil-initiated inquiry (e.g. Black, 2007; English, Hargreaves & Hislam, 2002; Hardman, Smith & Wall, 2003). How best to implement ‘interaction’ within teaching therefore is still a matter of debate.

In thinking about pupil involvement or interaction in the LP/ lesson, Fiona reflected in her VSRD session that:

Maybe you see I could have got that from them (the pupils). So I could have said, ‘what can we attach? What body parts shall we attach? You tell us. What would you like to see us do?’ Involve them a little bit more so they’re not just watching. Having said that they are, they seem quite engaged.

Such considerations highlight the similarity but not equivalence of the terms interactive teaching and dialogic teaching, where both emphasise the role of pupil input, but dialogic teaching requires that pupils’ responses and classroom exchanges be cumulative as well as extended (Alexander, 2008), building on previous activities and experiences, and not closed off once a correct answer had been found, or re-directed were a ‘wrong’ answer given. The comment by Fiona also raises the issue of the type of content being covered at any particular point, and whether the teacher sees their role as authoritative – to deliver knowledge not currently within the pupils’ awareness – or dialogic – to gather a range of views for consideration from pupils or other sources (Mortimer & Scott, 2003). In this frame both approaches could be interactive or non-interactive.

In terms of access to different potential sources of information and selecting the most appropriate classroom tool to the task, Adam in his post-interview highlighted the possible usefulness, or affordances, of the IWB:

the main thing is erm, er, using whatever, whatever the best, erm resource is at the time. Generally it’s the whiteboard because you’ve got access to the internet, you’ve got sound, you’ve got video, you’ve got pictures, films, everything. That’s why, it generally is whiteboard stuff.

6.5.1 Interactivity and the IWB

The IWB, a relatively new addition to the classroom arena, has proven equally contentious in terms of its capacity for ‘interaction’. For some, interactivity is seen as a product of the board, with researchers wary that such a perception is influenced by its name and thus assumption that any use of this tool would therefore be ‘interactive’ (Haldane, 2007). Other researchers however argue that interaction is a potential affordance of the tool whereby, as mentioned earlier, actual interactivity with and through the board are influenced by users’ perception of and subsequent use of the tool (Gillen, et al., 2007). And of course whether or not pupils ‘interact’ with the board is a further issue for teachers to consider.

Smith, Higgins, Wall and Miller (2005) differentiated between ‘technical interactivity’ and ‘pedagogic interactivity’ with the IWB. In this sense, the IWB is seen as a tool to enhance teaching through (amongst other things) technical interactivity with the board – by teacher and pupil – but also pedagogic interactivity of teacher-pupil, and pupil-pupil where the class attempt to construct meaning together and further their individual and joint understanding by expressing their ideas and explaining concepts. The authors did however state that pedagogic interactivity and social re/construction of meaning seem to be rare.
6.5.1.1 Using pupils’ work to demonstrate
One particular use of the IWB observed in the lessons (and there are others) where images taken on the PSP of group work (which had been shown to the group at the time to support their ongoing work) were displayed on the IWB at the end of the lesson, can be addressed through the terms of technical and pedagogic interactivity. This was a maths lesson from the second term of observation.

Unfortunately images cannot be shown of this sequence of events, but they can be summarised as:

1. Image shown on the IWB of group making symmetrical shape. (Image had been taken on the PSP and then shown back to the group. Image was taken by the dance specialist from above, and identified that their shape was not quite symmetrical);
2. Image shown on the IWB of group making symmetrical shape, after they saw the first image back on the PSP (again the image was taken by the dance specialist from above, and identified that they had altered shape to make sure it was symmetrical);
3. Pupil is invited to the IWB, to draw the line of symmetry through the second image.

Groups were working to make a symmetrical shape, which Deb had encouraged them to consider from above, in terms of where the line of symmetry would fall. She took the first photo on the PSP, and showed it back to the group for them to get an instant bird’s eye view of their shape. The group then modified the shape they were making, using this information, and the second picture was taken. In the lesson plenary, Deb showed the two pictures to the whole class on the IWB, and asked a pupil to draw the line of symmetry onto the projected image. Thus pedagogic interactivity by pupils was present around the initial use of the PSP images, and technical interactivity by the pupil drawing in the line of symmetry. As before, both the group’s physical shape and the image of the ‘corrected’ shape can be considered as improvable objects, in the modifications and annotations made to them. In this case, although Deb was in charge of the images being taken and projected, pupils were given time and space to physically interact with the images through the PSP and IWB.

6.5.1.2 The usual restrictions: time and pace, tendency for teacher-centred pedagogy
As mentioned earlier, there is a suggestion that in many cases the IWB in the classroom has served to reinforce a teacher-centred pedagogy. This seems particularly the case with younger pupils, related to concerns about the time taken for pupils to carry out any physical interactions with the board, as in the quotation by Adam from his post-interview:

I think when you first came in I was using the whiteboard a lot more and erm, revealing things and getting them to remember things, erm, moving things about myself. But as time went on then I started to let them move things about as well. Er it’s just that sometimes, when they’re this young down, it takes a while for them to come up and choose and then, move it and, you know time’s always a factor (laughs). So, as long as they get it I don’t mind quickly moving it. That was why I was usually doing it but. Actually I find like, especially for some of the lowers, you know it really helps them to, stop, think about it, and then move something across themselves. And then assess themselves ‘have I got it right?’ And it really helps. Erm, so I would like to incorporate more of that in my teaching.

Adam weighs up the potential time costs with the potential benefits of pupil interaction with the IWB, and how an actual slowing of lesson pace to allow time for pupil interaction with content through the physical or technical display may help to consolidate their learning by the act of doing it themselves.
Particularly with the school’s focus on language, encouraging them to write directly onto the IWB is another way of allowing them to practice their writing. Reflecting in his VSRD session, at a point where he had initially started to fill in the blanks from the IWB screen (see figure 17) himself but stopped when a pupil asked if they could do so:

Adam: I should have erm, got them to write it in the first place. I don’t know, only when they said ‘can I write it?’ did I think ‘oh yeah of course, that’s an even better idea, why didn’t I think of that?’.

Figure 17: Pupils having filled in blanks in prepared sentences on IWB slide

In the above figure, the pupil has written where the Great Fire started, in Pudding Lane, but has not spelt it correctly. The point of pupils feeling safe to try out their spelling at the public space of the IWB is important here, and recognised by Adam as he says to the class: ‘It’s OK, she’s sounding it out’. While Adam acknowledged that correct spelling is important, at this point it was considered more important for the pupils to feel confident to have a go for themselves. Thus the pupil’s technical interactivity with the IWB served to facilitate the pedagogic interactivity with the subject content and writing practice. It also identified for Adam the pupil’s level of subject understanding and linguistic competence.

Pupil height was a further restriction to pupil use, particularly in the hall, and particularly for the youngest (Y2) pupils. A bench was a possible solution, but teachers would have to question if this would actually raise the need for risk assessment, and health and safety concerns. If no bench can be used this further confounds teachers’ attempts to offer fairness of pupils using the IWB as only the taller pupils would be able to do certain tasks. Pupils commented on this in their focus group:

(School 1 focus group) N: And when people are small like (O’s name) and (pupil’s name)

O: I’m not small

N: they, he (Adam) gets a chair, erm, and the people who are, too little, they get on the chair.

A similar point was made later in the same focus group, though the specific response was not anticipated by the interviewer:
Interviewer: Was there anything that you did with the whiteboard, interactive whiteboard in the hall, in the dance lessons that you don’t normally do in class?

?: Erm, we had to stretch up higher... and we couldn’t reach so (Adam) had to, tell the other people which was high, erm, to put them up.

Whilst this is a largely practical issue, and one that is perhaps less pertinent with older year groups, it is a very real consideration for some teachers when thinking how best to make use of the available tools. Other issues raised however focused on positive elements that the teachers’ and dance specialists’ use of the IWB had added to their lessons, such as how planned IWB resources can allow a strong base from which to explore pupils’ responses.

6.5.1.3 The usual scope: prepared resources free the teacher to be more spontaneous

We saw in focus group comments earlier how powerful and lasting an impact two particular photographs shown on the IWB had on the pupils’ learning and memory of topic material (of balancing baskets on heads, and of the cycle rickshaw). Deb in her post-interview commented on the work done around some of the photographs displayed on the IWB, but also suggested how pupils’ writing around images could have offered further benefits:

It was really good for photos and pictures, cos there were so many, especially the clothes and food, and landscapes and things like that. That was really important because you, however you describe it, it’s so much better when you have a picture. So that was lovely. And (Clare) had been to India, had been to Rajasthan, and so had pictures she’d taken, and so it was very personal. She talked about what the pictures were about and that was really lovely. Erm, that worked really well. Erm, we did a few things, looking at key vocabulary, like erm, people’s jobs and things, looking at farmers, I remember we were talking about farmers and, sort of moving words to fit sentences. I remember we did that once and that worked quite well. And I would have liked to have done more of that rather than just using it for images. Cos then the children can really make decisions about words and where they should fit, and that would be good for their literacy as well.

Figure 18: Pupil filling in blank left on prepared IWB slide

Thus the issue of pupils’ literacy particularly at two of the three schools acted as an obstacle, but perhaps also an incentive to encouraging their physical interaction with the IWB. Perhaps writing onto the IWB cannot be considered a particularly innovative use of the tool,
but in many cases it served to further and model pupils’ writing practice, which was no small concern for these two schools.

6.5.1.4 Unexpected restrictions: literacy, and school focus on language

Pupils’ literacy was a potential barrier to them writing on the IWB, particularly at school 1. But provision of the IWB provided an opportunity in the ability to focus much language learning around the use of images and video:

(School 1 focus group) P: In health and growth, er we was erm, we was erm, we played a game, erm, on the interactive whiteboard, and erm, and we had to put the foods in the right places.

Notably in this class with the focus on language as well as them being the youngest class of the three schools observed, images on the IWB were a key resource in introducing and learning about the topics. Key points on the images could then be pointed out or annotated, to align the edited image with the narrative around its relation to the topic. Key words could also be highlighted to show their importance to the learning material (as in Clare and Deb’s lesson from school 2, illustrated in figure 19 below), to introduce and consolidate their place within pupils’ developing subject discourse, and to introduce the focus for a lesson.

Figure 19: Highlighting and adding terms to prepared IWB slide

Figure 20: Drawing lines to show differences between past and present images of London

In her VSRD session, Beth commented on how she spontaneously modified her image (figure 20 above) by drawing lines to direct pupils’ attention to the differences in the pictures, in response to pupils’ comments, and to focus their attention on the points relevant to why the Great Fire spread:

B: I was trying to fish for information about, kind of the, width of the streets, and, erm, how close together the houses but they weren’t necessarily coming up with
that because they were talking about black and white versus colour and the drawing versus the picture. But I think, yeah, we could draw on it, very, very helpful, which I wouldn’t have been able to do without having the whiteboard.

I: Had you planned to do that?

B: I hadn’t planned to do that no, but it was to help them understand.

The IWB here was used in both a planned and unplanned way, with an open style of pupil response to the initial image leading to a funnelling, or scaffolding, of features to attend to. In this sense the approach was interactive but still predominantly authoritative, to use Mortimer and Scott’s term. Given that new material was being introduced, in terms of why it mattered that buildings at the time had been so close together, it is perhaps not surprising that such an approach was chosen. Indeed Mortimer and Scott argued that all approaches (on the two continua of interactive:non-interactive, and dialogic:authoritative) are valid when used appropriately to the teaching and learning aims.

6.5.2 Unexpected scope: small class, open forum style of call and response

Particularly within this class (at school 1), which had a relatively small number of pupils (20), and in attempts to encourage all pupils to verbally contribute wherever possible, the teacher often recapped key points about the topic by a quick fire question and answer activity. This was mimicked in the focus group, in that all pupils when prompted could remember key dates and names. It could be argued that such learning was not embedded by this activity, and simply rote learnt without understanding of how isolated facts fit within the wider context of the historical event. However, their following contributions, in jointly re-construction of some of their common knowledge about the Great Fire, evidence their grasp of how the topic material learnt over a series of eight lessons could be linked together. We also refer back to Alexander’s emphasis on the use of ‘repetition’, as one teaching and learning tool:

(School 1 focus group) Interviewer: Erm, can you remember anything else that you liked doing, about those two topics? (pause) Can you remember when the fire started?

Group: Yeah

Interviewer: When was that?

Group: 1666

Interviewer: Very good. And who wrote the diary?

Group: Samuel Pepys

Interviewer: Very good. Can you remember anything else? Any of the other things you learnt?

P: The fire

?: Yeah someone buried his cheese

(Group laugh)

?: Someone, Samuel he buried his cheese

?: because they don’t want it to go on fire

?: It started from the Kings Bakery in Pudding Lane.
Hargreaves et al. (2003) offered a distinction between surface and deep interactivity. They suggested that many teachers focused on ‘surface’ features of interaction, evidenced in their comparative study by the rise in questions posed relative to statements made to pupils (from 1:1 in 1996 to 5:1 in 2000 – KS1 literacy). They found that instances of ‘deep’ interactivity, such as through extended pupil contribution, were however rare.

6.5.3 Interactive teaching summary

A much-debated but popular term in educational discourse and policy, interactive teaching is used here to refer to where pupils’ contributions are invited and accepted, either in verbal suggestions, or physical activity with focal resources. Within LPi, ‘interactive’ also refers to the potential for physical interaction with technologies including the IWB and PSP, by the teacher and pupils. It is noted in the literature that recommendations and attempts at encouraging interaction or interactive teaching can often be in apparent competition with other recommendations that lessons maintain ‘pace’, and this was certainly an issue the teachers and dance specialists faced. Some teachers addressed this by encouraging pupil interaction with images taken by the pupils, to allow the pupils more time to engage with the content while the teacher managed the practical issue of taking a photograph. Equally other teachers found that an occasional and appropriately-supported slowing of pace to allow pupils to add their contributions to an IWB slide, rather than the teacher writing for them, facilitated pupils in thinking about concepts and having confidence to know that their contribution is valued. Such an approach also supported pupils’ growing linguistic confidence and competence, which was a key issue at two of the three schools. Teachers employed a mix of offering information - posing as a source of authority - and gathering pupils views in a more interactive and dialogic manner – sometimes positioning themselves as having made an error for pupils to be in a place to correct. It was clear how use of focal images prepared and presented such as on the IWB could fuel pupils’ imagination and discussion, and also be used as a prompt for the teacher to modify or add detail as need arose.

Reflecting on the distinction between surface and deep interactivity could be very useful to teachers and researchers, and Burns & Myhill (2004) highlighted ‘the need to examine more closely what goes under the name of interaction in whole class settings’ (p. 36). In light of this consideration, and points raised earlier, it is appropriate now to address the notion of dialogic teaching and where aspects of this approach were evident in the collected data.
6.6 Dialogic teaching: talk as historical and dynamic

Alexander (2008) stated that ‘it is the qualities of extension and cumulation which transform classroom talk from the familiar closed question/answer/feedback routine into purposeful and productive dialogue where questions, answers and feedback progressively build into coherent and expanding chains of enquiry and understanding’ (p. 26). In dialogic teaching, Alexander explained how:

questions are structured so as to provoke thoughtful answers... answers provoke further questions and are seen as the building blocks of dialogue rather than its terminal point; individual teacher-pupil and pupil-pupil exchanges are chained into coherent lines of enquiry rather than left stranded and disconnected (p. 42).

6.6.1 Dialogue and pupil involvement

With this in mind, in the second half of the first term there seemed to be more pupil use of the IWB (notably in Adam’s and Clare’s class), and more ‘open’ use without teachers checking what pupils would write before asking them to write it. Where this occurred, teachers were keen to encourage the pupils to have a go, and not worry about correct spelling (as shown above). Teachers were also noticing and correcting their own (accidental or deliberate) mistakes on their prepared IWB slides – Clare crossed out and handwrote above a typed (unintended) mistake, while Adam used the keyboard on the connected PC to type in the correct word or moved images directly on the IWB into the right places (deliberate mistake to check pupils’ knowledge and attention – see figures 21 and 22 below). As Alexander also noted, dialogic teaching ‘challenges us to re-assess attendant notions of time and pace’ (2008, p. 23), whereby sometimes slowing the pace of a lesson can offer more realisable and lasting benefits than moving quickly through a larger quantity of material.

Figure 21: Images deliberately mismatched to headings (Health & Growth, in classroom)

Figure 22: Images deliberately mismatched to headings (Great Fire of London, in hall)

Allowing pupils space to give contributions and build on each other’s suggestions was noted by Emily in her post-interview, and how such an opportunity enabled them to contextualise the new material in their explanations:

I think they’ve started to learn the vocabulary to use to evaluate each other’s work, and make a positive and negative, constructive negative comment, and sort of, and furthering their, some of them were able to explain why they thought something,
rather than just ‘oh it’s nice’ they were able to go why, what particular thing. And some of them were even using, the movement vocabulary, like going into a bridge, forward roll, that kind of thing.

Such an activity could potentially also be informative for the teacher, viewing how pupils explain their reasoning or use subject terminology. While such fora can be sites to reveal misunderstandings, again teachers must be mindful in such situations that pupils need to feel safe to share their ideas or opinions, and that fear of error is not a deterrent to participation.

6.6.2 Team teaching as dialogue

Just as dialogue between teacher and pupils, or between pupils (pedagogic interactivity) may be beneficial to pupils, Gary in his post-interview commented how he and Fiona had used the team teaching relationship to model subject and dance understanding:

G: I know the class really well, she knows, where to go, I know what needs to be taught, and it kind of just, we kind of used each other’s strengths. And that worked really well. I think it was that kind of, they could see, (Fiona) was the dance specialist and everything there. They knew that the science, I knew the science, and it was good that we did kind of, we did swap, cos (Fiona) was starting to do a lot about science and I started doing the erm, the dance. And the children saw that, that actually, you can do both. And even though they knew that we, one knew more than the other, cos they would know that (Fiona) would do the dance better and the other way I science better than (Fiona), yet they would erm, they would look at giving that level of respect to, it didn’t matter which was which.

We showed earlier how Gary and Fiona used the relationship to model errors in understanding, in making coffee and bread. Used within the lesson in this way, we can see how Gary was building his repertoire and confidence in the LPi lessons, in using the dance terminology and approach to subject material. We reported a similar comment earlier from Adam through his team planning and teaching with Beth, in developing his confidence to continue planning and teaching the LPi lessons. Thus the aim of the LPi programme in terms of CPD for teachers required effective dialogue between teachers and dance specialists both in planning the lessons and in the lessons themselves.

6.6.3 Dialogic teaching summary

Proponents of dialogic teaching would argue that this approach goes one step further than interactive teaching, looking at how pupils’ contributions are worked with in class. The notion here is that pupil contribution leads to an extension and cumulation of the debate, rather than a closing point once a ‘correct’ or ‘appropriate’ answer has been given, or redirected if a ‘wrong’ answer were offered. As well as more traditionally noted in pupils’ talk, this was also evident as the observed lessons progressed, where pupils were allowed more opportunity to interact with resources, modify or add their contributions to IWB slides, capture and view images and video on the PSPs. This shift toward more pupil contribution and in more forms was made possible as teachers and pupils became comfortable both with these tools for teaching and learning, and in knowing they were only using them where they enhanced the activity and learning potential. Teachers’ increased confidence was also facilitated by effective dialogue with the dance specialist with whom they collaborated, reinforcing the importance of the CPD element of the LPi programme.
7. Final comments

7.1 Practical issues

All three teachers reported a series of positive outcomes from engaging with the LP/i lessons and programme. They felt they were well supported by the dance specialist with whom they collaborated. Time was a key issue for them regarding how to incorporate the LP/i lesson within their timetable (as a PE lesson, a subject lesson, or a replacement lesson), as well as time needed for planning these different types of lessons. Mostly the teachers felt this was a worthwhile investment, for the benefits the programme offered for their pupils’ learning.

Managing and meeting the needs of pupils with a range of ability levels was addressed in different ways: i.e. to push the most able (Emily) or to model and practice contextualised activity in a safe environment (Adam).

Physical exploration of material was considered a useful way of revealing levels of understanding and targeting extra help (Adam and to an extent Emily). In light of this, some teachers were beginning to use more physical activities in other lessons, as a means to render visible who had understood a concept, and who was in need of extra support.

Where English was not the first language for a number of pupils in the school, language and literacy teaching became particular foci of the school, and this was evident in the way content was presented and worked with. This meant key vocabulary were emphasised, repeated and explored in different ways, and personal experience was drawn on where possible to contextualise and make learning meaningful. This strategy encouraged inclusion and acceptance of the varied skills pupils can bring to the classroom. The teachers felt that the physical exploration of content, and the power of displaying and working with visual resources in the whole class arena, via the IWB, offered an effective means of supporting the development of linguistic and subject knowledge. It is possible that such an approach could be equally effective in supporting pupils with a broader range of language difficulties, and not limited to those learning English as a second language. In this context a multimodal or multisensory teaching and learning environment is proposed as especially important, in offering other avenues and entry points into linguistic competence and grasp of subject terms and understandings. Through this approach, new words and concepts are learnt in a meaningful and accessible context.

7.2 Technical issues

Use of the IWB was something that the dance specialists reportedly came to feel more at ease with through the course of the programme lessons, in this sense often learning from the subject teachers. The IWB was an addition to the previous incarnation of LearnPhysical, and so this was a relatively new tool for them. In this respect there was a levelling and sharing of expertise: between the dance specialist’s knowledge of dance terminology and how to use movement in a cross-curricular frame; and the teacher’s knowledge of the specific curricular area and the predominantly classroom technology of the IWB. Equally the addition of the PSP offered an opportunity for the pupils also to be experts, with many of them having previous experience of similar devices.
June 2010

The IWB and PSPs were seen and used by the teachers in different ways and for different reasons. As the eight week period progressed teachers and dance specialists were sharing IWB resources, in cross-referencing activities and learning materials in the classroom and hall-based lessons. There was also more pupil use of the IWB (notably by Adam and Clare, but this was encouraged by all teachers and dance specialists by the end of the eight weeks), and more ‘open’ use without teachers checking what pupils would write before asking them to write it. Where this occurred, practitioners were keen to encourage the pupils to have a go.

Functionalities of the IWBs being used included:

- Prepared information and pictures on slides – to prompt and give information or instructions;
- Screen or block reveal – with hidden information revealed by teacher or pupils;
- Playing video;
- Writing and highlighting onto slides / annotating pictures (over time there was more pupil writing, as well as teacher writing onto slides);
- Moving things to correct places on prepared slides (teachers and pupils);
- Playing games or simulations from external sources (teachers and pupils);
- Re-sizing images to fit the screen, or temporarily to focus on key points.

Cited benefits of the IWB in the teachers’ practice included:

- Discussing and amending any mistakes, in the children’s responses and in the teachers’ prepared slides;
- Structuring the lesson;
- Moving forward and back through the slides as necessary – this was felt to offer the ability to keep lessons ‘pacy’ (management issue sometimes of maintaining ‘pace’ during pupil input with the IWB);
- Revisiting material from previous lessons as a starter to subsequent lessons;
- Exploiting high visual content that can be prepared and presented easily and quickly;
- Accessing online content;
- Accessing video files.

The issue of how any tool is perceived – in terms of what someone thinks it can do or they can do with it – and how the IWB was used in practice, became apparent during the analysis phase of the evaluation. Examples within the data of spontaneous modification of the resource on the IWB demonstrate the teacher appreciating and harnessing this affordance of the IWB, whilst also incorporating a form of pupil participation in using pictures of them on the IWB to demonstrate key points. In pursuing the multisensory and participative aims of the LPi programme overall, such practice evidences the cross-curricular use of the dance activity, combined with the PSP to take images and IWB to show them back, and in doing so drawing out the subject concepts by annotating the captured image as a cumulative and improvable object.
Difficulties that teachers and dance specialists found in using the IWB and PSPs included:

- The height of small children (particularly in the year 2 class) restricted pupil use as they could not reach all of the board;
- Grasp of language, vocabulary and spelling also added a potential level of difficulty if pupils were writing on the IWB;
- Speed of children’s writing slowed down the lesson since it took more time for pupils to use the IWB than the teacher;
- There were issues of fairness as to who gets to use the IWB, and how to select pupils.

Adam commented on weighing up the potential time costs with the potential benefits of pupil interaction with the IWB, and how an actual slowing of lesson pace to allow time for pupil interaction with content through the physical or technical display may help to consolidate their learning through the act of doing it themselves. Deb also balanced the potential time costs of pupil use of the PSPs with the potential benefits for their social skills by working in groups and negotiating shared use of a tool.

Again considering the issue of a tool’s affordances, all teachers reported positively on the use of the PSPs, and ability to show back pupils’ work. However, a further issue of affordance was evident in terms of whether the PSPs were seen by pupils as a device to play with, or with which to record learning activities. Consideration should perhaps be given to how each tool is introduced, as it is highly plausible that some of the pupils were distracted from this device’s learning potential by knowledge of its gaming potential.

All of the teachers and dance specialists in some way wrestled with how best to use the PSPs, and particularly how any pupil involvement with the devices and/or images taken on them could be orchestrated. They found that if they gave the actual device to pupils to use, they did not know how the pupils would use it. Equally they could not know what pictures they would get back if they put the images or videos up on the IWB, particularly if showing to the whole class in the same lesson. They therefore had to balance how much freedom to give the pupils with the technology, with obtaining a product that could be used to pedagogical effect later in the lesson or subsequent lessons. Some teachers found the most effective use was for them to manage and control capturing images and video. This then allowed more time for pupils to work with the ‘filtered’ resources – the images of themselves taken by their teacher. It is inevitable that different approaches and uses of each tool are more or less appropriate with different classes and teachers, and the time taken to explore alternatives resulted in more successful and embedded use. Teacher enthusiasm to engage with the programme was generally more important in its successful application and reception by the pupils, than teacher confidence with the tools or with dance vocabulary and practice. It also tended to facilitate a more effective relationship with the dance specialist with whom they worked to prepare and deliver lessons.
7.3 Adopting the programme

One measure of the success of any programme is the extent and enthusiasm with which teachers aim to incorporate elements within their ongoing teaching and learning practices. For instance:

- After the first term of LPi lessons, Adam was starting to use pictures and videos of class work, to evidence assessment;
- Adam was running a series of maths lessons using kinaesthetic teaching and learning activities;
- In the classroom Gary was using pictures printed from the images taken on the PSPs, for pupils to stick in their books and annotate as appropriate for the subject content;
- Gary was also embracing the realisation that he did not always have to do ‘book work’ to evidence learning, but that pupils’ physical exploration and verbal discussion of learning concepts could be sufficient rather than simply a precursor to a more formal learning output;
- Clare had found the experience from LPi of using photographs of the pupils in her lesson material so positive that she had invested in a class digital camera, to use images more with the IWB. This had just arrived as the Spring term LPi lessons came to an end.

7.4 The model of LPi

One of the stated aims of LPi was that it adopted a cross-curricular approach, utilising dance and movement as a different entry into learning a range of subject material, and through this gaining awareness of dance terminology and building confidence in creative exploration of movement. This resonates with recommendations from the influential Rose Review on the reform of the national curriculum. The teachers in this LPi evaluation study had a general feeling that the exploration of vocabulary across the lessons helped to embed learning and enhance pupils’ understanding. (In focus groups eight weeks after the lessons, pupils could still remember a good number of the key terms, and more importantly how to use them.)

Teachers also reported that the physical nature of much of the work in the LPi lessons encouraged those pupils to participate and feel safe in their participation, who were perhaps more shy about contributing in a traditional, language-dominated lesson. Teachers and dance specialists frequently used and built upon the same resources or activities in consecutive lessons, across the hall and classroom learning environments, to show continuity of content and support cumulation of understanding about the subject and dance material. In particular, using resources across the two learning environments, such as the initial IWB slides, Adam felt helped the pupils see the link between the two types of lessons. Thus the resources were used to offer context in which to build new and build on current, common knowledge. Particularly in schools where language is an issue, such resources can be invaluable in quickly re-orienting key ideas.

Just as the teachers tend to be the introducers of new subject terms, trying to find ways of making them meaningful to pupils, what pupils can bring to lessons from their own personal experiences proved to be particularly influential within one of the three class’s topics. In this sense, we can see the importance of pupils actively engaging in the knowledge they
construct, elaborating and questioning ideas, in making learning meaningful to them and in allowing them to see links between new and established conceptual understanding. Whilst teachers cannot always prepare for or predict such pupil contributions, a more dialogic approach to topic material allows for following up on any instances where this does occur, and can facilitate a deeper understanding due to the pupils having made the links themselves.

An ‘assault on all of the senses’ (Clare) was seen as a positive way of introducing and consolidating material. This was supported by Adam’s reference to the various modalities of class tasks to explore the key concepts. In using the analytical concept of a meaning-making trajectory, we can consider in the data how pupils worked with and appropriated subject understanding, through their interactions with cumulative (improvable objects) and consistent resources and activities across lessons, and use of complementary and matched resources within lessons. This was often supported by:

- repeated and contextualised use of new terms - through pupils saying the words, saying the words in sentences or explaining them in their own words;
- labelling diagrams and identifying the terms/places on maps or diagrams;
- dance interpretation;
- evaluation of other pupils’ dance phrases from activity or captured activity on the PSP/shown on the IWB.

Overall, the programme proved effective in the three schools in different ways and for different reasons, including:

- Using non-verbal activity and resources as a means to support general understanding as well as linguistic comprehension of concepts, and identify points of misunderstanding, was valued in all schools but particularly where language and literacy were of concern.
- Teachers’ enthusiastic engagement with the programme was more important than experience of teaching dance, or using dance vocabulary.
- It was not necessary to use all elements of the LPi programme in every lesson, and exploration of how best to apply the various tools and practices, as well as issues of pupil usage, tended to result in their more successful application and reception.
- Building an effective dialogue and relationship between teacher and dance specialist enabled the potential time pressures of engaging in a new enterprise to be lessened. Having established this relationship teachers more quickly understood the aims of LPi and were able to adapt it within, and expand their own teaching practice and curricular aims. This increased confidence in turn facilitated the teachers to see how the multimodal and participative model could be adapted to suit a range of topics, and reinforces the importance again of the CPD element of the programme.
8. Recommendations

8.1 Practical and technical issues

- Practitioners should carefully consider which LPi elements are to be used in a lesson, and how they are used as a whole to provide an integrated learning environment.

One of the key resources teachers and dance specialists felt short on was time. This affected, and was also perhaps hindered by, their efforts to include the various elements of the LPi package: using dance content, using subject content, using an IWB and PSP among other resources. With this in mind, and for other reasons cited in this report, at the start of the eight weeks of lessons pupil use of the IWB and PSP tended to be both rare and restricted. This did change as the lessons progressed and teachers and dance specialists felt confident to incorporate different LPi elements in different lessons, such as not using the PSPs in every lesson.

- Teachers and dance specialists should reflect on how to make best use of the LPi elements, as appropriate to individual lesson aims.

Where PSPs were used, their use through the course of the series of lessons appeared to become more embedded as a natural part of the lesson, and pupils themselves were developing their skills to record and review images and videos taken. Equally in terms of the IWB, teachers appeared to be encouraging pupils to use it more as a public arena to try their ideas, mostly within pre-planned activities, rather than as a space to write a response once it had been approved as 'correct'. Teachers and dance specialists may find it useful to consider how they perceive the value of the IWB and PSP, and particularly the value of pupil use of these tools. In practical terms this would then facilitate a consideration of how any perceived value of tools and types of use is likely to affect the opportunities they plan or spontaneously offer.

- Consideration needs to be given to how best to use images and videos taken on the PSPs to support learning objectives.

Again time seemed to be a key issue in terms of teachers and dance specialists feeling they were not making substantial use of the images and videos recorded. This was raised regarding time in class to review them, and time for the teacher/dance specialist to pick images for the class to talk about from the set taken by the whole group. This raises the issue of how to move effectively between performance and appreciation, both in terms of dance and subject knowledge and evaluation. Towards the end of the second term, teachers and dance specialists were starting to incorporate images within their next lesson’s prepared slides. For instant feedback, some found it more successful to take photographs themselves, and show the captured images straight back to pupils on the small screen of the PSP. Having the photographs in an easily and quickly usable format was therefore important in this instance. When displaying images on the IWB, practitioners were beginning to annotate them to highlight key features, or encourage pupils to do so, but other ways to work with the images could perhaps be explored. Consideration should also be given to how each tool is introduced, as it is highly plausible that some of the pupils were distracted from the PSP’s learning potential by knowledge of its gaming potential.
Consideration needs to be given to how IWB and PSP files are shared by teachers and dance specialists, due to file sizes.

In practical terms an issue was raised regarding sharing of resources to support team teaching. It was mentioned that for embedded use of the PSP images, such as within the next lesson’s planned resources or for use in other classes, the large file size of the images meant that the files need sharing immediately after the lesson due to them being too big to email. This small issue could make a big difference in a sense of lessons feeling streamlined and connected, where team planning is orchestrated remotely.

8.2 Teachers’ confidence, and CPD

Teachers and dance specialists need to negotiate how best to co-ordinate lesson planning and preparation, and what their aims are for the programme overall and each lesson individually.

The teachers appreciated the support of the dance specialists, but time was always a concern for them: in planning, and fitting in the various programme elements within the lesson, as well as timetabling the lessons. Teachers agreed that the level of support from the dance specialists inside and extra to the lessons helped them to feel confident in working within the LPi approach. Indeed one of the teachers (Adam) took on this supportive, ‘dance specialist’ role in working with another teacher at his school in the Summer term, after two terms of working within this supportive relationship himself, to embed LPi further in the school. As with any element of team teaching, effective dialogue is needed to establish a working relationship that is positive for both teacher and dance specialist, in maximising the strengths each have to offer, within the available time and space in the curriculum.

8.3 The model of LPi

Further analysis is needed to explore in more detail how pupils adopted and adapted the learning resources and activities.

Whilst planned and often projected lesson resources can offer a visible marker of teachers’ intended learning outcomes, a more detailed analysis of pupil interactions with each other and with learning materials might reveal which resources and activities worked particularly well or less well in achieving intended or unanticipated learning gains.

Programme developers should consider whether LPi is marketed as a programme to teach dance, or to use dance to teach other subjects.

In promoting the model of LPi more widely, consideration should be given to whether it is viewed as a means of covering the dance curriculum or using dance to cover a range of curricular areas, and how this is communicated to participating or interested teachers. This should enable teachers to optimise the benefits of the approach, and also facilitate a clear working relationship based on mutual goals between the teacher and dance specialist. Equally, the potential success of LPi in being embraced by schools partly rests on it being viewed as an integrated rather than additional element of the timetable and curriculum. For instance within the context of this evaluation, the model was accepted and applied for two terms in two schools who used it to support other curricular areas. It was also successfully adopted in one school who used it to support dance teaching – it therefore had a limited lifespan to the extent that dance is one part of the PE curriculum and so not generally...
covered explicitly for the whole year at this stage, but it was still an effective approach for covering the dance curriculum.

- Consideration needs to be given to how LPi can be tailored to specific school needs

One option to reduce the concern over incorporating the various elements of the LPi programme would be to offer an action research style approach with partner schools, and encourage them to select a particular feature of the programme to try with a topic and class. This could develop to incorporate further elements as confidence increases, within the CPD model of the existing programme.

Alternatively schools may like to use the programme to address a particular concern. Teachers may wish to work with dance specialists to employ the multisensory and participatory programme as suitable to the specific needs of the teacher and pupils (such as in supporting EAL pupils, or in teaching subjects that are deemed particularly difficult via traditional methods).

- Programme developers may wish to consider whether an INSET or workshop for potential teachers might offer a valuable impetus for an action research approach to using the programme

This may enable the broad aims and scope of the programme to be introduced, and for teachers to consider how they could employ the model or aspects of it within the context of their school, class, and curricular aims.

- Programme developers may wish to consider making generic LPi lesson plans available, for teachers to customise and apply with their own class, and so reduce planning time and make the resources available to a wider audience

An alternative consideration, and one which would require more work as preparation but potentially less involvement in teaching, was a suggestion from Emily that generic LPi lesson plans available as a resource would be a useful way to make the approach accessible by more practitioners, and reduce planning time by having to re-create a lesson afresh. The argument was made that the core curricular units are the same for all schools within each year group, whereby a generic resource could be made to cover the subject criteria, using dance and interactive technologies as a vehicle, and then be tailored where necessary by each teacher. This may or may not be a route the programme developers wish to consider in thinking about the wider future of LPi, and may alter how the CPD element is supported.

- Consideration needs to be given to how to disseminate the LPi model and findings of this evaluation

As above, the programme developers may find it a useful activity to produce more generic LPi lesson plans, for wider use and customisation at the point of use. They may also wish to consider whether they would prefer to work more closely with teachers to encourage the teachers themselves to become dance specialists for their colleagues (as Adam is doing), or whether they wish to work with more teachers perhaps for less time, to enable direct contact with dance specialists for as many teachers as possible. Contacts in local authorities may offer inroads with more schools, and widen general awareness of the programme. Maintaining dialogue with teachers and headteachers may offer more timetabled and
embedded use of the programme at the point of contact with pupils. Therefore where and with whom to focus ‘buy in’ is an issue to consider.

- Programme developers may wish to consider approaching teacher training institutions, to allow contact with a large number of qualifying professionals as they form their pedagogical practices.

Again this would depend on what scale programme developers wish and have capacity to work with other professionals and training practitioners.
9. References


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10. Notes

1. Mortimer and Scott identified two continua of teacher talk, to form four main communicative approaches.

| Authoritative, non-interactive | Dialogic, non-interactive |
| Authoritative, interactive    | Dialogic, interactive     |

Figure 23: Mortimer & Scott (2003). Four types of communicative approach