ESRC Impact Acceleration Account (IAA) Pilot Programme
Final report

Using a research-informed professional development workshop programme to impact on the quality of classroom dialogue using the interactive whiteboard

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ABSTRACT

This project used a research-informed professional development workshop programme to impact on the quality of classroom dialogue using the interactive whiteboard (IWB). It aimed to develop more interactive uses of the IWB in order to support a dialogic approach to teaching and learning through active participation of students, collaborative knowledge building and learning through enquiry and evaluating ideas. Ten professional development workshops based on video-stimulated discussions of practices were developed and delivered within five school clusters. Participants involved 80 teachers from 14 schools ranging from infant to secondary schools and across the public and private education sectors. Data was collected through 70 surveys, 16 semi-structured interviews with teachers and ambassadors, 40 teachers' posters created during workshop activities and a portfolio of dialogic classroom practices with the IWB solicited from teacher participants. Findings strongly support the potential of this professional development workshop model to impact on teachers' understanding of classroom dialogue and use of approaches to support it, as well as confirming the potential of the IWB as a tool to support dialogic teaching.

Key words: classroom dialogue, dialogic teaching, interactive whiteboard, professional development

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INTRODUCTION

In many UK schools, interactive whiteboards (IWBs) have almost completely replaced other classroom equipment such as ordinary whiteboards. Indeed, the UK is the most prominent investor globally in IWBs, with penetration into 85% classrooms (Futuresource, 2013). Researchers report that many teachers consider IWBs to be a valuable teaching resource (Rudd, 2007; Smith, Hardman & Higgins, 2006; Moss, Jewitt, Levačić, Armstrong, Cardini, & Castle, 2007; Warwick & Kershner, 2008). Meanwhile, the rhetoric of national and local UK government agencies, of all political persuasions, has been one of pedagogical 'transformation' through the use of Information and Communications Technology (ICT). There has been an expectation, in political circles at least, in other countries as well as the UK, that the classroom use of IWBs by teachers would be a driver for such change. Yet the nature of the change required is rarely made clear and assumptions about 'transforming pedagogy' have not been supported by subsequent research (e.g. Moss et al., 2007). In addition, some researchers adopt a rather deterministic stance in which technical fluency with devices such as the IWB is assumed to be the key precursor to pedagogical change (Glover & Miller, 2009).

Thus, there appears to be a 'deficit model' of classroom pedagogy operating, whereby teachers are not considered competent unless they have substantial technological skills, and those that have these skills are conversely assumed to have a secure pedagogy. Yet the relationship between technology and pedagogy is more subtle than this characterisation implies. In a large-scale study, Lewin, Scrimshaw, Somekh & Haldane (2009) suggest that there was at least a reciprocal relationship between teachers' pre-existing pedagogies, their understanding of IWB functionality and their implementation of a wider range of teaching strategies. So it seems that the tools teachers use will influence the ways they teach, but that the use of tools is often predicated on their existing pedagogical approaches. It is the teacher, rather than the tool, that has the agency; thus a hand-in-hand development of technical and pedagogical knowledge and skills seems necessary.

A sociocultural perspective highlights the significance of mediating tools (or 'mediating artefacts') and technologies in the social processes of learning (Säljö, 1999; Wertsch, Tulviste, & Hagstrom, 1993). This perspective emphasises the role of language as the prime cultural tool, whilst also in more recent years offering valuable insights into the use of computer-based technology (for example, Crook, 2007; Wegerif & Dawes, 2004). Advocates of dialogic approaches to classroom interaction maintain that classroom talk is 'central to the meaning making process and thus central to learning' (Mortimer & Scott, 2003, p3), and studies indicate that a 'dialogic pedagogy' (Alexander, 2008) stimulates development of reasoning skills and learning gains in mathematics and science and other subjects (Mercer, Dawes, Wegerif & Sams, 2004; Rojas-Drummond, Littleton, Hernández & Zúniga, 2010). Such pedagogy requires teachers and learners to actively comment and build on each other's ideas, posing questions and constructing shared interpretations and new knowledge. It involves teachers in open-ended higher order questioning, feeding in ideas, reflecting and interpreting, and thereby helping learners to link 'everyday' and 'educated' discourse. It encourages pupils to articulate and justify their own points of view; appreciate and respond to others' ideas; and take extended turns in whole-class and group interactions (Mercer & Littleton, 2007). And, as we have stated above, when teachers encourage the more active discursive involvement of pupils, through drawing them into more extended and thought-provoking question and answer exchanges, this is associated with improved learning outcomes (Rojas-Drummond & Mercer, 2004). A systematic review of research conducted during the 40 years up to 2011 (Howe & Abedin, 2013) likewise found positive associations between extended and cumulative responses, competing viewpoints and gradual resolution in talk during group work, and eventual student learning. However the studies relating dialogue to learning outcomes were mainly concerned with small-group interaction amongst students, rather than whole class teaching, where there is little evidence to date. Moreover, 'in many classrooms most of the dialogue appears to occur more by accident than in a deliberate, conscious manner' (Smardon & Bewley 2007, p.2).

There seem to be a possibility that the 'technical interactivity' of the IWB (Smith, Higgins, Wall & Miller, 2005; Beauchamp & Parkinson, 2005) may be used to contribute to 'dialogic interactivity' in the classroom, thus making classroom talk more productive for learning. The IWB affordances of provisionality,
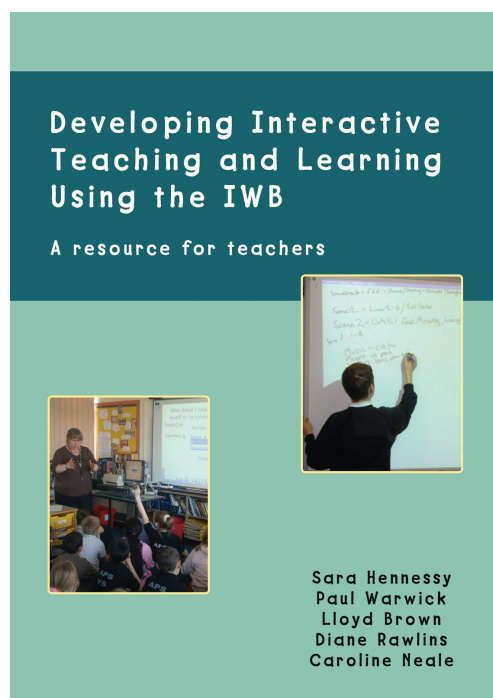
interactivity and multimodality offer rapid, smooth manipulation of text, colour, shape, plus auditory, static and moving images (Jewitt, 2006) and potentially provide opportunities for learners and teachers publicly to express and reformulate ideas, both verbally and using other rich representations. Hennessy (2011) argues that the powerful and increasingly prevalent technology that is the IWB opens up opportunities for learners to generate, modify, and evaluate new ideas, through multimodal interaction along with talk. Classroom dialogue in the context of IWB use is construed as being facilitated by teachers and learners constructing digitally represented knowledge artefacts together. These mediating artefacts are visible, dynamic, and constantly evolving resources that constitute interim records of activity and act as supportive devices for learners' emerging thinking, rather than finished products of dialogue. IWB use thereby potentially supports rich new forms of dialogue that highlight differences between perspectives, and make evolving ideas and reasoning processes more explicit. But do such possibilities necessarily lead to pedagogical development in teachers?

In our research projects conducted over the past eight years we have explored the development of the classroom use of IWBs as a support for a dialogic pedagogy. This research has strongly supported the IWB's potential value for collectively expressing, visibly recording, testing and evaluating learners' developing ideas, and for co-constructing new knowledge during whole class teaching (Hennessy, Deaney, Ruthven & Winterbottom, 2007). Our research has also indicated that use of the IWB can provide opportunities for collaborative reasoning and for building a mutually acceptable 'common knowledge' (Edwards & Mercer, 1987); the explication and exchange of ideas; and negotiation of new meanings in accordance with a range of perspectives (Mercer, Hennessy & Warwick, 2010; Warwick, Mercer, Kershner & Kleine Staarman, 2010). We have seen how reflective practitioners can harness the distinctive affordances of IWB technology to create space, time and status for learner contributions, to challenge thinking and to offer responsive assistance (Gillen, Kleine Staarman, Littleton, Mercer & Twiner, 2007; Warwick & Kershner, 2008; Warwick *et al.*, 2010; Mercer, Kershner, Warwick & Kleine Staarman, 2010). Crucially, however, our work has shown that for such sharing to happen, a 'dialogic approach', and a classroom ethos that supports it, is a crucial adjunct to the development of technical expertise. Teachers in turn require support in developing such an approach. However a review of the lessons learned from whiteboard initiatives internationally (Hennessy & London, 2013) shows that the role of teacher professional development – crucial for increasing the skills and professional knowledge of the teacher in mediating interactions with learners and exploiting the IWB productively (Higgins, Beauchamp & Miller, 2007) – is often marginalised when the new technology is introduced.

Our prior research has now culminated in a theoretically informed, practical model and resource for school-based continuing professional development (CPD) in this area. (Research findings are reported in a series of publications listed at: http://dialogueiwb.educ.cam.ac.uk/publications.) The approach draws on contemporary models of CPD that encourage critical reflection, peer learning, observation and feedback, include concrete, experiential tasks and classroom trialling, and focus on immediate teaching needs and everyday, first-hand classroom experiences (Cordingley, Bell, Rundell & Evans, 2003; OECD, 1998; Twining, Raffaghelli, Albion, & Knezek, 2013; Wells, 2007). They offer opportunities to encourage, extend and structure professional dialogue, and they sustain CPD over time so as to enable teachers to embed practice in their classrooms (Cordingley et al. 2003; Hennessy & London, 2013). An external stimulus can also play a pivotal role; our model draws on lesson video clips in particular, to stimulate discussion, reflection and inquiry. Footage of unknown teachers allows viewers to experience and more freely critique a wider range of practices, so that alternate pedagogical strategies can be compared and contrasted (Sherin, 2007).

The CPD programme we developed and trialled here aims to support teachers in developing more interactive uses of IWBs, especially in whole-class teaching. In particular it fosters approaches promoting active participation of students, collaborative knowledge building and learning through reasoning, enquiry, comparing, linking and evaluating ideas during classroom dialogue. The CPD resource "Developing Interactive Teaching and Learning using the interactive whiteboard" (by Sara Hennessy, Paul Warwick, Lloyd Brown, Diane Rawlins and Caroline Neale) was published by Open University Press in January 2014, and co-authored by participating teachers. The book is accompanied by freely accessible, online multimedia resources (http//tinyurl/OUPIWB), including a digital resource bank of annotated screenshots and video

exemplars of dialogic classroom practice, flipchart templates for creating activities. Structured face-to-face workshop activities guide teachers through the CPD process. An overview of the contents of the printed and online resources can be seen in Appendix 1. The materials are designed for use across phases (primary, middle and secondary schools) and across subject areas. The workshop model was developed during our previous research (Hennessy, Warwick & Mercer, 2011) and piloted in a small number of schools.

Developing Interactive Teaching and Learning Using the IWB

A resource for teachers

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This impact project aimed to establish a strategy for rolling out the approach more widely and actively, based on recruiting "ambassadors" – teachers with an interest in dialogic teaching who facilitated workshops and spread of the approach within each designated cluster (federation/partnership) of linked local schools. **The project's overall aim was to stimulate and assess impact of the CPD programme upon teachers' understanding of dialogue, and use of dialogic approaches to teaching with the IWB.** It gathered evidence for this impact and simultaneously developed materials for wider dissemination through (a) a brief questionnaire survey to compare initial understanding and degree of dialogic practice with teachers' perceived progress; (b) interviews with ambassadors and teachers; (c) portfolio evidence of dialogic classroom practice with the IWB from teacher participants. This report describes our activities and outcomes. Further illustration can be seen on the project website at http://dialogueiwb.educ.cam.ac.uk/evaluate/.

CPD PROGRAMME

Activities overview

The CPD programme was offered at no cost to teachers in 5 locations during the Spring and Summer terms in the 2013/2014 school year. The activities involved:

- 2 workshops engaging with the resource in each location (school cluster), with teachers trialling new approaches in between (minimum of 3 weeks between the workshops);

- one person ("ambassador") in each location organising the CPD scheduling and co-leading the 2 workshops with our researcher, involving up to 20 teachers per workshop;

- teachers answering a short survey at the beginning and taking part in an (individual or group) interview at the end of the CPD programme;

- participants reflecting on what they thought worked well and sharing some examples of what they did in the classroom (at Workshop 2);

- teachers subsequently offering examples of their new practices for uploading to our website at http://dialogueiwb.educ.cam.ac.uk/resources/.

Launch event

Both the resource and the CPD programme / impact project were launched on February 27th, 2014 at the Faculty of Education. Over 50 attendees comprised academic colleagues, teacher educators, classroom teachers, professional development leaders, mentors and school leaders, including postgraduate students on a university-schools partnership Masters course. The book and the project launch event proved to be an efficient way of recruiting interested schools and after having discussed our project with 11 potential clusters/schools, five designated clusters were identified. These clusters were located in the region (50-mile radius of Cambridge); they were able to identify a willing ambassador and could participate within the timescale of the impact project, i.e. at short notice. Each cluster nominated their own ambassador based on the role description in our 'CPD Ambassador briefing sheet', sent to all interested schools (Appendix 2).

Workshops and participants

Ten CPD workshops were co-designed and co-delivered by our research associate and ambassadors in 5 clusters. Hosting schools included two primary schools (Longstanton and Cherry Hinton, Cambridge), one middle school (Royston), one high school from the private education sector (Norwich) and one secondary community college (Chesterton, Cambridge). 80 participants from 14 schools, ranging from infant to secondary schools and from the public to the private education sector, attended CPD workshops (see Table 1). The vast majority (about 80%) were Key Stage (KS) 2 or 3 teachers; the rest were mainly early years or KS 1 teachers.

16 teachers who attended the first CPD workshop did not take part in the second one. Ambassadors from hosting schools reported that the 16 teachers were from partner schools or academy cluster schools and that there was an issue with finding the most appropriate dates for all involved schools, particularly if they were located far from the hosting schools. The 16 teachers apologized and explained that they were unfortunately allocated unplanned duties on the day. On the other hand, five teachers who did not attend the first CPD workshops joined the second CPD workshops and they all came from the hosting schools. They were all motivated to come to the second CPD workshop as a result of hearing about the CPD programme from their ambassadors and their colleagues who attended the first one. This could be taken as an indicator that ambassadors and participating teachers from hosting schools invested energy and time in disseminating information, knowledge and skills acquired at the first CPD workshop. This is aligned with one of our outcomes – establishment of cluster-based ambassadors to widen the project's impact.

All ten CPD workshops included catering for participating teachers. Each participant, ambassador and head teacher of the hosting school received a copy of the printed CPD resource book.

CPD workshop 1 (see outline of workshops in Appendix 3) involved an overview of the ESRC Impact project and the resource book and various video-stimulated activities. The first activity, designed specifically to initiate discussion on teachers' understanding of classroom talk and classroom dialogue, was followed by an introduction to the 'dialogue table' developed by one of our collaborating teachers, Diane Rawlins. Teachers audited their teaching practice using the extended dialogue table (downloadable from http//tinyurl/OUPIWB) and were shown three video examples of dialogic teaching practice. Video-stimulated discussion led to an in-depth exploration of the 'Resource Bank' on our website and resulted in lesson planning in subject, year or KS groups.

CPD workshop 2 built on video-stimulated discussions from the first workshop and was used as a vehicle for sharing and reflecting on the teaching material teachers developed in between the two workshops. Teachers were asked to comment on their own and their colleagues' concrete examples of dialogic teaching supported by the IWB. A further four video examples of dialogic practice were shown and discussed. A handout of ways to develop the dialogic potential of the IWB, as well as the 'Resource Bank', were reviewed. Motivated and inspired by shared examples of dialogic teaching supported by the IWB, the

teachers were again encouraged to plan a lesson in subject, year or KS groups. The second workshop concluded with ideas for further development of their own dialogic practice and for a whole school approach to dialogic teaching.

Table 1 Overview of the CPD workshops

CLUSTER (Hosting school)	CPD WORKSHOPS 1 and 2	NUMBER OF ATTENDEES
Royston (Greneway Middle School)	April 1st June 17th	**CPD Workshop 1:** 24 attendees + 2 ambassadors **CPD Workshop 2:** 20 (18 previous + 2 new) attendees + 2 ambassadors
Histon and Impington (Hatton Park Primary, Longstanton)	April 30th June 25th	**CPD Workshop 1:** 14 attendees + 1 ambassador **CPD Workshop 2:** 10 (previous) attendees + 1 ambassador
Chesterton (Chesterton Community College)	May 15th June 24th	**CPD Workshop 1:** 13 attendees + 1 ambassador **CPD Workshop 2:** 9 (8 previous + 1 new) attendees + 1 ambassador
Cherry Hinton (The Spinney Primary)	June 11th July 9th	**CPD Workshop 1:** 9 attendees + 1 ambassador **CPD Workshop 2:** 10 (9 previous + 1 new) attendees + 1 ambassador
Independent schools (Norwich High School for girls)	June 23rd July 7th	**CPD Workshop 1:** 9 attendees + 1 ambassador **CPD Workshop 2:** 9 (8 previous + 1 new) attendees + 1 ambassador
TOTAL		**CPD Workshop 1:** 75 attendees **CPD Workshop 2:** 59 Workshop 1 attendees + 5 new attendees **TOTAL:** 64 attendees **Overall number of teachers becoming familiar with the project:** 75 attendees at CPD Workshop 1 + 5 new attendees at CPD Workshop 2 = **80**

The CPD workshops were described by teachers as both reflective and practical and they particularly emphasized how important and valuable it was to see and discuss video examples of dialogic teaching

practice. The workshop model, based on video-stimulated discussions and testing of the adapted and newly developed IWB-based teaching materials in between the workshops, proved to be successful and clearly appreciated by teachers. Some of their opinions are listed below:

Year 2 teacher:
"I also think that the video clips are really useful as well, and I really got a clear idea of what the objectives were…"

Year 1 teacher:
`*"And it was useful to watch those videos and I think a lot of us were commenting, 'Oh that teacher, the teacher in the video did this well', or, 'I like how he said this particular sentence'…"*

Maths teacher:
"I'd done a little bit of dialogic learning before and it was like a year-long course and I think teachers had to upload things. That wasn't as good as the CPD programme this time, [which] had already seemed to progress successfully, because I quite liked that it opened some ideas, have some time in between to try some things, and then meet and discuss how it went, and that was quite powerful."

DATA COLLECTION AND ANALYSIS

The project's milestones included recruitment, completion of workshops and data collection. The data collection process consisted of a survey (see Appendix 4), semi-structured interviews, audio recordings of the CPD workshop activities, note taking during CPD workshops and collating teachers' posters created as part of the workshop activities (see outline of activities and purposes in Table 2). Surveys were filled in (mostly online using SurveyMonkey) by 70 participating teachers prior to their participation in the project; the questions aimed to explore teachers' understanding of dialogic teaching and the use of the IWB. 16 participants were interviewed: 5 ambassadors and 11 teachers. Two different semi-structured schedules were developed: one for ambassadors focusing on their role in the CPD programme (Appendix 5) and one for teachers with the focus as described above (Appendix 6).

Four activities at each of the 9 CPD workshops were audio recorded (one of the workshops was not recorded due to technical issues). Table 2 explains the purposes of recording each workshop. Notes were taken on the first two occasions at CPD Workshop 1. The overall purpose of collecting 40 posters created by teachers during the workshop activities was to explore any pre-post shifts in teachers' thoughts about 'classroom talk versus classroom dialogue' and in their thinking behind developing materials for fostering dialogic teaching.

Surveys were analysed for both quantitative and qualitative data and triangulated with other data sources such as teachers' posters and semi-structured interviews. Counter-examples to pedagogic change were sought within each dataset but none emerged. A coding scheme for qualitative answers to survey items was developed (Appendix 7); this allowed us to characterise teachers' understanding of dialogue and dialogic teaching as weak, medium or strong. All responses were independently coded by two different researchers (the first two authors), resulting in 93.5% reliability (100/107). Semi-structured interviews were transcribed and then coded inductively and deductively, with categories and emergent themes being developed (Appendices 8 and 9).

Table 2 Data collection

PURPOSE OF DATA COLLECTION	DATA COLLECTION	PARTICIPANTS	LOGISTICS
To explore teachers' ideas about and understandings of dialogic teaching and the use of the IWB prior to their participation in the CPD programme	Survey	70	**Timing:** prior to attending the first CPD workshop **Length**: 16 questions (see Appendix 4) **Administration:** on-line or hard copy
At the first CPD Workshop to record teachers' thoughts about classroom talk vs. classroom dialogue and auditing their own teaching practice. At the second CPD workshop to record any benefits and challenges of application of dialogic teaching supported by the IWB	Audio recordings of CPD workshop activities	4 activities at each of 9 workshops were audio recorded	**Length:** activities from 6 min to 20 minutes recorded (all together 6,5 hours of recordings) **Recording:** audio (iPad/VRP7; iPhone/VRP7; digital recorder Tascam DR07)
To revisit teachers' ideas about and understanding of dialogic teaching post CPD programme, assess the impact of the programme on teachers' practice, elicit what teachers got out of their participation in the CPD programme and what kinds of teaching materials they developed	Semi-structured interviews	16 participants 5 ambassadors (all individual interviews) 11 teachers (4 individuals + 2 groups: 1 of three teachers and 1 of four teachers)	**Timing:** 2-3 weeks after the delivery of the second CPD workshop **Length:** 20-40 minutes (ambassador interview consists of 5 questions and teachers' interview consists of 8 questions) – see Appendices 5 and 6 **Recording:** audio (iPad/VRP7 and laptop/QuickTime) **Location:** at hosting schools
To record sequence of the activities at the first CPD workshop (for internal evaluation and feedback) and teachers' thoughts about classroom talk vs. classroom dialogue and auditing their own teaching practice (groups that were not audio recorded).	Notes	2 x Workshop 1	**Location:** at hosting schools **Note taking:** by visiting scholar from University of Barcelona (Ms Carme Grimalt Alvaro)
At the first CPD workshop to record and explore teachers' thoughts about classroom talk vs. classroom dialogue and auditing their own teaching practice. At the second CPD workshop to record any benefits and challenges of application of dialogic teaching supported by the IWB (groups that were not audio recorded)	Posters	40 posters	**Location:** at hosting schools **Recording**: posters created on sugar papers by participants/teachers

FINDINGS AND DISCUSSION

The findings are based on both quantitative and qualitative analysis of data and are presented according to the coding categories:

A) Baseline levels of understanding of dialogue
B) Understanding of dialogic teaching after participation in the CPD programme
C) What professional benefits did teachers ascribe to the CPD programme?
D) Examples of dialogic teaching supported by the IWB
E) Sustainability – what is next?

As the ambassador interview schedule included slightly different questions (e.g. a question on challenges they faced as ambassadors) their accounts are presented separately.

Baseline levels of understanding of dialogue

Analysis of the survey data showed that 56% (38/68 respondents to this question) of participating teachers agreed and/or strongly agreed that they were aware of the distinction between classroom dialogue and other forms of classroom talk prior to their participation in the CPD programme. (13 teachers or 19% disagreed or strongly disagreed and the rest were neutral.) Teachers' posters, on the other hand, showed that the distinction between the two concepts was not actually very clear. As seen on the teacher posters below (Figures 1 and 2), both classroom talk and classroom dialogue were characterized by similar features such as purposeful talk and asking questions.
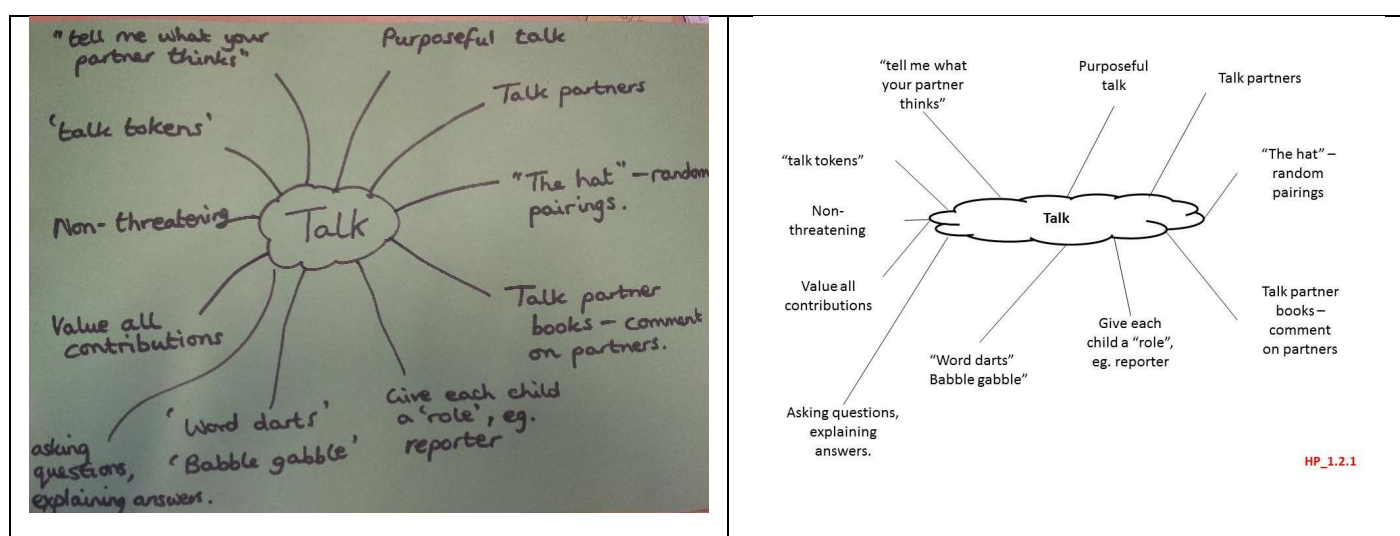

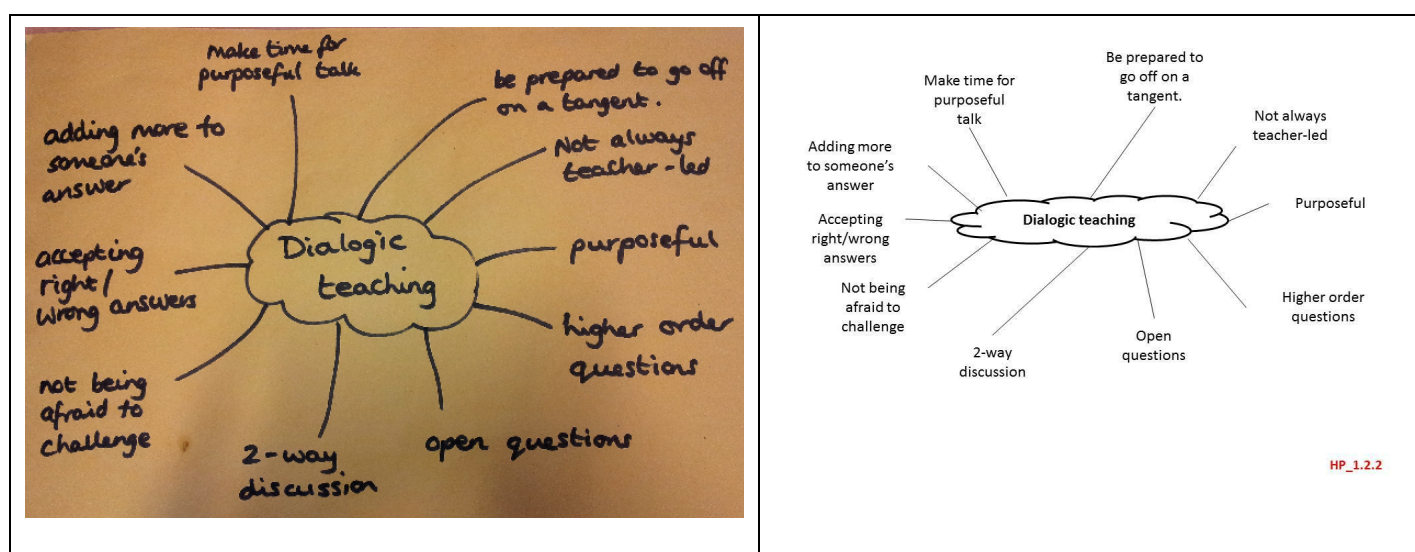*Figure 1 Teachers' understanding of classroom talk at the very beginning of the first CPD workshop*

Figure 2 Teachers' understanding of dialogic teaching at the very beginning of the first CPD workshop

The teachers' lack of clear distinction between talk and dialogue was further supported by both quantitative and qualitative analysis of a survey question on whether they could provide examples of their awareness of the distinctions between classroom dialogue and other forms of classroom talk. 31 teachers shared their examples and the quantitative analysis showed that only 6 of them provided evidence of a strong understanding of the distinction and a further 7 showed medium understanding. 18 showed weak understanding; along with the 30 who had already acknowledged on the survey that they were unclear about the distinction, this means that at least 48/68 or 71% of the survey sample were initially unfamiliar with what dialogue is. The true figure is likely to have been as high as 81% since only 19% (13/68) actually demonstrated evidence of medium/strong understanding through offering examples, with a further 7 teachers (10%) not offering any evidence for their proclaimed awareness.

Some illustrative examples of the teachers' medium and strong understanding of classroom dialogue included answers referring to 'challenges', 'building on responses' and 'raising new points'. Examples of weak understanding were briefer and more ambiguous, as illustrated below.

Teachers' answers demonstrating medium and strong understanding of classroom dialogue

- *Dialogue is sharing knowledge, and building on responses of other children. Dialogue shapes the lesson and provides feedback about what children know*
- *…a multi way conversation whereby questions and answered are challenged by teacher and pupils. Usual conversations which link together with purpose at focus - conversation/dialogue needs challenge + progression*
- *Is a conversation that usually involves two opposing perspectives or ideas that, through the conversation attempt to reach a resolution. Each utterance in the dialogue must give rise to a point or question in order for the dialogue to continue*

Teachers' answers demonstrating weak understanding of classroom dialogue

- *A discussion in which (usually) 2 people are involved. This could be in written form.*
- *Chat to do with learning in the classroom*
- *Communication between pupils, between teacher/pupils*
- *Not led by one person*
- *Discussion between audience and presenter*

Prior to their participation 27 teachers stated that they sometimes used 'dialogic teaching' and around half of them (13 or again, only 19% of the whole survey sample) showed medium or strong understanding of dialogic teaching. The rest showed weak understanding. Some illustrative examples included the answers below.

Teachers' answers demonstrating medium and strong understanding of dialogic teaching:

- *Four groups with scenarios re. ethical dilemmas. The groups discussed how these situations give rise to ethical debate and then introduced their scenario and the issues to the other groups. Each group was invited to develop the debate and discuss the issues, suggesting any solutions or further considerations, other potential views etc.*
- *Problem solving in maths where each child has a role in the investigations so they each bring an aspect of the task to the group discussion*
- *Pupils looking at variation in music. In groups they were discussing how music can be changed, varied. Pupils were able to build on each other's ideas and use of vocabulary.*

Teachers' answers demonstrating weak understanding of dialogic teaching

- *Often do talk tasks and target specific children*
- *Talking partners and feeding back?*
- *Children discussing a story before writing. Talking all aspects through without writing anything.*

31 (46%) of participating teachers agreed or strongly agreed that they had used the IWB to support

classroom dialogue, but only 9 of them (13% of survey sample) demonstrated medium or strong understanding of dialogic teaching through sharing concrete examples. Some illustrative examples are listed below.

Teachers' answers demonstrating medium and strong understanding of the use of the IWB for supporting classroom dialogue:

- *As a stimulus – displaying a photograph that had been magnified. There was no right or wrong answer for the suggestions. I had told the children that I wasn't aware of the object. Using SMART I was able to annotate the picture and these ideas were developed and added to new lines of investigation. There was a real buzz in the room as the children challenged each other.*
- *Questions, use of dice, use of images, reveal/colour coded – crack the code and discuss with partner.*
- *It has been great for displaying pictures/videos to stimulate discussion, and for me to write directly on as pupils contribute ideas*

Teachers' answers demonstrating weak understanding of the use of the IWB for supporting classroom dialogue:

- *Talk task identified and discussed*
- *Provides a focal point for the classroom dialogue. Involved more learners by catering for visual and kinaesthetic learners. Encourages all types of students to give standing at the front a go (a reason to stand up to control the IWB or write on it - less scary or intimidating than simply standing up and talking)*
- *I use open questions to stimulate MFL dialogue.*

Understanding of dialogic teaching after participation in the CPD programme

Semi-structured interviews carried out after participation in the CPD programme provided evidence of a shift in teachers' understanding of classroom dialogue by, for example, emphasizing pivotal features of classroom dialogue such as ''building on each other's ideas,'' as the illustrative example below demonstrates.

Building on each other's ideas

Maths teacher:
"So where [before] I thought it was maybe looking at the dialogue and maybe dialogue perhaps being open questions rather than closed questions, and perhaps the way I speak, I've now realised it's all about students building on each other's thoughts… so that they can contrast their ideas, compare their own ideas and by doing that have dialogue with each other and build on each other's ideas…

Other illustrative examples of shifting from understanding classroom dialogue as similar to classroom talk (purposeful talk, asking questions etc.) include teachers' accounts of classroom dialogue being a 'more layered approach than just classroom talk'; 'giving pupils independence, letting them be their own learners' and 'pupil-led/pupil-driven process'.

More layered approach than just classroom talk

Science teacher:
"…dialogue, obviously, maybe refers to the building of ideas and coming back, so the more layered approach. So whereas classroom talk might be the students talking to each other, dialogue is more ongoing, more building a deeper understanding, if you like, through interrogating, I suppose, each other's talk.

Allowing pupils independence and responsibility for their own learning

Year 2 teacher:
"…giving them that independence, I suppose, and thinking about how you structure what you're saying, so there's not just one answer, but there's a wealth of answers that everyone can partake in… And I think I've really tried to take a step back, I suppose, and let them be their own learners."

Pupil-led/pupil-driven process

Science teacher:
"I think I've got a deeper understanding of it, and I had this vague idea that you're not just talking – beforehand I thought, well, you're not just talking at the kids, you're trying to forward their thinking through the way you ask the questions; and you're trying to get them to progress by asking them a series of questions. But then it's still got to be two-way because it's dialogue, that I'd ask them something and they'd answer and then I'd respond to what they've said by asking them another question, which would then elicit another answer that would develop there. And then I could try channelling them into this pathway that I wanted them to go into in terms of their depth of knowledge, or their understanding of something. But I think now I'm thinking, well, it's much more pupil-led, rather than teacher-led, but you've got to get to this point where the pupils are mostly driving the process; you do an occasional bit of nudging and steering to focus them in on something."

Teachers' posters provided corroborating evidence that the shift from understanding classroom dialogue just as classroom talk to understanding it as a multi-layered approach did happen. Two posters below clearly demonstrate that teachers understood classroom dialogue as 'creating conversation', 'open-ended' and 'guiding' at the beginning of the first CPD workshop whereas their poster from the second CPD workshop describes dialogic teaching/learning as a multi-layered and whole-school approach including teachers 'ready to learn' and whole school policy 'embracing/encouraging dialogic teaching' and 'setting expectations of respect and trust'.
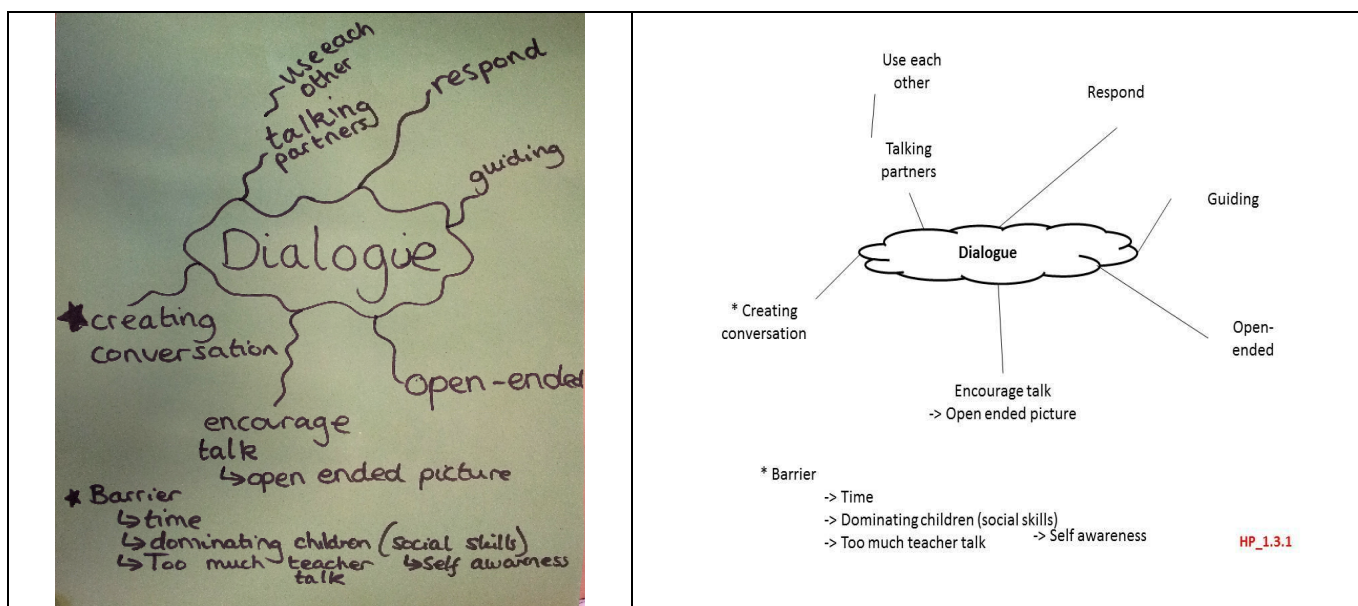

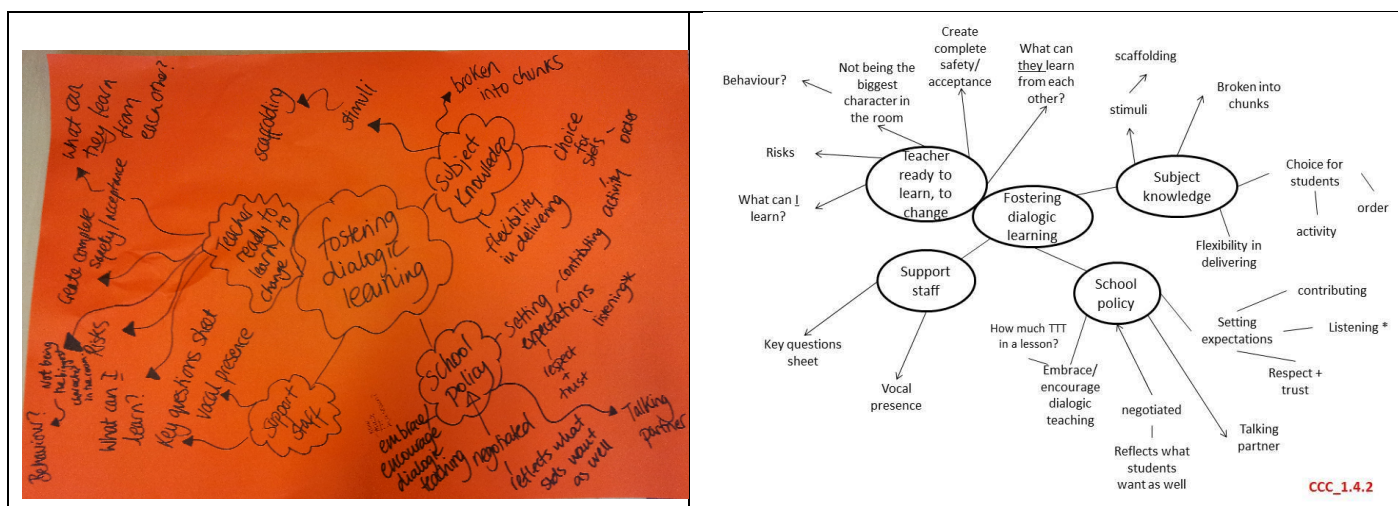*Figure 3 Teachers' understanding of dialogic teaching at the very beginning of the first CPD workshop*

Figure 4 Teachers' holistic understanding of dialogic teaching at the second CPD workshop

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On the other hand, nearly half of the teachers from one of the hosting schools (a maths and computing specialist college) had been involved in a pilot phase of the project; thus not only did they have a strong baseline level of understanding of classroom dialogue before Workshop 1 but they had also considerably developed the use of the IWB for supporting dialogic teaching since 2000, when they got their first IWBs. Hence their response to the first CPD workshop was different from other schools, whereas they showed a similar appreciation of the second workshop to other schools.

Year 7/Year8 teacher:
"And I think I felt very much with the first session that . . . the audience was a little misjudged, because, actually, there is a big core of us that had, that felt that we'd done all of that before, because of (our colleague) and (our head teacher's) involvement in the past. So, actually, the second session I found much more satisfactory, because it made me go back and focus on things and look at things, and just things like the scrolling banners."

Teachers from this school thus could not demonstrate the same level of a shift in their use of dialogic teaching supported by the IWB, as a dialogic approach was already embedded in their teaching practice and the whole school is moving towards the use of other technology-based devices such as iPads and Chromebooks.

Middle school teacher:
" Well, I think that actually we're sort of moving as a school more towards developing dialogue and things in the classroom, by using things like the Chromebooks. So we've almost - I think we've, some of us have gone quite far with the interactive whiteboard things, and now we're looking at being able to share pieces of work on the Chromebooks, so that other people and some teachers can see it and give feedback, and discuss what's good about the piece of work and next steps for improving it. So I think in terms of my practice, and generally as a school that's what we're looking to develop over the next academic year."

Middle school teacher:
"I mean, we've worked a lot in the last year with the iPads, and actually they've been embedded in quite a few schemes of work now, so I think the children are very confident using them."

However, even in this school, teachers and ambassadors emphasized how valuable it was to 'refresh' their knowledge and to 'remind' them of some of the features of the IWB that they could use in order to foster dialogic teaching.

Year 7/Year 8 teacher:
"So in the past I've given them a sheet of paper with drawn lines and said how they all link, so I made a sort of web out of it. Well, I put it actually on the whiteboard and got them to come up and write where the link was, and explain what the link was to everybody else. Which was – it was a really simple thing, but watching some of those videos just made me think, actually, I don't know why I didn't do it that way, it's a much better way to do it. And that's now in my planning and the next time I do it I'll make sure I do it."

How did teachers benefit professionally from the CPD programme?

Survey data showed that 91% of participating teachers agreed or strongly agreed that they would value a chance to talk through issues about classroom talk and dialogue with their colleagues. A majority of interviewed teachers confirmed this when they were asked about the perceived benefits of the CPD programme. Some commented on how dialogue had taken place in the workshops themselves, with teachers feeling that *they* were learners and co-creators of knowledge while we discussed and explored the main features of a dialogic approach to teaching and learning. The following illustrative examples emphasize the value of having an opportunity for sharing, reflection and discussion with peers.

Opportunity to discuss, share and reflect:

Year 7 teacher:
"The opportunity to share information, because we don't really have a chance to reflect on our own practice….we had the opportunity to go away and think about it, and think how to put it into practice and what to try out."

KS1 teacher:
"I really enjoyed all the CPD workshops, I must say. I think the thing I enjoyed most was, obviously, I enjoyed sharing things with my colleagues at [own school], but it was lots of different schools and I thought that was really helpful."

After teachers' participation in the CPD programme they shared in interviews how they overcame 'reluctance' to use the IWB and became motivated to use it more frequently for fostering dialogic teaching.

Motivation to use the IWB and overcoming reluctance:

Science teacher:
"I'd think of any excuse to not turn it on. But, on the other hand, it did get me over that because I was then turning it on and practising using it, and I think it's got me past that point where it was easier not to use it. [Now] I just want to get on and do it, and I think then I've got the impetus to keep going with it a bit more."

Maths teacher:
"…for me, that was the strongest point was seeing those techniques used by a teacher, and wanting to go away and use them myself."

KS 1 teacher:
"It's made me value I think the whiteboard slightly more, and have it rather than a slideshow for me to say, 'What's next?"

What most teachers valued and saw as a great benefit of participating in the CPD programme was becoming familiar and focussed on dialogic teaching.

Becoming familiar with and focused on dialogic teaching:

KS3 teacher:
"…and to hear what dialogic learning is all about, as I'd sort of had a little bit before, but didn't know a great deal."

Maths teacher:
"I think what I've got out of it is the focus on the dialogical techniques."

Concrete examples of dialogic teaching supported by the IWB

Before their participation in the CPD programme 93% of participating teachers agreed or strongly agreed that so far they had been using the IWB mainly for displaying their Power Point presentations or other resources, often linked to websites. After the CPD workshops they reported concrete experiences of using the IWB for fostering dialogic teaching. All participating teachers were asked to store the materials they developed between the first and second CPD workshops either on Google drive or Dropbox. To date, 35 teachers contributed 114 notebook flipcharts, 12 ActiveInspire flipharts, 2 audio files, 1 video file, 4 Word documents, 4 pdf files and 1 PowerPoint. These have all been made available to practitioners in other schools via our project website (http://dialogueiwb.educ.cam.ac.uk/evaluate). All participating teachers agreed to share their teaching materials with colleagues from other schools, thus maximizing the impact of the programme. It is worth noting that due to the fact that the last few workshops were conducted near to the end of the school year, there are still many flipcharts to be uploaded from schools' drop boxes and Google drives, as teachers did not manage to store all of their materials in time. Some of the examples contributed are presented below.
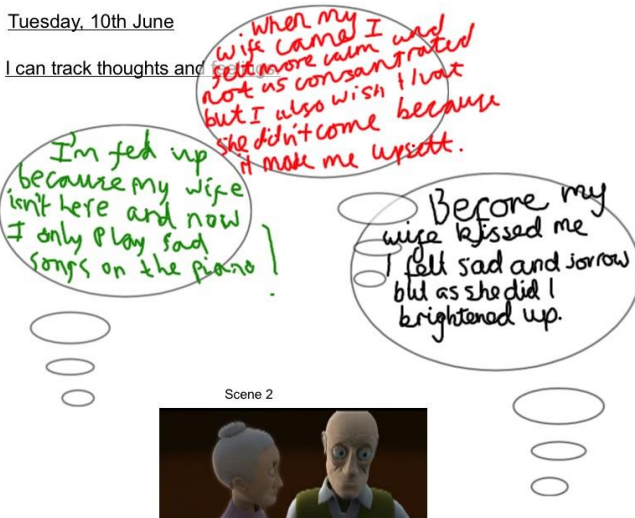
15

Use of pictures/photos as prompts

Year 5 teacher:
"One of the examples was linked to the animation of the piano, and so the children were given some images which were taken from freeze frames from the animation and including thought bubbles coming out of various characters' heads. And the children had to write what they thought each character was thinking in each case, but it was okay to think something different to your partner. So we had a few different examples and the children had to write up what they thought, then other children had to say which ideas they agreed with, which ones they disagreed with and discuss so that everyone was open to participate with their opinion.

Figure 5 SMART Notebook flipchart and description of accompanying activity: Thought bubbles

KS 1 teacher:
"This was part of our, 'Hurray, let's go on holiday' topic and we were planning to go to the seaside as well, so we were looking at lots of different English holidays, and especially beach holidays. And as part of the history strand, we had a look at beach holidays and if we could tell what age, so they would, the children were working in small groups and I put them on a timeline…. And the children were…Yes, absolutely, they were looking not dressed for the beach; very prim and proper. But the children were looking at the similarities and differences, and they noticed the way the clothes are and suggested things and they were explaining their ideas why. And I wasn't saying anything…And it was actually quite nice, because they are young, they're six and seven and it actually showed me how independent they can work, and they worked beautifully together and it was lovely to see…"
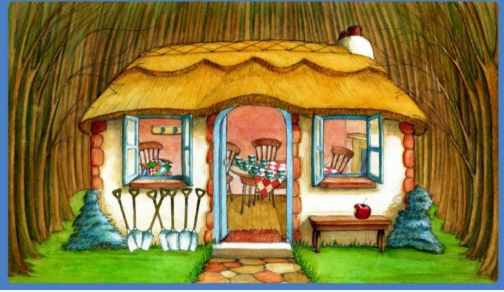

Year 1 teacher:
"Yeah, I had a picture on the whiteboard of a cottage in a wood, and it was at the start of our traditional tales topic. And I asked the children who they think might live in this house, and that was the only introduction to the topic, so I tried to get as many different answers as possible. The children in my class being so little, some of them find writing on the board really difficult and the actual mechanics of using the technology… So it was just one still image that just opened up a lot of conversation, different opinions, ideas and I was able to come back to the same image a couple of days later, and they remembered a lot of what they'd said and had new ideas expanded by what they had heard from others last time."

Figure 6 SMART Notebook flipchart and description of accompanying activity: Traditional tales

Dragging, sequencing, pen and group dynamics

KS 3 teacher:
"So, okay, continue using the dragging function, really, of the board and the interactive whiteboard pen. Now, I'm quite fascinated by the group dynamics and the dialogic that can be - if you shuffle a team around and take one person out of a team, and put one person in a team or group and see how that changes dynamics. So using lots of different

groups so that the students get a chance to discuss things with lots of different people, and see how they work with different students. But you're using that basically simple dragging technique, really, to keep dragging and moving things around the board, particularly in terms of sequencing… we don't have the whiteboards that use the fingers, so it's very much who's got the pen, pass the pen. So I'm kind of - and that's, you know, I remember we looked at a video where a boy was standing in the middle of two girls, and he was doing the dragging and moving. And I'm - so I'm curious to investigate that . . .how I can ensure equality whilst having one pen and how the dialogue, yeah, so how the dialogue will link to the pen?"

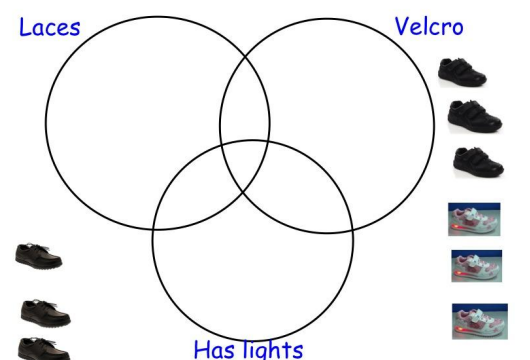## Combining hands-on and IWB-supported activities

Year 3 teacher:
"Later on during an Ofsted inspection, I had the opportunity to do a maths lesson with some children all about Venn diagrams. I just gave my top group three hoops which they linked together themselves, and I asked them to take their one shoe off and arrange them accordingly in the hoops. Which was a lot of fun and we were able to do this outside because the weather was good, so there was a lot of room and a lot of space. And the children spent ages, actually, discussing, agreeing and disagreeing, deciding which shoe should go where… changing their minds…and we talked about the categories, the colour, the design of the shoe, male or female…

…And following up with that, then they had their own Venn diagrams with similar pictures and shapes to move around inside the three hoops on the interactive whiteboard. And there was a lot of discussion with the whole class about almost how they could themselves extend the activity. And it was just – it was a lot of fun and there was a lot of learning, and a lot of talking, discussing, building on each other's ideas and a lot of people agreeing or disagreeing with each other...and it was a very cooperative, collaborative piece of learning."

Figure 7 Hands-on activity and accompanying SMART Notebook flipchart

Annotation + video recording

Year2 teacher:
"We looked at a painting of the Mona Lisa and . . . a bit like the video clip, I got them to comment on the painting of the Mona Lisa and annotate and, actually, it was really interesting the way they offered completely opposite views, and I didn't really need to explain to them, they'd just note and accept each other's views, or challenged… When I chose someone to explain a word, they were quite happy to do that and think about why a person had said what they said. And it opens your eyes up to another way of viewing something that you're familiar with... and it does open your thinking up to looking at situations in a different way… and there was a real buzz, actually, when we did it because it was a new way of working and they really enjoyed it, and I enjoyed it."

KS3 Teacher:
"…so the Year 9s I've got a sense of vision the percentages, and also that can be taken into Year 8 and Year 7 as well, and used quite a bit. …Whereas I've now thought, well, obviously the next step if I was to get them to do it themselves and come to the board and annotate, effectively, exam paper questions: so using annotation. But then I've thought,

well, actually, the most powerful then is video recorder, because they can actually see their own working back, and I think that's what the sense I got. I think, I can't remember in what context it came up, but I do remember the kind of either a video or a conversation in the training that talked about/showed some students maybe seeing some work that they'd done the week before and feeling, ah, that's powerful, and that would, obviously makes a very good start to the lesson just to recap what's been done previously. And a video recorder is – using the board video recorder seems to me a way forward, so that's the thing that I've most taken out with respect to the interactive whiteboard.

Audio recording

<u>English teacher:</u>
"My colleague and I were very excited by the fact that we discovered how to record sound onto something, but that's a powerful thing…and you can do that live in the classroom, and get them to come and communicate what it was, and then what they want to say and then play it back with their blessing in another session, it's captured there for ever."

All teachers who shared their examples at the second workshop, as well as all 16 teachers that were interviewed, demonstrated a high level of understanding of dialogic teaching, as illustrated above. Their concrete examples and audio recordings of discussions during the second workshop activities provided evidence of their progress in understanding dialogic teaching supported by the IWB through their participation in the CPD programme, as illustrated below:

<u>Year 1 teacher:</u>
"I think I've got a . . . better understanding of how much collaboration is involved. At the beginning I thought, okay, it's just, maybe just an open-ended discussion, but now I kind of see dialogic teaching as more building knowledge together."

<u>Year 3 teacher:</u>
"I've now been able to model those ideas with my class, and obviously explain to colleagues about those ideas too. It's not just a picture on a screen, it's not for you just to talk about and involve the children. So I think I'm more aware of what I need to do with it."

Sustainability - what is next?

When teachers were asked in interviews how they would sustain their focus on dialogic teaching, the following themes emerged:

A) Further development of own dialogic teaching practice
B) Value of having and using an ambassador in the future
C) Cross-department professional development groups
D) Whole school initiative
E) Dissemination of the acquired knowledge/skills (within own school and among other schools)

Further development of own dialogic teaching practice

<u>KS 3 teacher:</u>
"Yeah, that's what I want, because I'm rewriting some of the schemes of work this summer for the Key Stage 3 in particular, I want to get some of those things written into the schemes of work as suggested activities."

Value of having and using an ambassador in the future

<u>Science teacher:</u>
"So, yeah, there's enough people that are interested in it that I think that we can then get a critical mass, and I think that's part of the idea that you need. I think the idea of having a local coordinator in the school, which is the role that (colleague) has, is crucial because that person will then keep the ball rolling.

Cross-department professional development groups

KS 3 teacher:
"And I thought, actually, that was a great opportunity to kill two birds with one stone, because it's got, you've got the interdependence and the adaptation of the interdependence aspects of the biology in there, but you've also got the English aspects in there. So you can light up not only the kids that are interested in science, because you're talking about science anyway, but also the ones that are interested in art, because there's this wonderful kind of illustrated poem…And that's quite useful to have a few people from the same school, but from different departments that you can turn to."

Whole school initiative

One science teacher described how she and a colleague moved beyond trying out ideas in their own teaching to working with colleagues in other departments to adapt a dialogic approach to tackle underachievement:

KS 3 teacher:
"And we were talking the other day about some – when you think about whole school initiatives, this is how your brain then gradually thinks of other things later on. We were talking about some particular students we've got coming into Year 7 next year, and how the head of Year 7 has got these two groups of students identified that are at potential risk of underachieving later on at GCSE… we were then talking to one of the other maths department, a lady called B . . . about this dialogic teaching we'd been doing, and how some of these interesting images might be really appealing for these students. Because some of them come from quite disadvantaged backgrounds, and we wanted some things that are going to hook them into their learning. So it's like these ideas are all gelling together now, they're all coming to critical mass and we are now thinking, right, we could do something similar for these students to get them engaged in their learning to try and hook them in early in Year 7, so that we're getting them really interested in their subjects. And we were then talking about the Escher pictures and things, which interested this other maths teacher . . . So we're going to try and see if we can develop. . .some more simpler images than the ones I've been looking at that'll be suitable for those particular types of students. So it was interesting how these ideas kind of compound and you end up. . .in a different direction to what you thought. So I thought I was just going to develop something in my classroom, suddenly now I'm talking about links in English and links in maths, and this realising potential groups are particularly critical."

Dissemination of the acquired knowledge/skills (within own school and among other schools)

Maths teacher:
"I'm even planning, or I've been asked to and even I haven't done it yet, is to lead a session in a training carousel. So I'll plan to share those techniques."

Year 2 teacher:
"And I know that some people who – from the school who didn't come to the workshops, I've been showing them the blockbuster game just because it's a nice filler, I suppose, isn't it? And something that they can easily apply into their normal teaching… And my dad's a teacher as well, and I've been telling him all about it."

How did ambassadors benefit from taking that role in the project?

Ambassadors had a pivotal role in the project, as they were recruited to ensure cascading, school ownership of the programme and to widen the project's impact. The interviews provided interesting data on how ambassadors felt they had benefited professionally from taking on that role in the project, grouped under these themes:

A) Co-delivery and co-design of the CPD workshops
B) Own professional development
C) Collegiate sharing and enrichment
D) Leadership role development
E) Awareness of adult learning processes
F) Developing framework for dialogue

Co-delivery and co-design of the CPD workshops

Middle school ambassador (Year 7/8 teacher):
"And it was useful as well; a useful experience to be able to deliver the CPD to the whole staff, really."

Secondary school/College ambassador (English teacher):
"I think specifically it was nice to have to host something like a workshop for the first time, so personally specifically that was a new experience… And you were open to – into my ideas for like questions and activities we could do, so that was nice to be able to think about that."

Primary school ambassador (Year 3 teacher):
"It was the first opportunity I'd had to, well, collect – well, to meet so many people, communicate with so many teachers and to organise an event like that, because I've never, never had the opportunity to do that before. So that, actually, was quite exciting in itself, and I just felt it was very rewarding because we had some lovely comments back immediately."

Own professional development

Middle school ambassador 2 (English teacher):
"So I think that was useful and it's also always nice to develop your own professional role, standpoint, whatever it is and perhaps take things in slightly different directions…I think what was interesting and useful to, or for me was that I was able, I suppose, to examine my own practice first and foremost, and think about the ways in which I was delivering in the classroom, and was I being necessarily always inclusive and dialogic in my approach? And I think sometimes it brought home to me having been to the training sessions and led sessions, it brought home to me that sometimes I was perhaps not always doing that."

Collegiate sharing and enrichment

Middle school ambassador 2 (English teacher):
"So I think that was good, that sort of sharing in a collegiate sense of what is going on in individual classrooms… you're not lucky enough to get to do that unless you're someone that's responsible for observing, or doing a learning, or whatever it happens to be. So it's nice to have the opening of the doors and that shared approach, and it only enriches our practice and helps us…"

Leadership role development

Primary school ambassador (Year 5 teacher):
"Well, I think it was very good for increasing - in terms of my professional development, I know that my head teacher is very keen for me to take more of a leadership role in the school, and she would like me to become a senior leader soon. So this was a really good thing to get involved in, because it meant that I had to be very proactive and I had to go and speak, encourage teachers to do a little bit more work. And, yeah, it was a very, very useful activity for me, so yeah I think, above all, being the ambassador meant it was great to take more of a leadership role, so that's what I got out of it."

Awareness of adult learning processes

Secondary school/College ambassador (English teacher):
"Oh, I really enjoyed going through in the preparation session and you taught me about the different kinds of adult learners, and that was really helpful. It's stuck with me in terms of thinking about presenting and discussing, and working at all times with teachers in the department. So the other day we were just doing some collaborative lesson planning, and then it helped me negotiate my dialogue with them… And it was nice to see, and it was nice to have that given to me from you, then to see it concretely demonstrated in the workshop… and then to see actually tailoring to their needs that they then became like the best and brightest, which was really interesting."

Developing a framework for dialogue

Secondary school/College ambassador (English teacher):
 "For instance, just having a clear framework for how the dynamic of dialogue will take place in a lesson…And then in a couple of related ways, lesson planning and the kind of resources that I've developed, they've had a space for, well, not a new space for dialogue, but I suppose like a framework for dialogue."

Challenges faced by ambassadors

Overall ambassadors struggled with a few challenges, mainly pressures of time and other work commitments, coordinating activities across schools, and in the school mentioned earlier, with already well-established practice of dialogic teaching supported by the IWB.

Time and daily work pressure

Secondary school/College ambassador (English teacher):
"I was just on my knees by the second workshop in terms of workload and, well, stress in particular…So that was, obviously, with just time, I mean, the best time was at the end of the school day and it was nice once we'd got into the workshop, and the stress in the day beforehand, and the anticipated day afterwards dissolved away. But…it was an obstacle getting as many teachers as we had to the first workshop, and even that first workshop I'm sure that if it was earlier on in the year we'd have doubled that easily."

Coordination across schools

Middle school ambassador 2 (English teacher):
"I think maybe that was a challenge, just coordinating across the academies, because we're a big body when we're together, but people still came along."

Pre-existing well-established practice of dialogic teaching supported by the IWB

Middle school ambassador 1 (Year7/8 teacher):
"I think a few people felt – from mutterings in the staffroom – that we'd done this before. . . well, this is nothing different to what we did three or four years ago, so why are we doing it again. . .? But they still came along and they still tried, and they still looked over it and I know that some of the people that still maybe felt that there wasn't particularly a lot of new material being covered, they still went back and they altered things and they changed it, and it made them look at things with a fresh eye."

Future impact

When ambassadors were asked how they plan to ensure cascading and widen the project's impact, they mentioned a diverse range of strategies, as listed below:

A) Dissemination of the acquired knowledge/skills (within own school and among other schools):
- catch-up sessions
- wider school development activities
- sharing with new teachers
 - inclusion in an ongoing CPD programme in the college
- at TeachMeets in the Cambridge area
B) Further cooperation/follow up with University of Cambridge
C) Introducing dialogic teaching supported by the IWB as initial teacher training students' weekly targets
D) Integrating dialogic teaching supported by the IWB as a criterion for an outstanding lesson

Dissemination of the acquired knowledge/skills (within own school and among other schools)

Secondary school/College ambassador (English teacher):
"Yes (there was one catch-up session in between CPD workshop 1 and 2), and then I've since been requested that we do more catch up, yes."

Middle school ambassador 2 (English teacher):
"It has been made part of my wider school development for next year, so it's something that [my head teacher] has enshrined within what it is that I'm going to be doing on a weekly basis… certainly there is a spot of time that has been set aside for that, so that I can continue, hopefully, to support people, to help them make their own resources, to make my own and continue to improve my practice… So, certainly, I think I'm going to continue to be an ambassador, and

not perhaps so much with you guys, but within the school and someone that would continue to forge ahead with that development, and ensure that everybody is still doing the things that we discussed at the sessions.”

Primary school ambassador (Year 3 teacher):
“…which I'll be able to explain to new teachers who are coming to the school in September, and we have three new members of staff. So I'm certainly going to spread the word, and I have put all the information we've had, all the activities and ideas onto a file, onto our server so they can be accessed by anybody in the school.”

Secondary school/College ambassador (English teacher):
“Yeah, we're - they're definitely being included in an ongoing CPD Programme here anyway, we shall be doing Thursday lunchtimes and then you can just put your name forward to put on one of these sessions. So I'll definitely be doing a series of those.”

Secondary school/College ambassador (English teacher):
“And we have TeachMeets in the Cambridge area where lots of different teachers come from different schools, and then everyone will give, say, a 5-minute or a 10-minute presentation on something. So I'll definitely put my name forward for that.”

Further cooperation/follow up with University of Cambridge

Primary school ambassador (Year 3 teacher):
“I would love to see it obviously spreading to more schools, and as one of our colleagues – who you will be meeting later – is going to be studying this in depth as a Masters degree, I think it would be really nice to see how her course works, and what she could actually offer to maybe Cambridge University and ourselves in terms of development... I'm just wondering if it would be possible [for you] to maybe come to one of our training days. I don't know, and maybe not a whole day, but a half day of training or follow-up to what we…because our school being an academy will have members of staff have come from those three schools to attend this course.”

One of the teachers starting her Masters studies in the autumn had indeed become motivated to specialize in dialogic teaching.

Year 4 teacher/science coordinator:
“Well, in September/October I'm going to start my Masters, so I did my PGCE at Cambridge two years ago, I've now been teaching for two years and I'm going to go back and complete my Masters next year. Right now I'm thinking probably of specialising in dialogic teaching, so I'm very interested.”

Introducing dialogic teaching supported by the IWB as initial teacher training students' weekly targets

Primary school ambassador (Year 5 teacher):
“I think definitely we can do this with initial teacher training from the university, because in September/October, I don't know, I'll be receiving some new students in my classroom… I can definitely disseminate to them some of the information that I've learnt about dialogic teaching. And that can be easily part of their training, and I have to give them weekly targets so I can guide them, and we can have one week or two weeks, or however many weeks, it really depends on the students that I get, obviously. But that's something that I can quite easily weave in to their targets to spread this a bit further.”

Integrating dialogic teaching supported by the IWB as a criterion for an outstanding lesson

Primary school ambassador (Year 5 teacher):
“May be we could do - yeah, we have an outstanding lesson tick sheet, a checklist, which our head teacher uses whenever she comes to observe a lesson, to check this is what an outstanding lesson looks like. So I could ask her if we could slip in some dialogic teaching targets that could be ticked off to make an outstanding, this is what we see as an outstanding lesson, and that would be something quite good, actually. And that would be solid, but we could return to as like a crib sheet for the future.”

When asked in interviews whether there was anything they would like to add at the end of the interview, many teachers and ambassadors expressed their wish for continuation of the CPD programme, i.e. the third workshop and lesson observations both by researchers and by peers.

Positive workshop feedback

Overall, teachers were very satisfied with the CPD programme and, as already mentioned above, were keen to suggest further cooperation/follow up with University of Cambridge. They clearly articulated that the CPD programme had an impact on their practice and that they found it useful, well organized and well run.

Secondary school/College ambassador (English teacher):
 "Yeah, even following only the two sessions, it's had an impact in, I can say with all honesty, every lesson that I've taught subsequently."

Primary school ambassador (Year 3 teacher):
"...the course itself was very contained, it felt quite secure talking to people and everything that you gave us, and highlighted was very clear. I can't really say I could improve it in anyway at the moment, because I think it worked very well as it was. I think it was very concise and the point was made every time you initially gave us examples, and all those little videos we watched….I think the course itself was absolutely fine, and we all enjoyed it."

Year 5 teacher:
"I think the style of the two workshops was good, because it's really important to make sure, and it made sure that people did something and they had a go, and then they, and then we reviewed it and that was really important…"

CONCLUSIONS

Progress made against the planned outcomes of the CPD programme was as follows.

a) **Evidence of dialogic classroom practice with the IWB.** To date 35 teachers have contributed 159 files of lesson material and these have all been made available to practitioners in other schools via our website. Further examples will be collated in September. Evolving dialogic practice was also captured via interviews and workshop posters;

b) **Establishment of cluster-based ambassadors of the approach to widen its impact.** 6 ambassadors were established and all plan to be engaged in further dissemination of the project;

c) **A model for further school clusters**. Our research-informed workshop model based on video-stimulated discussions proved to be successful. As there are further schools interested in the project (and participating schools who would like a third workshop), we are considering a semi-supported model where the CPD workshop materials are made available, and the schools themselves organize workshops with their own ambassadors.

d) **Evidence of spread to further schools in the autumn term 2014.** This will be investigated for our own interest and plans are already in place.

The project's overall aim was to stimulate and assess the impact of the CPD programme upon teachers' understanding of dialogue and use of dialogic approaches to teaching with the IWB. Only 19% of participants initially demonstrated a medium or strong understanding of what dialogue and dialogic teaching are, and even fewer (13%) were able to provide concrete examples of IWB use that demonstrated medium or strong understanding of dialogic teaching with that technology. Yet all teachers who shared their examples at the second workshop, as well as all 16 teachers and ambassadors that were interviewed, subsequently demonstrated a high level of understanding. This was documented in their portfolios of IWB flipcharts, Workshop 2 posters and interview accounts. It was particularly revealing – and pleasing – to see the shifts in thinking with respect to an understanding of dialogue and dialogic pedagogy actually leading to

shifts in the use of the IWB to implement a more dialogic approach. Rather than seeing the IWB as primarily a presentation tool, as many of the participating teachers had done prior to involvement in the workshops, the discussions around the nature of classroom dialogue do genuinely seem to have developed understanding of the multimodal possibilities of the tool in relation to key elements of a dialogic pedagogy. Thus, we found the IWB being used to promote collaborative meaning making (Scott & Mortimer, 2003) and to develop opportunities for individual and collective reasoning to be articulated (Mercer & Littleton, 2007). We have examples of the IWB being used as a central stimulus to teachers' open-ended, higher order questioning, which in turn encouraged pupils to articulate and justify their own points of view. Thus, the use of the IWB as a tool for the development of a dialogic pedagogy, through teachers and learners constructing digital knowledge artefacts together (Hennessy, 2011), seems to have moved from a possibility to a reality for many of our participants.

The pivotal mechanisms for this shift included the external stimulus of the video and other multimedia CPD materials provided (Sherin, 2007), the opportunities to engage in collaborative learning, critical reflection, dialogue and inquiry with like-minded peers, and the close connection to daily classroom practice through trialling and refinement of new approaches and ideas (Cordingley et al., 2003; Twining et al, 2013). Both teachers and ambassadors considered that they had experienced a dialogic approach to their own professional learning in the workshops. The participating teachers came to harness the distinctive affordances of the IWB technology to create space for learning through dialogue (Gillen, Kleine Staarman, Littleton, Mercer & Twiner, 2007; Jewitt, 2006; Warwick et al., 2010). They were keen to continue developing their practice in new directions after the research project had ended. Examples of their plans included embedding the approach in schemes of work, wider school development activities, initial teacher training, future research, and lesson observation criteria. Finally, the role of the ambassadors proved central in ensuring support for and smooth running of the programme within each cluster. Challenges they faced were mainly logistical ones and these are hopefully surmountable in future implementations of the programme. Ambassadors benefited in terms of their own professional development and leadership skills through jointly designing and running the CPD workshops.

Broadly, therefore, we are confident that the project met all its original objectives in full and:

- extended and developed teachers' understanding of both dialogic pedagogy and the potential of the IWB as a mediating tool within that pedagogy;
- broadened experience of engagement with the public and the private education sectors;
- deepened and strengthened relationships with existing contacts including schools participating in the research and piloting, as well as establishing new contacts;
- developed and tested an innovative workshop model based on video-stimulated discussion of practice;
- featured engagement with whole schools and clusters to ensure critical mass, consistent approaches, local sharing of practices and outcomes of teacher testing in the classroom;
- provided induction of ambassadors to ensure cascading and school ownership of the programme.

OUTLOOK

As the activities outlined above indicate, the project followed the original time schedule and was completed by the end of August 2014. However, the timescale for impact was quite short and we hope that a third CPD workshop and some lesson observations in at least two participating schools may be undertaken in order to evaluate the sustainability of dialogic practice supported by the IWB. The measurement of impact could be enhanced in future through conducting lesson observations before and after participation in the CPD programme, and administering a post-programme survey so as to confirm that the interview data was representative of all participants. However, the fact that counter-examples to pedagogic change did not emerge, is most encouraging.

Potential improvements to the programme structure, based on teacher and researcher feedback, include:
- scheduling more time between workshops;
- including a third workshop as part of the programme;
- teachers observing their peers in the classroom (as occurred in one school spontaneously);
- more flexible timing of the CPD to suit school circumstances.

In addition, more technical support may be beneficial. After the first two workshops we realised that not all teachers were confident users of the IWB technology and a participating teacher kindly collated a handout listing 22 steps on how to use the IWB (downloadable from http://dialogueiwb.educ.cam.ac.uk/evaluate/). This may prove useful to others too. In similar future projects we would take into account the abovementioned improvements and implement them as far as is possible.

It is notable that many schools are now introducing tablets and other similar mobile devices to support teaching and learning; schools participating in the study which had invested in these devices were encouraged to apply new dialogic approaches to their use, and did so with much success. Future development of the programme and collation of teaching resources could explicitly encompass these new technologies, particularly in conjunction with use of the IWB or new interactive flat panels that are increasingly replacing IWBS (they offer all the same functionality plus high definition and multi-touch facilities, and a long lasting LED display removes the need for a projector). Again, it is the pedagogy that is paramount, not the technology, although a large interactive screen of either type does offer very specific affordances for supporting whole class dialogue, as discussed above.

Our plans for going forward include involvement of other researchers interested in this area, including perhaps one or two of the participating teachers who may want to undertake Masters or Practitioner Professional Development research projects in the Faculty. During the CPD programme, a colleague from University of Barcelona spent a month with us as a visiting scholar. Carme Grimalt Alvaro was involved in some data collection, design of data-gathering instruments and observations of the CPD workshops. She is planning to replicate our CPD programme in Spain focussing on use of the IWB in teaching secondary science through a dialogic approach.

Further development as well as dissemination of the CPD programme over the next year or two is expected through engagement of two current postgraduate students of Sara Hennessy. Pallavi Singh, second year MEd student, has recently devised more IWB activities for mathematics and plans to investigate impact of the programme in two secondary school mathematics departments. Her research questions include: Which aspects of the CPD programme do teachers consider to be instrumental in promoting dialogic pedagogy with the IWB in mathematics? How can the programme be developed further for promoting dialogic pedagogy in IWB-equipped secondary mathematics classrooms? What adaptations and examples prove helpful? What additional support might schools need to provide? Rogerio de Paiva, incoming PhD student, will also draw on our programme in evaluating its impact on supporting dialogue and active learning, in particular researching teachers' and students' perceptions about IWB possibilities and challenges. He will conduct comparisons between the UK and Brazil concerning possibilities and challenges of IWB use.

Finally, Sara Hennessy will shortly take up an exciting opportunity to run a 4-hour hands-on workshop for a very large, private, bilingual school in Mexico. She will introduce the CPD programme to teachers across Grades K-12 and different subject areas, administering the baseline survey and a subsequent survey further down the line.

ACKNOWLEDGEMENTS

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Appendix 1 – Overview of the CPD Resources

Developing interactive teaching and learning using the IWB:
A resource for teachers

Sara Hennessy, Paul Warwick, Lloyd Brown, Diane Rawlins and Caroline Neale
Open University Press, 2014

CONTENTS

Contributors

Acknowledgements

Foreword

Guided Tour

PART A. THE TEACHER DEVELOPMENT RESOURCE

Developing interactive teaching and learning using the IWB

1. **Introduction and use of the resource**

    1.1. What is this resource for?

    1.2. How might the resource be used?

    1.3. What kinds of activities are involved?

    1.4. What does the resource contain?

    1.5. Deciding where to start

2. **Stimuli for professional development**

    2.1. Getting started

    2.2. What is dialogue?

    2.3. Considering classroom dialogue

    2.4. What role can the IWB play in supporting whole class dialogue?

    2.5. Extending our understanding of IWB technology use in a dialogic classroom to small group work and computer-based activity

    2.6. Using the Resource Bank

    2.7. Reviewing your learning

    2.8. Sharing new ideas

    2.9. Further resources

Resource Appendix 1: What do teachers use talk to do?

Resource Appendix 2: Dialogue Table

Resource Appendix 3: Expanded Dialogue Table

Resource Appendix 4: Edited extract of whole class dialogue

Resource Appendix 5: Creating a climate supportive for dialogue

Resource Appendix 6: Teacher strategies for supporting dialogue with the IWB

Resource Appendix 7: How can you engage all students in activity at the IWB?

Resource Appendix 8: How can you find out what students think?

Resource Appendix 9: Teaching and Learning Policy guidance and proposed action plan

PART B. RESOURCE BANK

Dialogue and IWB activity descriptions with screenshots: Online at
http://dialogueiwb.educ.cam.ac.uk/resources/resourcebank/

Flipchart templates – in Notebook and ActivInspire format: Online at
http://dialogueiwb.educ.cam.ac.uk/resources/resourcebank/

Reader Chapters 2-4 Appendices – lesson flipcharts in original Notebook or ActivInspire format plus jpeg
image files: Online at http://dialogueiwb.educ.cam.ac.uk/resources/appendices/

GeoGebra resource files: Online at http://dialogueiwb.educ.cam.ac.uk/resources/resourcebank/

Video clips: Online at http://sms.cam.ac.uk/collection/1085164

PART C. READER

Chapter 1: Creating a supportive environment for classroom dialogue (Simon Knight)

Chapter 2: Supporting dialogic teaching of personal safety with the interactive whiteboard in an urban
primary school (Diane Rawlins)

Chapter 3: Developing a dialogic approach to interactive whiteboard use in English: teacher reflections and
student perceptions (Caroline Neale)

Chapter 4: Using the interactive whiteboard to support dialogic teaching in history: The pupil perspective
(Lloyd Brown)

Chapter 5: Supporting dialogue by exploiting interactive features of the IWB (Sara Hennessy)

Chapter 6: Effective group work at the interactive whiteboard (Paul Warwick)

Chapter 7: Learning to learn together with ICT and with the Internet (Rupert Wegerif)
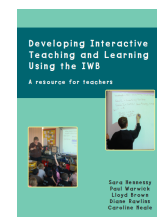
Appendix 2 – CPD ambassador briefing sheet

CPD AMBASSADOR BRIEFING SHEET

Using a CPD workshop programme to impact on the quality of classroom dialogue supported by the interactive whiteboard

What is the CPD ambassador profile? She or he...
- is interested in dialogic teaching,
- has shown enthusiasm for innovative teaching practice,
- is an effective motivator and workshop leader,
- is quick at establishing rapport with colleagues from own and other schools within the cluster,
- is highly organised and responsive, and
- is good at sustaining motivation and focus of others.

What is the CPD ambassador role?
- organising the CPD scheduling: liaising with and getting together colleagues within the cluster,
- co-leading the workshops with our researcher,
- cascading the approach to further teacher cohorts.

What benefits will the ambassador get from the CPD programme?
- being a pioneer in leading workshops on a CPD programme for increasing the quality of classroom dialogue supported by the interactive whiteboard,
- development of own dialogic teaching practice,
- supply cover for 3 days – for 2 workshops x 0.5 day plus 2 days for induction, to collate resources and to attend a cross-cluster ambassador focus group for evaluation,
- travel costs to schools reimbursed,
- a copy of the published CPD resource book (worth £25),
- access to the evolving pool of innovative IWB-based teaching ideas, flipcharts and other materials for use across subjects and key stages, and
- a report on the impact of the CPD programme.

Contact: If you would like any further information, please contact Tatjana Dragovic, Researcher, University of Cambridge (td344@cam.ac.uk or 07979 656902).
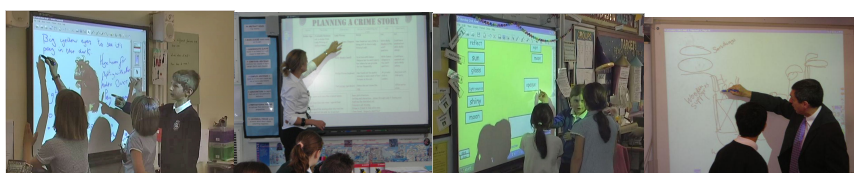
Appendix 3 - CPD Workshops outline

DIALOGIC TEACHING SUPPORTED BY THE IWB
CPD WORKSHOPS OUTLINE

CPD workshop 1:

Introduction:
- resource book
- ESRC Impact project overview (CPD activities)

Activity 1: Classroom talk and dialogue (discussion in groups and plenary)
- How do you currently use talk in lessons?
- How important is focus on talk?
- What barriers are there to using talk as a tool for learning?
- What do you understand by the term 'dialogic' teaching?

Dialogue table (by Diane Rawlins): Introduction

Activity 2: Does my own teaching support dialogue? (discussion in groups and plenary)
- Could you 'audit' your practice using the (expanded) dialogue table?
- Do you do some or all of this now?
- Look at Column 1 again: Is the ethos in your classroom supportive for dialogue? Could you make it more supportive?

Video example 1: Annotating a portrait of Queen Elizabeth I on the interactive whiteboard
Video example 2: Using open-ended prompts on the interactive whiteboard and children's recorded voices to stimulate discussion
Video example 3: Using text and pictures on the IWB to stimulate interest and initial dialogue in English

Activity 3: Discussion of videos (in groups and plenary)
- How did the portrayed teachers support dialogue?
- How did they weave the use of the IWB into the lesson activities?
- Discuss how useful/feasible these activities and strategies are in your own setting.

Resource bank: Introduction

Activity 4: Explore the 'Resource Bank' and collection of video clips
- Are any of these ideas useful to you?
- What other applications of them can you think of?
- What might be effective with your particular students?

Lesson planning (by subject/year/key stage groups)

Conclusion: Ideas for follow up

CPD workshop 2:

<u>Introduction:</u>
- short summary of CPD workshop 1
- ESRC Impact project overview (CPD activities)

<u>Activity 1</u>: Classroom dialogue so far (discussion in groups)
- Have you used classroom dialogue supported by the IWB in lessons? If yes, how? Concrete examples.
- Were there any benefits in using dialogue supported by the IWB as a tool for learning?
- Were there any challenges in using dialogue supported by the IWB as a tool for learning?

<u>Activity 2</u>: Sharing and reflecting on concrete examples/teachers material (plenary)

<u>Video example 1</u>: Group interaction at the interactive whiteboard

<u>Video example 2:</u> Brainstorming ideas as a class using the interactive whiteboard

<u>Video example 3</u>: Drawing objects on the interactive whiteboard together: collectively constructing knowledge

<u>Video example 4</u>: Dialogue after interactive whiteboard use in a secondary history class

<u>Activity 3</u>: Discussion of videos (in groups and plenary)
- How did the clips illustrate the use of the IWB for supporting dialogic teaching?
- Discuss how useful/feasible these activities and strategies are in your own setting.

<u>Activity 4</u>: Introduction to 22 steps of how to use the IWB

<u>Lesson planning</u> (by subject/year/key stage groups)

<u>Conclusion</u>: Ideas for follow up

Appendix 4 – Survey

CPD PROGRAMME ON CLASSROOM DIALOGUE SUPPORTED BY THE IWB

Introduction

This questionnaire aims to collect information about your experience of classroom dialogue and the use of the interactive whiteboard (IWB), before you participate in the CPD programme. Please complete all questions.

ABOUT YOU

1. **About you**

   Name:
   School:
   Email address:
   Phone number:

2. **Are you**

   a participating teacher
   an ambassador
   Other (please specify)
   _____

3. **Your role in school (select all that apply)**

   Early years teacher
   KS1 teacher
   KS1 coordinator
   KS2 teacher
   KS2 coordinator
   KS3 teacher
   KS3 coordinator
   Teaching assistant
   Trainee teacher
   Newly qualified teacher
   Professional development leader
   ICT coordinator
   Deputy principal/deputy head
   Principal/head teacher
   Other/additional roles (please specify)
   _____

ABOUT CLASSROOM DIALOGUE AND THE IWB

4. **I am aware of the distinctions between classroom dialogue and other forms of classroom talk.**

   Strongly disagree
   Disagree
   Neither disagree nor agree
   Agree
   Strongly agree

If you agree or strongly agree, please describe what you understand by 'dialogue'.
_____

5. **I know what a 'dialogic classroom' might look like.**

   Strongly disagree
   Disagree
   Neither disagree nor agree
   Agree
   Strongly agree

If you agree or strongly agree, please suggest a couple of features of a dialogic classroom.
_____

6. **I would value a chance to talk through issues about classroom talk and dialogue with my colleagues.**

   Strongly disagree
   Disagree
   Neither disagree nor agree
   Agree
   Strongly agree

Comment (optional)
_____

7. **I would value the opportunity to review video examples of classroom dialogue 'in action'.**

   Strongly disagree
   Disagree
   Neither disagree nor agree
   Agree
   Strongly agree

Comment (optional)
_____

8. **I would be interested in auditing my own practice to see how dialogic it is, before considering where the IWB 'fits' in developing classroom dialogue.**

      Strongly disagree
      Disagree
      Neither disagree nor agree
      Agree
      Strongly agree

Comment (optional)
_____

9. **If you consider that you sometimes use 'dialogic teaching', please give us a recent example, including the roles of the students and yourself in the dialogue:**

_____

10. **I am interested in examining the role that the IWB has to play in supporting my dialogic practice.**

      Strongly disagree
      Disagree
      Neither disagree nor agree
      Agree
      Strongly agree

Please explain why you are interested/disinterested:
_____

11. **How long have you had an interactive whiteboard in your classroom?**

      Less than a year
      1 year
      2 years
      3 years
      more than 3 years

12. **Approximately how many times on average per week do your students interact directly with the IWB (using fingers/stylus/slate/tablet)?**

      Never
      In 1-3 lessons
      In 4-7 lessons
      In 8-10 lessons
      In more than 10 lessons

What kind of uses do students make of the IWB?
_____

13. So far I have been using the IWB for (select all that apply):

displaying my Power Point presentation or other resources/websites
showing videos
displaying picture(s) to stimulate discussion
class brainstorm
highlighting and annotating texts or images
focusing attention using spotlight, magnifier or 'cover and reveal'
drawing objects
dragging and dropping objects
none of the above
Other (please specify)

_____

14. I think I have used the IWB to support classroom dialogue.

Strongly disagree
Disagree
Neither disagree nor agree
Agree
Strongly agree

If you agree or strongly agree, please describe how you did this in as much detail as you can:
_____

15. I am keen to develop more dialogic practices with the IWB.

Strongly disagree
Disagree
Neither disagree nor agree
Agree
Strongly agree

Comment (optional)
_____

16. I would be willing to share with other teachers any new practices I develop.

Strongly disagree
Disagree
Neither disagree nor agree
Agree
Strongly agree

Comment (optional)
_____

THANK YOU
Many thanks for filling out this survey. Your help will enable us to get a better understanding of the relevant issues in the area.

Appendix 5 – Semi-structured interview for ambassadors

STUDY ON DIALOGIC TEACHING SUPPORTED BY THE IWB
AMBASSADOR INTERVIEW SCHEDULE

I <u>Questions on the value of their ambassador role in the CPD programme:</u>

1. What was most valuable for you in taking the role of an ambassador in the CPD programme?

2. Has your teaching practice improved as a consequence of taking part in the CPD programme?

   If yes, could you give us some concrete examples?

   If not, what might have been the reasons?

Look/prompt for concrete impact of their ambassador role on their CPD and teaching practices

II <u>Questions on challenges:</u>

3. Have you encountered any challenges? If yes, what was the greatest challenge?

   Did all the teachers participate equally? If not, what might have been the reasons (technical or others)?

   How did you motivate teachers?

III <u>Questions on the future steps/sustainability:</u>

4. How do you plan to continue your own and teachers' CPD on dialogic teaching supported by the IWB?

5. Do you have any suggestions for improving the CPD programme?
   If yes, please describe how.

Appendix 6 – Semi-structured interview for participating teachers

STUDY ON DIALOGIC TEACHING SUPPORTED BY THE IWB
TEACHER INTERVIEW SCHEDULE

I Questions on the usefulness of CPD programme:

1. What was most valuable/useful for you in the CPD programme?
    What have you got out of your participation in CPD workshops?

2. What ideas that you got at CPD workshops have you tested or adapted and what has worked? (or has not worked)

Look/prompt for concrete impact of CPD workshops on teachers' practices

II Questions on classroom talk and dialogue:

3. What do you understand now by the term 'classroom dialogue/dialogic teaching'?
    Which features of classroom dialogue/dialogic teaching would you say you are particularly fond of? Which of them do you use most frequently?

4. How do you distinguish classroom dialogue from classroom talk?

Look/prompt for teachers' understanding of both approaches and their distinctions

III Questions on the use of the IWB for classroom dialogue:

5. Since you participated in the CPD programme, have you used the IWB to support classroom dialogue?
    If yes, please describe how you did this
    How many times on average per week have your students interacted directly with the IWB since last CPD workshop?

6. Which features of the IWB have you used and found most appropriate for supporting classroom dialogue? (give concrete examples)
    Have you tested some features you have not used before?
    Was it you or students using them?

7. What kind of activities/teaching materials have you developed yourself or with colleagues?

    Would you be willing to share them (and any future materials) with other teachers?

Look/prompt for concrete examples

IV Questions on the future steps/sustainability:

8. What features of classroom dialogue and the IWB do you plan to continue using in the future?

9. Is there anything you would like to add about how to further develop classroom dialogue supported by the IWB?

Appendix 7 – Coding scheme for survey questions 4, 5, 9 and 14

STUDY ON DIALOGIC TEACHING SUPPORTED BY THE IWB

Q4: I am aware of the distinctions between classroom dialogue and other forms of classroom talk.

Q5: I know what a 'dialogic classroom' might look like.

Q9: If you consider that you sometimes do 'dialogic teaching,' please give us a recent example, including the roles of the students and yourself in the dialogue.

Q14: I think I have used the IWB to support classroom dialogue.

DEFINITIONS for LEVELS OF UNDERSTANDING	EXAMPLES
Weak/No understanding: Comments which refer only to talk, discussion, group work, pair work, wait time, open-ended tasks/questions, higher order questions, teacher as facilitator, unelaborated reference to 'talk task' etc. , moving learning forward, brainstorming	**Q4:** 'Chat to do with learning in the classroom.' **Q5:** 'Pupils sit in groups.' **Q9:** 'Talk partners - discuss answer with partner before bringing it to the whole class. Thinking time (think-listen-say).' **Q14**: Provides a focal point for the classroom dialogue. Involved more learners by catering for visual and kinaesthetic learners. Encourages all types of students to give standing at the front a go (a reason to stand up to control the IWB or write on it – less scary or intimidating than simply standing up and talking)
Medium: Comments which refer to some of the elements of dialogic teaching (e.g. rules for talk, collaboration, complementary roles within groups, "talk for learning", striving to reach consensus through discussion, teacher learning with/from students, annotation on IWB during class discussion, use of images to stimulate discussion, listening to others, equality and free expression of views) but lack overall big picture/clarity/explicit responsivity	**Q4:** 'Input and discussions leading to collaborative learning between teachers and students and between students and their peers.' **Q5:** 'Clear rules and boundaries for 'talk' established; teacher confidently modelling/scaffolding/leading the class to a conclusion'. **Q9:** 'Problem solving in maths where each child has a role in the investigations so they each brings as aspect of the task to the group discussion.' **Q14**: 'By displaying a list of questions or statements for discussion By displaying an image for discussion By showing videos which then lead to discussion.'
Strong: Comments which refer to responding to other people's ideas, debating, building on each other's ideas, co-construction of knowledge and learning, exploring different perspectives, challenging or disagreeing with others	**Q4**: 'Dialogue requires thinking. It requires questions which involve more than just recall, answers which are justified, contributions which build on existing ideas but extend to create new understandings, all within an atmosphere of trust and respect for the ideas of others which make this possible.' **Q5:** 'Everybody's contributions are valued and respected. People build on each other's ideas.' **Q9:** 'I will offer a controversial viewpoint on a character (say Mercutio was responsible for his own death) and divide the class into agree or disagree, then argue the point around the room, each student responding to the rest of the class.' **Q14:** 'As a stimulus - displaying a photograph that had been magnified. There was no right or wrong answer for the suggestions. I had told the children that I wasn't aware of the object. Using SMART I was able to annotate the picture and these ideas were developed and added to new lines of investigation. There was a real buzz in the room as the children challenged each other.'

Appendix 8 – Categories and emergent themes for semi-structured interviews (teachers)

STUDY ON DIALOGIC TEACHING SUPPORTED BY THE IWB

CODING for SEMI-STRUCTURED TEACHER INTERVIEWS

(Categories and emergent themes)

Table 1 Coding phases

Phase of coding	Outcomes	Type of coding
1st/ (Primary) coding	4 pre-determined categories	Deductive coding
2nd (Secondary) coding	Emergent themes in each category (13)	Inductive coding

Table 2 Categories based on the data-gathering instrument and emergent themes in each category

CATEGORIES	THEMES
1. How teachers benefited professionally from the CPD programme	A) Opportunity to discuss, share and reflect B) The resource book C) Becoming familiar with and focused on dialogic teaching D) Motivation to use the IWB and overcoming reluctance
2. Concrete examples of improved teaching practice	
3. Understanding of dialogic teaching after participation in the programme	A) Pupil-led/pupil-driven process B) Build on each others' ideas C) More layered approach than just classroom talk D) Allowing pupils independence and responsibility for their own learning
4. Sustainability – what is next?	A) Further development of own dialogic teaching practice B) Value of having and using an ambassador in the future C) Cross-department groups D) Whole school initiative E) Dissemination of the acquired knowledge/ skills (within own school and among other schools)

Appendix 9 – Categories and emergent themes for semi-structured interviews (ambassadors)

STUDY ON DIALOGIC TEACHING SUPPORTED BY THE IWB

CODING for SEMI-STRUCTURED INTERVIEWS for AMBASSADORS
(Categories and emergent themes)

Table 1 Coding phases

Phase of coding	Outcomes	Type of coding
1st/ (Primary) coding	4 pre-determined categories	Deductive coding
2nd (Secondary) coding	Emergent themes in each category (11)	Inductive coding

Table 2 Categories based on the data-gathering instrument and emergent themes in each category

CATEGORIES	THEMES
1. What ambassadors valued in their role	A) Co-delivery and co-design of the CPD workshops B) Own professional development C) Collegiate sharing and enrichment D) Leadership role development E) Awareness of adult learning processes
2. Concrete examples of improved teaching practice	
3. Challenges of ambassador's role	A) Time and regular workload pressure B) Coordination across schools C) Pre-existing well established practice of dialogic teaching supported by the IWB
4. Sustainability – what is next?	A) Dissemination of the acquired knowledge/skills (within own school and among other schools) B) Further cooperation/follow up with University of Cambridge C) Introducing dialogic teaching supported by the IWB as initial teacher training students' weekly targets D) Integrating dialogic teaching supported by the IWB as a criterion for outstanding lessons