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Question-posing and Question-responding: the heart of 'Possibility Thinking' in the early years

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Question-posing and Question-responding: the heart of ‘Possibility Thinking’ in the early years

Abstract

Drawing on research which sought to explore the characteristics of ‘Possibility Thinking’ⁱ as central to creativity in young children’s learning, this paper considers question-posing and question-responding as the driving features of ‘Possibility Thinking’ (PT). This qualitative study, employed micro-event analysis of peer and pupil-teacher interaction. Events were sampled from two early years settingsⁱⁱ, one a Reception classroom (4- to5-year olds) and the other a Year 2 classroom (6- to7-year olds). This article arises out of the second stage of an ongoing research programme (2004 – 2007) involving the children and practitioners in these settings. This phase considers the dimensions of question-posing and the categories of question-responding and their inter-relationship within PT.

Three dimensions of questioning were identified as characteristic of PT. These included: (i) *question framing*, reflecting purpose inherent within questions for adults and children (including leading, service and follow-through questions); (ii) *question degree*: manifestation of degree of possibility inherent in children’s questions (including possibility narrow, possibility moderate, possibility broad); (iii) *question modality* manifestation of modality inherent in children’s questions (including verbal and non-verbal forms). The fine-grained data analysis offers insight into how children engage in PT to meet specific needs in responding to creative tasks and activities and reveals the crucial role that question-posing and question-responding play in creative learning. It also provides more detail about the nature of young children’s thinking, made visible through question-posing and responding in engaging playful contexts.

Key Terms: ‘Possibility Thinking’, PT, question-posing, question-responding, creative learning, teaching for creativity

Introduction

There are many ways of situating creativity within education, in terms of the broader discourse, as well as the close-up conceptualisation. Banaji and Burn (2006) identify nine different discourses on creativity in education, attributing the notion of ‘ubiquitous’ creativity (creativity as everyday, lifewide and pervasive) to Craft (2000, 2001), and within this, PT (Craft, 2001; Craft, Cremin, Burnard and Chappell, 2008). With its focus on posing the question ‘What if?’ in multiple ways, Craft (2000) suggests that PT can be construed as the ‘engine’ of creativity. It involves the shift from asking ‘What is this and what does it do?’ to ‘What can I do with this?’ particularly in relation to identifying, honing and solving problems (Jeffrey, 2005, Jeffrey and Craft, 2004). PT thus offers a conceptualisation of creativity as a common core across domains of activity. It provides means by which questions are posed or puzzles surfaced (Craft, 2002), whether as conscious questions or much more unconsciously in the flow of engagement. Originally a conceptual project, PT is seen as being as vital to ‘high c’ creativity (for example, in the work of a choreographer, or the creative engagement of a physicist) as it is at the other end of the spectrum, ‘little c’ creativity (for example, in a five-year-old working out how to make exactly the right colour of paint, or an adult designing a meal from an unexpectedly limited number of ingredients).

The research reported in this article aims to tackle some of the complex issues in identifying and documenting micro elements of creative behaviour. In doing so we track the emergence and phases of our ongoing study of PT, referring specifically to PT as positioned and framed within some of the existing orthodoxies that form an integral part of the literature and traditional ways of thinking associated with creative learning.

Since 2004, empirical work on PT has been carried out in three Early Years settings. Stage 1 of the research (Burnard, Craft & Cremin, 2006; Cremin, Burnard & Craft, 2006) focused on teacher thinking (via video-stimulated review of classroom segments) to identify teachers’ view on what constitutes PT. Findings identified a number of distinct but interlinked features of children’s and teachers’ engagement with

PT which were valued and fostered in the context of an enabling environment. These included: posing questions, play, immersion, innovation, being imaginative, self-determination and risk-taking, as shown in Figure 1.

INSERT Figure 1: Stage 1 Model of PT

Stage 2, reported on in this paper, involved further data collection of child-centred activity with fine-grained analysis of their classroom interactions via micro-event analysis (Burnard, Craft & Cremin, 2006). Here we have focused the transition from ‘what is’ to ‘what might be’ on the nature of question-posing and subsequent responding, exploring the ‘how’ of PT as identified in immersive, playful contexts.

There is a vast literature on questioning as a classroom activity and different types of talk including the bodies of work of Wragg (e.g. Brown and Wragg, 1993) and Mercer (e.g. 2002,) and Wegerif (e.g. 2005). In the literature, ‘question-posing’ ‘posing questions’ and ‘questioning’ refer to the interaction perspectives, practices and products that define how learners and learners, and learners and teachers, interact and collaborate (Joiner *et al*, 2000). The approach of the Reggio Emilia pre-schools in Northern Italy is one manifestation of such co-researching, involving co-learning, reflecting, revisiting, and reconsidering engagement (Malaguzzi, 1993). The Reggio approach is distinctive in its consistency of approach to provocation, shared exploration and documentation (Rinaldi, 2006) and offers a broad conceptualisation of learning and the learner as an enquiry-based process. Our work focuses right in on the heart of enquiry in the early years classroom, albeit in settings beyond the Reggio context. This paper considers question-posing and responding as the core and driving feature of PT, and so to a certain extent enters distinct new territory, particularly in the context of playful engagement.

Figure 2 provides a representation of the focus for analysis in the PT Study Stage 2 (Craft, *et al*, in press), and sets the context for analysis of teachers’ and children’s question-posing and responding.

INSERT Figure 2: Representation of Focus of Analysis in PT Stage 2

Figure 2 shows how early Stage 2 analysis led to the categorization of play and immersion as the context for PT and behaviour, hence their representation around the diagram edges. Analysis also indicated that action/intention and self-determination were better described as permeating through PT rather than being core components. Innovation was conceptualised as a possible outcome of PT and thus a condition for attributing creative learning.

Our conceptual and empirical work is influenced by several influential approaches mapped out by Sternberg (2003), in particular the humanistic approach, drawing on Maslow's notion of creativity as self-actualization (Maslow, 1970). Our work is also influenced by approaches focusing on social-personality factors, and seeks in part to explore characteristics summarised by Brodin (1992) who, in a synthesis of studies of 'the creative personality', found surprising agreement between studies, which highlighted the following characteristics of the creative person:

- Strong motivation
- Endurance
- Intellectual curiosity
- Deep commitment
- Independence in thought and action
- Strong desire for self-realization
- Strong sense of self
- Strong self-confidence
- Openness to impressions from within and beyond self
- High sensitivity
- High capacity for emotional involvement in their work
- Willingness to take risks

This PT work has sought to explore the creativity of ordinary children, rather than the 'extraordinary creative', and in the development of our partially pragmatic model of pedagogy and learning, we have been influenced by the broad principles of 'confluence' in the study of creativity – i.e., the merging of multiple components in the manifesting of creativity. In the sense that we are seeking to externalise social-cognitive processes, in a way that can be practically understood by and challenge the early years practitioner, we

are seeking to develop a pragmatic-cognitive model as a representation of how this productive force functions in educational contexts (Craft, 2008).

Methods

We have adopted a case study approach, where the case is bound as classroom interaction in three sites, working with three teachers over time to develop understanding of each: Thomas Coram Early Childhood Centre in London (providing for children aged 0-5), Cunningham Hill Infant School in South East England (providing for children aged 4-7), and Hackleton Primary School in the English Midlands (providing for children aged 3-11). The teachers and their classrooms were originally selected as they were featured by the Qualifications and Curriculum Authority (QCA, 2005a, b) as successfully nurturing pupil creativity. Whilst policy-selected settings may not be a sufficiently robust criterion of selection in its own right in representing either the only or best practice, since two of the researchers (Craft and Woods) involved in exploring PT contributed as independent experts to the identification of sites, we argue that the sites nevertheless represent robust choices, identified through researcher-triangulation. We adhered to the BERA Revised Ethical Guidelines (BERA, 2004) in our research design and informed consent and the right to withdraw for any and no reason was ensured for all participants. Care was taken to safeguard all data and to anonymise where appropriate. Following discussion with participants, and given the original source of the sites, as publicly recognised centres of excellence for creativity, the agreement was made to name settings and staff, but not children.

Stage 1 data sources included interviews, participant and non-participant observation, video material (both QCA's and additional material collected specifically for the project), and whole group data surgery sessions using video-stimulated review and other techniques. Naturalistic collaborative enquiry approaches encouraging careful reflection on and reconstruction of practice, sat alongside observation and systematic event recording.

Data Collection and Analysis Methods

During Stage 2, the focus shifted to more detailed investigation and documentation of core features, particularly asking: what are the dimensions of question-posing and the categories of question-responding and their inter-relationship within PT? The case study approach remained constant, but methods were selected to enable fine-grained data collection and analysis. Video data of classroom activity from the two sites was collected which represented a range of play and of individual, paired and group activity, and reflected a gender balance. An *episode* was defined as a video section in which a child or children were immersed in sustained focused playful activity, where that activity was discrete and where children's thinking was evident. On the basis of these criteria eight episodes were selected from the Cunningham Hill episodes, and ten from the Hackleton episodes. Two additional criteria (thinking made visible through verbalisation or action; episodes should come from beginning, middle and end of activity) were then used to select down to approximately 7 minutes of episodes for each site.

From there, *event record* or *event sampling* analysis was drawn from the detailed transcriptions of eight episodes of action and talk by a particular child in contemplative time or immersed activity and from children's interactions as they engaged with a particular object, event or setting. A useful frame for understanding children's learning is to document at the micro level each of the actions – non-verbal and verbal - used by children to 'possibility think' in educational settings. We hoped that the documentation of brief episodes of children engaged/immersed in short sequences of talk and action would illustrate something of the kind of variation with which PT might be concerned. It was decided that event or activity recordings would be helpful to describe a specific recurring activity. The activity record, as detailed by Werner (1992) and Werner & Schoepfle (1987) was used to document specific actions and make activities very explicit. Sampling criteria for an event were defined as: fluid action; no apparent hesitation; intentional activity.

Both the visual and verbal data of each episode were transcribed, so that co-occurring verbal and non-verbal behaviour could be considered together. Notations for the transcription of gaze and other conventions were adapted from Heath and Luff (1993)

and are summarised in Appendix 1. The *unit of analysis* was a single discernable action, with each change of action signalling a new unit e.g. putting one brick on top of another; rubbing eyes; running away (Hall, 1992).

The observations were further elaborated in interpretive commentaries for each transcript. These commentaries classified analytic observations from the transcript under what seemed the most appropriate category from the features of PT. We used the elements themselves as analytic categories when relevant to the data and proposed new subcategories when helpful in further describing the data. In this way it was possible to generate empirically grounded categories of thinking which both characterise and elaborate the features. General analytic findings from each episode were then examined against the framework, working both inductively and deductively using the existing PT framework (Craft, 2000).

In this paper, we concentrate on analysis of episodes from two sites, thus differentiating the schools from the Early Childhood Centre.

Participant Schools

Cunningham Hill Infants School is situated in a South Eastern English County. Serving a mixed community including families living in social housing and those in privately-owned homes, this popular, over-subscribed school has won many excellence awards under the leadership of an inspirational headteacher and long-standing staff team. In 2006 it received an 'Outstanding' grade from the Government's Inspectorate, OFSTED. Staff strongly encourage children's ownership of space and contribution of their ideas to the development of the learning environment, in particular through interactive display. Considerable time is devoted to developing children's skills and knowledge to facilitate this co-participative approach to the learning space.

The Reception class children (4-5 year olds) and their teacher, Jean Keene, were the focus for the research within Cunningham Hill School. The episodes were drawn from a morning's activity of planning and then seeing through a birthday party for two

large stuffed animals, Rory the tiger and Rodney the moose; including designing and making party hats and bags, a birthday cake and games.

Hackleton Primary School is a small school with mixed aged classes situated in middle England and serving a widespread suburban/rural community. Creativity has been at the centre of the curriculum for several years combined with a specific commitment to fostering responsibility and independence. Research, reasoning and recording are seen to be essential complements to the traditional '3 Rs'. The Key Stage One teachers, focus upon developing both autonomy and agency through the planned 'curriculum flows'. The emphasis is on children working in teams, experiencing, exploring and reflecting whilst their teacher frames creative opportunities, acting both as a guide and a resource to support learning.

The Year 2 class children (6-7year olds) and their teacher, Dawn Burns were the focus for the research within Hackleton School. The data was contextualised within an initial curriculum focus upon Florence Nightingale, which had flowed, (through the children's interest), into a dual focus on the life and work of Mary Seacole. The episodes were drawn from an activity which involved the teacher inviting the children to design and build models of carts to transport injured soldiers from a Crimean battlefield to Mary Seacole's hospital on the Black Sea. They were offered a range of materials, including rectangles and circles of cardboard and wooden dowelling to construct their emergency vehicles

Findings

In articulating the findings this section focuses, in part 1, on the dimensions of question-posing, and, in part 2, on the categories of question-responding, and how question-posing and responding interrelate within PT.

Part 1: Question-posing within PT

One of the most important features of PT seems to be the presence of question-posing. In exploring question-posing, three dimensions of questioning were identified as characteristic of PT. These were:

Dimension 1 - Question Framing: i.e. manifestation of purpose inherent within questions for adults and children (leading, service and follow-through questions)

Dimension 2 - Question Degree: i.e. manifestation of the degree of possibility inherent in children's questions (possibility narrow, possibility moderate, possibility broad)

Running across **Question Framing** and **Question Degree**, is

Dimension 3 - Question Modality: i.e. the manifestation of modality inherent in children's questions (verbal and non-verbal forms)

Table 1 provides examples of the full range of the different questions posed and analysed within the data from Cunningham Hill and Hackleton Schools. The *type of question framing* is in the left column, with *question degree* in the next column. The coding in brackets is structured with the dimension of question framing labelled first (e.g. in row 1: *Leading Question Possibility Broad*), then the dimension of question degree of possibility labelled second (e.g. in row 1: *Leading Question Possibility Broad*). The *question modality dimension* is indicated by the label ^{n-v} or ^v (e.g. in row 1: *L Question_{p-b}^{n-v} or ^v*). **Bold** is used within the table to indicate the fuller examples, which include discussion of question-posing and the related activity of question-responding, that are given in two discrete episodes towards the end of the findings section (starting on page 11).

The evidence within the Table draws on the four episodes selected from each of the two sites. In Cunningham Hill the episodes related to the children and teacher preparing a birthday party for two large, stuffed animals, and by the end of the morning celebrating their birthdays. In Hackleton the episodes related to the children's response to a request from their teacher to build model carts to transport injured soldiers from a battle site to a field hospital.

Table 1: Question categories and range of examples from different sites

Question Framing	Question Degree	Example (numbers indicate line number within transcript)
1 Leading Question	Possibility broad	<i>'Possibility-full' leading q posed in the environment within which children play</i> ⁴ (TC)* (L Question _{p-b} ^{n-v or v})
2 Leading Question	Possibility moderate	A lengthy Q and A session results in: What are we going to do to have a birthday party for Rodney + Rory? (Cunningham Hill) (L Question_{p-m}^{n-v or v})
3 Leading Question	Possibility narrow	Mrs Burns + children do Q + A/build up re making soldiers carts resulting in: How can you make a cart to transport the soldiers to the hospital? (Hackleton) (L Question_{p-n}^{n-v or v})
4 Service Question	Possibility broad	1 Jo places model on table Karen, holding square wooden blocks, picks up piece of orange cord from the floor (Hackleton) Mrs Keene + children decide to make party bags + contents for Rodney + Rory as part of the birthday party (Cunningham Hill) (S Question _{p-b} ^{n-v or v})
5 Service Question	Possibility moderate	8 Mrs Keene: "Who can help Rhianna to make this into a hat? Would you be able to?" (Cunningham Hill) (S Question _{p-m} ^{n-v or v})
6 Service Question	Possibility narrow	2 Amy (to Niamh in the play area): "How's he gonna squeeze through the doorway? How's he gonna squeeze through the door?" (Cunningham Hill) 15 Rhianna: "There we go, now we can go see (?)" Rhianna picks up the hat untangling a pen from the wool strap (Cunningham Hill) (S Question _{p-n} ^{n-v or v})
7 Follow-through Question	Possibility broad	5 Abu picks up the dowelling Abu>dowelling: "what's that going to be then?" (Hackleton) (FT Question _{p-b} ^{n-v or v})
8 Follow-through Question	Possibility moderate	9 Abu: "like this?" Abu picks up a pair of scissors and grips them onto the dowelling (Hackleton) 3 Hannah moves the framework closer to her + adjusts it so that axle sits at 90 degrees to connecting bar (Hackleton) 13 Shifts made object around in her hands, gradually raising it to eye level 14 "A necklace" _to camera Jessie raises the object to put it over her head 15 The loop with the feather won't go over her head _to camera "Or a (?little) hat" 1 – 14 n-v articulated q across beginning of episode as to the 'what-if?' of how the hat might be decorated (Cunningham Hill) (FT Question_{p-m}^{n-v or v})
9 Follow-through Question	Possibility narrow	7 Hannah is holding an axle (detached from previously connected bar) in her L hand. With her R hand she is putting a piece of thin cardboard up against the axle <axle:Gemma> 23 Neil: "Two wheels at the back- two small wheels at the back and two wheel- two big wheels at the front so that'll work won't it?" 4 Hannah adjusts the connecting bar between the axles, then places a piece of cardboard on top of the framework. She then turns the piece of cardboard round; one corner finishes resting on a wheel >framework (Hackleton) 7 >>>>Chair 1. Removes chair which has caught on Rodney's leg 9 Stops as his legs get caught on another chair

⁴ This example from Thomas Coram Early Childhood centre is included even though the article focuses on the two school sites, as it is the only exemplification of Leading Question Possibility-broad.

		<p>14 Niamh attempts to put her arms around Rodney’s neck from one angle <Rodney:her arms></p> <p>16 Puts her arms under his neck whilst bending lower down</p> <p>22 “Which party bag shall it go in?”</p> <p>20 Jessie: “aaerh” Points end of glue stick towards her >>>> glue stick</p> <p>39 Jessie pulls hat away: “Let’s just check if it will fit him” <Rhianna:hat> (Cunningham Hill) (FT Question_{p-n}^{n-v or v})</p>
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Dimension 1: Question Framing

Question framing refers to the way in which questions are framed in terms of the purpose they serve in the classroom regarding moving on the process of PT. They arise in three forms:

(i) *Leading questions* are those which provide the over-arching framework, or main question of PT. In Cunningham Hill, this was: “What are we going to do to have a birthday party for Rodney (large toy moose) and Rory (large toy tiger)?” (Row 2, Table 1) (L Question_{p-m}^v) and in Hackleton: “How can you make a cart to transport the soldiers to the hospital?” (Row 3) (L Question_{p-n}^v). In both classrooms, after an extended discussion with the children, these questions were verbally articulated by the teachers in order to frame and lead the PT that was to ensue.

(ii) *Service questions* are those posed in the service of the leading question. Their purpose is to move on the PT in relation to responding to the leading question. For example in Row 6, (S Question_{p-n}^v), Amy with Rory, who is nearly as big as her, in her arms (to Niamh in the play area) asks: “How’s he (Rory) gonna squeeze through the doorway? How’s he gonna squeeze through the door?” The children are working within the leading question of “What are we going to do to have a birthday party for Rodney and Rory?” Their PT in responding to this has led Amy to wanting to find a way to get Rory into the playhouse, as part of the organisation for the party. In most cases, it was children posing these service questions, although the teacher did intervene to assist in articulating some of these in Cunningham Hill.

(iii) *Follow-through questions* frame the minute detail of the final stage activities that achieve outcomes, whether concrete or abstract, of PT. In Row 8, involving the model cart-building activity : “Abu asks: “like this?” (FT Question_{p-m}^v) “Abu picks up a pair of scissors and grips them onto the dowelling” (FT Question_{p-m}^{n-v}).

This is within the context of Abu and Ben, his partner, making a set of axles for the wheels of their cart (responding to the leading question of how to make a cart to transport the soldiers, and service questions which have led to decisions about base platforms for the cart, roof design, wheels and axles). Abu is posing a ‘what if’ question to Ben regarding how they might follow-through making the dowelling (the axle to be) the right length to fit the base of their cart. His question leads to the boys working through how to measure and cut the dowelling to make the axle.

Dimension 2: Question Degree of Possibility

This dimension regards the manifestation of the degree of possibility inherent within children’s questions (including *possibility broad*, *possibility moderate*, *possibility narrow*). A metaphor which may be useful here is to think of the degree of possibility as represented by different lenses of the eye. There were three forms.

(i) *Possibility broad* is the broadest kind of questioning, and is like viewing a situation through the 360 degree lens of a fly’s compound eye, a whole variety of possibilities exist, none of them are clearly in focus or well defined but the lens applied to the questioning is 360 degrees. It is this lens that Abu is using when he is making his model cart within the service question exemplified in Row 7: Abu picks up the dowelling Abu>dowelling: “what’s that going to be then?” (FT Question_{p-b}^{n-v or v}). Abu and Ben have responded to the leading question of how to make a cart to transport the soldiers, and have generated service questions which have led to decisions about the base platform for the cart, the roof design, wheels and axles. When Ben brought a piece of dowelling to the table, Abu was prompted to ask his question regarding what part of the cart it was going to be. At this point the piece of dowelling (cut up, stuck together, on its side, on its end, snapped in half, painted, glued, etc.) could have become any constituent part of their cart; Abu’s question is full with possibilities. It transpires from the ensuing episode that it is in fact going to form the axle for the wheels, one of the potential ‘what ifs’ emergent from the PT process the boys are engaged in.

(ii) *Possibility moderate* is in between the possibility broad and possibility narrow questions. In Cunningham Hill, the leading question “What are we going to do to have a birthday party for Rodney and Rory ?” is possibility moderate in its capacity for

responses (around the 180 degree range in terms of the lens metaphor). This question has greater possibility within it than the specific cart making activity framed by the teacher in Hackleton.

(iii) *Possibility narrow* is the tightest and most focused kind of questioning. It is like looking at the situation through the lens of a camera-type eye (a descriptor used by Richard Dawkins to describe the human eye because of its ability to pinpoint focus clearly on an image), focusing on perhaps 20 degrees of the possibilities available. In the example in Row 6 (S Question_{p-n}^v), regarding Amy trying to get Rory through the playhouse door, the possibilities are very limited and in fact, after trying to squeeze him through the door, it turns out not to be a possibility at all as he will not fit, and the girls pass him around the side wall of the playhouse.

Dimension 3: Question Modality

This relates to the modality within which questions are expressed whether *verbal* or *non-verbal*. It is currently the most tentatively expressed of the question-posing dimensions. However, it was felt important to include it within the paper in its current form, highlighting it as an area for further investigation within the PT framework. Table 1 shows a range of questions posed verbally. Of equal interest are the questions that the children manifest non-verbally in the actions, dynamics, timings and relationships of their physical behaviour. Non-verbal question-posing is exemplified particularly well in the first full episode detailed below, involving Hannah and Gemma manually manipulating and building the axle and base for their cart, and, is an area for further analysis.

Part 2: Question-responding and question-posing: the nature of their relationship and role within PT

Two episodes, one from each site are given below in order to provide examples of:

- (a) a non-verbal question sequence in context; and
- (b) the relationship between question-posing and question-responding, and the sub-categories of the latter. Each episode includes transcription followed by interpretive commentary, and was chosen as it was felt to be the best

exemplar of (a) and (b). Participants' simultaneous moves are shown in the middle and right hand column.

Cunningham Hill Episode

Leading question: "What are we going to do to have a birthday party for Rodney and Rory?"

Table 2: Part of Episode 6a, Cunningham Hill School: transcription and coding

Coding	Main activity	Relevant simultaneous activity by another
S Question _{p-n} ^v	8 Mrs Keene: "Who can help Rhianna to make this into a hat? Would you be able to?"	
	9 Jessie approaches with hand in the air	Mrs Keene: "Oh Jessie will"
	10 Mrs Keene gives Jessie the piece of paper	
	11 (?Says something to first girl – unclear)	
	12 Jessie takes the piece of paper from Mrs Keene >>>>piece of paper	
Predicting/imagining ^{n-v} (L13 – 19)	13 She walks back to original table putting the edges of the piece of paper together to make a tube.	She is being followed by Rhianna.
Repeating ^{n-v}	14 The edges slip out of her fingers as she walks and she pulls them back together again	
	15 She lets the edges go and puts the piece of paper on the table	
	16 She picks up a glue stick >>>>glue stick then >>>>piece of paper	
	17 She takes the lid off the glue stick and puts in down on the table >>>>glue stick	
	18 She takes the corner of the piece of paper and flips it over	Rhianna >>>>piece of paper
	19 Jessie folds over the corner of the piece of paper and puts the glue stick to the paper	
Follow through Question _{p-n} ^{n-v}	20 Jessie: "aaerh" Points end of glue stick towards her >>>> glue stick	
Completing ^{n-v} (L21-22)	21 She twists the end of the glue stick to make the glue end come out >>>>glue stick	
	22 She puts the end of the glue stick to the paper and makes circular motions on the folded over corner	Rhianna holds up piece of string + strip of flowers >>>>string + flowers
Predicting ^{n-v}	----- 23 Jessie holds the glued corner to the opposite bottom corner of the piece of paper	Rhianna holds the edge of the paper that Jessie is working with >>>>piece of paper >>>>Jessie

	to make a tube >>>> piece of paper.	
Evaluating ^v	24 The two edges spring apart - >>>> piece of paper Jessie: “Oh dear”	
Repeating/completing ^{n-v}	25 Jessie presses the edges of the paper together again	Jessie: “, you might need to wait a little while”
Predicting ^v		
Completing ^{n-v}	26 Jessie puts the glued piece of paper on the table and walks away	
Predicting/ imagining ^{n-v} + v	27 Rhianna picks up the string and flower strip >>>> string + flowers	
	28 >>>>glued piece of paper	Reaches out to the glued piece of paper and quickly retracts it
	29 _Mrs Keene across the table. Raises the string and the flower above her eye level to show them to the person across the table: “Now then, look, decorations”.	
	30 Puts string + flowers back on the table	Mrs Keene: “Have you said thank you to Jessie?”
	31 Walks around corner of table _person across the table	
Repeating ^{n-v}	32 >>>>glued piece of paper _Mrs Keene	Rhianna holds either side of the glued together edges of paper
Rejecting, predicting, compensating ^{n-v + v}	33 Jessie sticks a piece of sticky tape across the glued together edges: “To make sure it will stay stuck on” >>>> glued piece of paper	
Completing ^{n-v + v}	34 <Rhianna:piece of paper Jessie: “The glue don’t work, do that well” Presses sticky tape onto the join	Rhianna_Mrs Keene
	35 Rhianna _to camera	
	36 Jessie picks up the hat by the join _Mrs Keene	Mrs Keene: “That’s lovely”
	37 Jessie turns the hat around >>>>hat	Rhianna >>>> hat
	38 Gives hat to Rhianna ,,from Rhianna	Rhianna >>>> hat Rhianna goes to take hat
Follow Through Question _{p-n} ^v	39 Jessie pulls hat away: “Let’s just check if it will fit him”	Rhianna:hat>
	40 Rhianna nods: “Come on”	

Interpretive Commentary, Cunningham Hill episode

Question-posing – In this episode, the first question is clearly framed by Mrs Keene at the beginning of the episode (Row 8, Table 2): “Who can help Rhianna to make this into a hat? Would you be able to?”. This is a Service question possibility moderate (*S Question_{p-m}^v*) which curtails the degree of possibility for consideration, but is occurring in

the service of the wider leading question ($L\ Question_{p-m}^v$): “What are we going to do to have a birthday party for Rodney and Rory?”. Within this episode, there is also a non-verbal follow-through question (Row 20, Table 2) as to why the glue-stick is not gluing the corners of the A4 piece of paper together to make the hat ($FT\ Question_{p-n}^{n-v}$). And a follow-through question as to whether the hat fits Rory (Row 39, Table 2) ($FT\ Question_{p-n}^v$).

Question-responding – In dealing with the question of how to make the A4 piece of paper into a hat Jessie and Rhianna engage in the question-responding activities of *predicting*^{n-v} (Row 13, Row 33, Table 2), that holding the edges of the paper together may work, and that sticky tape will aid the sticking of the two corners. They also engage in *evaluating*^{v, n-v+v} (Row 24, Table 2) when the edges of the paper spring apart when they are not held by the glue; *repeating*^{n-v} (Row 25 + Row 32, Table 2) when Jessie, then Rhianna try to reinforce the edges sticking by putting them back together; and *rejecting*^{n-v+v} (Row 33, Table 2) the idea that the glue stick will hold the edges on its own. Additionally, they engage in *compensating* (altering a sequence of action to repair an error)^{n-v+v, n-v} (Row 33, Table 2) where Jessie uses sticky tape to reinforce the glue when the glue on its own hasn’t worked. The notion of *completing*^{n-v+v} is reinforced (Row 36, Table 2) as the sticky tape is used to secure the join, which ultimately leads to the corners holding together and the hat being completed.

Hackleton School Episode

Leading question: “How can you make a cart to transport the soldiers to the hospital?”

Table 3: Part of Episode 4b, Hackleton School: transcription and coding

Coding	Main activity	Relevant simultaneous activity by another
Predicting ^{n-v}	1 Gemma holds the framework of wheels and axle model in both hands, possibly trying to move along into the centre the connecting bar between two sets of axles + wheels >framework	
Completing ^{n-v}	2 Hannah takes hold of one axle where it goes through a wheel with her R hand, takes hold of the end of the connecting bar where it meets the axle with her L hand and slides the connecting bar away from her R hand	Gemma holds the axle in the same place as Hannah and helps to push the connecting bar into the middle by holding it in the middle >framework

	until it is in the middle of the axle >framework	
S Question _? ^{n-v}	3 Gemma reaches across the table + picks up roll of red tape	Hannah moves the framework closer to her + adjusts it so that axles sit at 90 degrees to connecting bar
N + B Question _{p-n} ^{n-v} Testing/predicting/ imagining/evaluating ^{n-v}	4 Gemma unrolls a piece of tape (whilst looking around her)	Hannah adjusts the connecting bar between the axles, then places a piece of cardboard on top of the framework. She then turns the piece of cardboard round – one corner finishes resting on a wheel >framework
Rejecting/repeating ^{n-v}	5 Gemma cuts off a piece of tape, moving tape roll down to rest on table as she makes the cut >tape	Hannah rotates the cardboard on top of the frame again – again one corner is resting on a wheel >cardboard
? Question _? ^{n-v}	6 Gemma takes tape off fingers of one hand with the other	Hannah leans back >cardboard and puts her arm behind her head. She then touches the cardboard whilst > corner resting on wheel

Interpretive Commentary, Hackleton School episode

Question-posing: There are three questions evidenced in this episode. In Row 3, Table 3 as Hannah moves the cart framework, such as it is towards her across the table, she appears to be posing a question to herself: *S Question?*^{n-v}. It is unclear as to exactly what the question is, hence the ‘?’ in the subscript of our code, but this seems to be the point at which Hannah starts to somehow pose the next question for developing the cart – something to do with how to make the platform/bottom of the vehicle. In Row 4, Table 3 there is a follow-through question within Hannah’s behaviour - *FT Question*_{p-n}^{n-v}. Hannah adjusts the connecting bar between the axles, then places a piece of cardboard on top of the framework. She then turns the piece of cardboard round – one corner finishes resting on a wheel. This question focuses on how to make a piece of cardboard into the platform/bottom for the cart. In Row 6, Table 3 Hannah seems to be posing a ? *Question?*^{n-v} which is again non-verbal. She leans back, looking at the cardboard and puts her arm behind her head. She then touches the cardboard whilst looking at the corner

resting on the wheel. As the footage cuts here, it is difficult to categorise the question as Service or Follow-through, or p-n, p-m or p-b.

Question-responding – in this episode, question-responding activities are evidenced as follows: Row 1, Table 3 *predicting*^{n-v} (action suggests child holds a prior expectation) – in a non-verbal way that the connection bar should go between the two axles; Row 2, Table 3 *completing*^{n-v} (seeing through actions to a conclusion) – moving the connecting bar to between the two axles; Row 4, Table 3 *testing* (exploring the interaction of physical phenomena with objects in the environment), *predicting*, *evaluating*^{n-v} (judging the merits, success, fitness for purpose of a completed action), Row 5, Table 3 *rejecting* (discarding an idea), and *repeating* (action performed more than once)^{n-v} – trying the piece of cardboard for the base of the cart having predicted that it will fit, judging that it doesn't fit in relation to the axles and connecting bar, and repeating the action with a different orientation of the cardboard.

In these two episodes from Cunningham Hill School and Hackleton School, we see contextualised examples of the more tentatively expressed category of non-verbal questioning. We also see evidence of question-responding in the form of the following activities: testing, predicting, accepting, rejecting, evaluating, compensating, completing and repeating. The episodes demonstrate how question-posing leads to question-responding activities, which then in turn catalyse fresh question-posing; at the core of possibility these two core features appear to spur each other on PT.

Figure 3 provides a representation of these dimensions as they stand in relation to each other, which in action is both dynamic and fluid (see Figure 3).

Figure 3 Question-posing dimensions and question-responding categories in relationship

Discussion

This paper has presented the micro-event analysis involved in Stage 2 of the study of PT. *Question-posing* has emerged as the dominant feature driving the PT process

under scrutiny, with question-responding its related counterpart. Insight is given into the ways in which children engage in PT to meet specific needs in responding to creative tasks and activity.

Especially with the breakdown into leading, service and follow-through question-posing, we begin to see how questions posed with different purposes by both teachers and children further the process of PT. Carefully framed leading questions provide the overarching intent for a classroom sequence of PT. The children are then given the space to develop their own service and follow-through questions to meet their own purposes within this, as well as being given space for their own question-responding, which then in turn catalyses further question-posing.

For practitioners considering the import of these findings, it is perhaps useful to re-visit previously highlighted pedagogical features associated with fostering PT: standing back, profiling learner agency and creating time and space (Cremin, Burnard and Craft, 2006). The teachers' practice was seen to be flexible and yet focused, they offered the learners considerable time and space to generate ideas and shape and lead their own learning, yet remained attentive and responsive to their needs and interests. This appeared to nurture the children's capacity to imagine alternatives, generate new ideas and consider possibilities in immersive contexts. In the episodes articulated here, the teachers' framing of the purpose of the leading question, and the provision of space and extended periods of time for exploration and development work were crucial in enabling the children to generate their own service and follow through questions, and learn from their own journeys. For example, we see Amy and Niamh given the space to pose questions about getting Rory into the play area, when it is perhaps obvious to an adult observer that their selected method of squeezing him through the door will not work. The space provided to pose and respond to this question, in an un-interrupted, immersed manner, in the playful situation were key to Amy and Niamh self determining their actions and ongoing journey. The children drove the shift from 'what is' to 'what might be' themselves.

The degree of possibility inherent within questions posed, again defined by both teachers and children, provides a way of focusing or expanding the potential 'what ifs', to

achieve the purpose intended by questions, whether framed as leading, service or following through.

Again, for practitioners considering these findings, the previously highlighted pedagogical features associated with PT are useful. Perhaps in relation to the degree of possibility inherent within questions (broad, moderate or narrow), teachers' expertise in judging the balance between standing back and responsive intervention is key. In one of the examples above, we see Jean Keene curtailing the degree of possibility to moderate rather than broad by recruiting Gemma to help Rhianna design and make the hat for Rory. With perhaps too much possibility inherent within the service questions that Rhianna had posed herself, Jean skilfully curtails this, but keeps her own direction to a minimum by recruiting another child to assist Rhianna. Jean re-focuses the degree of possibility from a distance and then allows the children to continue on their own to shape the 'what is' of the piece of A4 paper to the 'what might be' of the hat.

The relationship between teacher intervention and children's self determination, illustrates how these opportunities to explore possibilities drive the children's learning journeys. And, although much less is as yet understood about the notion of non-verbal question-posing, elucidating this further is of great importance to encourage children and teachers to think differently about the potential of question-posing in developing creativity. This has the potential to contribute to practitioners being better able to recognise and nurture question-posing which may not initially be apparent because it is not verbalised.

Conclusions and future directions

This study has highlighted the importance of acknowledging the role that question-posing and question-responding play in creative learning and in particular it has provided more detail about the nature of thinking, made visible through question-posing and responding during peer and pupil-teacher interaction. The study has also highlighted the contribution of verbal and non-verbal behaviours as dimensions of PT in creativity and the significance of providing more, and appropriate, time/ space/ responsibility/ freedom for children to make their learning visible. There are implications for how practitioners and researchers identify, take note of, document and act on each learners'

meaning-construction processes, an assumption embedded within the Early Years Foundation Stage (DfES, 2007), which comes into force September 2008. The examples discussed here provide just two instances of the way in which greater understanding of the nuances of teachers' and children's question-posing illuminates the 'how' of creative learning. With examples such as this and the PT framework in mind, practitioners might be facilitated to recognise framing, degree of possibility and modality in their own classroom relationships and be better able to work with them to facilitate children's learning journeys.

There are also implications for practitioners and researchers' interpretations of questioning as framed as core to creativity by the English Qualifications and Curriculum Authority (QCA, 2005). This articulation of 'questioning' behaviour has recently been broken down further (CAPE UK, 2007) into the following: asking why, how, what if?; responding to ideas, questions, tasks or problems in an unusual way; asking unusual questions; challenging conventions and assumptions; thinking independently. In relation to this, if we consider the evidence from this study of how question-posing and question-responding was used by the children, driving the shift from 'what is' to 'what might be' within possibility thinking and in turn creative learning, again a more nuanced understanding might be developed in research and classroom practice of how question-posing and creative learning can be facilitated. For example, being able to unpack 'in an unusual way' and 'challenging conventions and assumptions' is potentially inherent within both the framing and degree of possibility dimensions of PT questions. 'Questioning' and 'responding' are encompassed within the PT framework as is the notion of 'thinking independently', and together the framework developed here might provide 'hooks' on which practitioners can hang their thinking about creative learning.

In terms of future research, what is becoming clear from ongoing analysis is that there are also important relationships to be understood between the different dimensions of questioning. For example, how do service and follow-through questions realise – or not - the purpose inherent within leading questions? How is the degree of possibility applied in the different question frames and how is this followed through as they undertake decision-making activities? How might non-verbal questioning be better understood and nurtured by teachers alongside risk-taking, being imaginative, self-

determination, and action/intention? Of particular interest is how the elements of question-posing may be evidenced among older childrenⁱⁱⁱ. In Stage 3 of the PT research (as of mid 2008 well under way and focusing on children aged 9-11), the team seek to respond to some of these leading and possibility broad questions.

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APPENDIX 1 Notations for the transcription of gaze and other conventions

Transcription Key

Transcription of Gaze

-	looking at (co-participant/s)
-	co-participants looking at each other
....	1 participant turning to another
, , , ,	1 participant turning away from another
>>>> object	looking towards object
< object/person : object/person>	looking from object/person to object/person

Other Conventions

()	researcher observation
?	uncertain
[]	simultaneous noise/action, off camera
actions sharing same line number	simultaneous noise/action on camera
-----	break in continuity of recording

ⁱ A term coined by Craft (2001) and which informed the ‘imagining’ aspect of the QCA Creativity Framework (2005); PT has been explored by the authors of this paper empirically since 2004.

ⁱⁱ Early Years settings in England care for and educate children from 0-8. This study focused on children aged 4-7.