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Young Children's Research: Children aged 4-8 years finding solutions at home and at school.

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Abstract:

Children's research capacities have become increasingly recognised by adults, yet children remain excluded from the academy, with reports of their research participation generally located in adults' agenda. Such practice restricts children's freedom to make choices in matters affecting them, underestimates children's capabilities and denies children particular rights. The present paper reports on one aspect of a small-scale critical ethnographic study adopting a constructivist grounded approach to conceptualise ways in which children's naturalistic behaviours may be perceived as research. The study builds on multi-disciplinary theoretical perspectives, embracing 'new' sociology, psychology, economics, philosophy and early childhood education and care (ECEC). Research questions include: 'What is the nature of ECEC research?' and 'Do children's enquiries count as research?' Initially, data were collected from the academy: professional researchers (n=14) confirmed 'finding solutions' as a research behaviour and indicated children aged 4-8 years, their practitioners and primary carers as 'theoretical sampling'. Consequently, multi-modal case studies were constructed with children (n=138) and their practitioners (n=17) in three 'good' schools, with selected children and their primary carers also participating at home. This paper reports on data emerging from children aged 4-8 years at school (n=17) and at home (n=5). Outcomes indicate that participating children found diverse solutions to diverse problems, some of which they set themselves. Some solutions engaged children in high order thinking, whilst others did not; selecting resources and trialing activities engaged children in 'finding solutions'. Conversely, when children's time, provocations and activities were directed by adults, the quality of their solutions was limited, they focused on pleasing adults and their motivation to propose solutions decreased. In this study, professional researchers recognised 'finding solutions' as research behaviour and children aged 4-8 years naturalistically presented with capacities for finding solutions; however, the children's encounters with adults affected the solutions they found.

Key words: Finding solutions, early childhood, children as researchers, capabilities, children's rights.

1. Introduction

This paper considers whether or not young children's naturalistic behaviours can count as research behaviour and whether or not this can be established by looking at ways in which children find solutions to problems. Recent revisions to English

education policy contain little emphasis on children's problem-solving,^{1 2 3} an activity that is indicated in both higher-order thinking^{4 5} and research processes.^{6 7} Young children's capacities to solve problems and to develop 'a philosophy of what counts as knowledge and truth'⁹ - epistemology - were established in the mid-twentieth century^{10 11} yet there is currently little acknowledgement of the potential contribution that young children might make to research through their problem-solving, even in matters affecting them.¹² This paper reports on a small-scale empirical enquiry located in the early childhood education and care (ECEC) field, investigating problem-solving as research behaviour in young children aged 4-8 years in their English ECEC settings and homes. The driver for this study began when I moved from ECEC teaching to work in a university; as a teacher, I had witnessed anecdotally children's autonomous, natural *epistemic*-behaviour every day. However, as I entered the university, I recognised that such activity is barely acknowledged, let alone regarded as research by the 'academy': a space where 'learners and knowledge producers'¹³ converge and where knowledge is produced¹⁴; a 'score-keeping world'¹⁵ which sets itself apart from 'the people'¹⁶ and from which children are excluded.¹⁷ I wanted to explore this phenomenon further.

ECEC focuses on children's first eight years,¹⁸ a phase widely regarded as a key indicator for lifespan outcomes.¹⁹ It is a relatively new multi-disciplinary field that may be viewed as a subset of the field of education and it is informed by a range of other disciplines including education, 'new' sociology, psychology, economics and philosophy and health.

Whilst there have been attempts to position young children as researchers,^{20 21} projects have predominantly focused on older children and young people.^{22 23} However, exclusion of young children's enquiries conflicts with perspectives positioning children as competent social actors^{24 25 26} and it disregards psychological studies reifying young children's significant cognitive potential.²⁷ Recognition of children's capacity for research participation has begun to emerge,²⁸ but remains under-developed in England.²⁹

The present paper reports on children's problem-solving as one aspect of a larger study reconceptualising young children as researchers. Three research questions are addressed in this paper:

- Do young children aged four to eight years find solutions in their ECEC settings and homes?
- If so, what is the nature of their problem-solving and what factors effect and affect it?
- Does young children's problem-solving in their ECEC settings and homes count as epistemology?

The paper will open by providing a brief context for children's problem-solving, before detailing the study's design and findings. Key to whether or not young

children's problem-solving can be regarded as 'research' are children's capacities for developing 'a philosophy of what counts as knowledge and truth': Strega's definition of epistemology³⁰ so this is interrogated later in the paper. In conclusion, I will draw on evidence provided by the findings to argue that aspects of children's naturalistic problem-solving may count as epistemology.

2.Children's problem-solving in context

This section briefly addresses literature surrounding the nature of problem-solving and the nature of research, children's engagements in problem-solving and children's opportunities for problem-solving.

Definitions of problem-solving often allude to cognitive processing;^{31 32 33} problem-solving processes may comprise an obscured goal, strategies and evaluation,³⁴ and problem-solving has been defined as '...thinking and learning in general'.³⁵ The present study assumes a broad definition of young children's problem-solving including social interaction,^{36 37} creating and solving problems,³⁸^{39 40} practical uses for solutions and dissemination of solutions.

Problem-solving often provides a rationale for research,^{41 42} research takes many forms⁴³ but problem-solving is particularly characteristic of pragmatism,⁴⁴ a model of thinking identified by the ancient Greeks who devised an eclectic range of modes for thinking about thinking⁴⁵. For example, Aristotle engages with experiential reasoning, whilst Plato adopts abstract thinking.⁴⁶ This dualism reappears in Enlightenment discourses, with Kant pursuing 'pure reason'⁴⁷ and Hume advocating empiricism.⁴⁸ Although Hume's view of inductive reasoning as inferior to deductive reasoning⁴⁹ has enjoyed popularity and longevity,⁵⁰ inductive reasoning may also result in logical ends.⁵¹ Researchers draw on these paradigms to shape their values and practices:⁵² whilst 'STEM' disciplines may be predicated on an 'idea of generality',⁵³ social sciences cannot assume such comforting predictability.^{54 55} Enquiry that is only considered worthwhile if it identifies 'what works' in practice may not 'work' in the 'complex social world(s) of interpersonal relations',^{56 57} where 'finding solutions' often means constructing multiple versions of 'truth'.⁵⁸ Popper describes epistemology as 'the source of certainty',⁵⁹ but for different researchers working in different paradigms that certainty will be shaped differently, according to the values they hold.

Nevertheless, Piaget's theory that aspects of human development are replicable⁶⁰ has been highly influential in the field of ECEC:⁶¹ Piaget's proposition that humans have innate capacity to transform cognitive structures through problem-solving episodes - 'genetic epistemology'⁶² - may also have proved attractive to those working with young children. However, his suggestion that this process develops in sophistication through the life course juxtaposes Isaacs' view that '...children's epistemic interest and inquiry is in every respect the same in the child as in the adult'.⁶³ Equally, Piaget's tendency to disregard context has

attracted criticism:⁶⁴ making tasks meaningful for children seems to be important for their engagement and for enabling them to reach self-actualisation.^{65 66}

In educational contexts, problem-solving can enable children to transform their understanding;⁶⁷ children who develop new understanding with ease seem to be those who can apply their learning to solving new problems.^{68 69} Moreover, young children are empowered when they pose *and* resolve their own problems in meaningful contexts,⁷⁰ which may include objects that they imbue with 'sense and meaning'.⁷¹ 'Doing activities that people value and have reason to value' may help children to build their capabilities,⁷² yet children's valued activities are often marginalised by adult hegemonies.^{73 74} Teachers do not always provide meaningful opportunities for children, which may explain why children rarely display curiosity in school, whereas they are 'full of questions outside the school'.⁷⁵ Children seem to become more deeply involved in activities if they find them genuinely interesting,⁷⁶ whereas teachers' direct instruction and questioning seem to limit children's problem-solving.^{77 78 79} Equally, children's problem-solving may present differently in settings and at home;⁸⁰ the 'here and now' seems to be important for young children in their ECEC settings⁸¹ and adults can support young children to solve problems 'in the moment' by anticipating their problems and affirming their problem-solving.⁸² Nevertheless, Tizard and Hughes note that children at home often discuss '...events outside the present context, including the child's own past and future'.⁸³

Many examples of children's problem-solving have a socio-emotional focus,⁸⁴^{85 86} with self-regulation, memory, attention, planning, organisation and partnership regarded as key features.^{87 88 89} Vygotsky's notion⁹⁰ that cognitive structures are transformed when learners are supported by expert others has commonly been reified within adult:child models.^{91 92 93} However, young children's peer interactions seem beneficial to their cognitive development.^{94 95 96} Children between 18 and 24 months engage in problem-solving with peers;^{97 98} equally, if children struggle to problem-solve in social contexts by five years they tend to be rejected by their peers.⁹⁹ Moreover, siblings aged 4-8 years are most likely to reach 'creative, agreeable resolutions' within positive relationships.¹⁰⁰

Tool use in problem-solving often involves acquiring, using and planning to use the tool, which young children often do 'in action'.¹⁰¹ From eight months, infants' tool use provides them with '...a motor solution to a cognitive problem';¹⁰² Pre-verbal children's physical tool use can reveal their plans.¹⁰³ Equally, from around two years children often use physical tools alongside symbols to solve problems,^{104 105 106} for example in their mark-making.^{107 108} Young children's problem-solving may also be mediated by their uses of gesture^{109 110} and analogy,^{111 112 113} as well as adult intervention tools such as Socratic dialogue^{114 115} and De Bono's 'Thinking Hats'.^{116 117}

Bridges suggests that pragmatists often neglect problem *setting*,¹¹⁸ yet when children set their own problems they may classify, sort, categorise, quantify and represent data.¹¹⁹ Equally, teachers may find it difficult to support children to set their own problems¹²⁰ because school curricula often focus on ‘basic skills’ rather than higher-order thinking;¹²¹ in the English context of national curriculum prescription from birth, opportunities to engage where ‘the problem is known (but the solution is not)’¹²² may be especially rare.

3. Methodological Discussion

Drawing on emancipatory discourses,^{123 124} this small-scale interpretive study synthesises critical ethnography¹²⁵ within a constructivist grounded theory approach¹²⁶ to seek perspectives about young children researching. As an attempt to explore and undertake democratic research¹²⁷, ethical considerations permeate form and function of the enquiry which was conducted according to the British Educational Research Association¹²⁸ ethical guidelines, with adherence to literature concerning ethics in ECEC research.¹²⁹ The enquiry was framed in three stages that were designed to co-construct data with participants:

Stage 1: Professional Early Years and Educational Researchers (PEYERs)

Stage 2: Children and practitioners in ECEC settings

Stage 3: Children and families at home.

‘Initial sampling’¹³⁰ indicated PEYERs as participants for Stage 1. Nine PEYERs participated in interview conversations¹³¹ and five engaged in a focus group.¹³² All had previously worked in children’s services. This stage focused on the nature of educational and ECEC research, resulting in a framework of 39 research behaviours (RBF), including ‘Find a Solution’. Furthermore, PEYERs indicated that young children, their parents and practitioners should participate: ‘theoretical sampling’.¹³³ Through professional connections, three primary schools became the locations for Stage 2.

There were parallels regarding the nature and size of these settings (see appendix 1), although full parity was not sought in these ‘real world’ contexts;¹³⁴ initially 150 children and their practitioners in the three settings participated (see appendix 1). Power relationships were relatively equalised because participants were predominantly white British and middle class, as am I.^{135 136} Once access issues had been addressed,¹³⁷ I piloted the design in Ash Setting, then proceeded to Beech and Cherry Settings, initially working as a volunteer teaching assistant for several days. This enabled me to build understanding of each setting’s culture through ‘thick description’¹³⁸ and to move towards ‘insider’ status:¹³⁹ important for accessing authentic, naturalistic data in the settings.¹⁴⁰

A series of multi-modal case studies^{141 142 143} was constructed with participants in ECEC settings, each undertaken over six half-days and three full days. Later, five children and their families co-constructed their own multi-modal case studies

at home during a period of about a month (see appendix 2). Initially, data were constructed on multiple aspects of the settings, using fieldnotes, naturalistic observations, informal discussions and documents. Data were constantly evaluated with focus on the RBF behaviours, including 'find a solution'; these indicated seventeen children for closer focus (see appendix 3).

Naturalistic observations continued, focused on the everyday activities of the focus children in their settings. Practitioners and children engaged in interview conversations focused on the nature of research as well as analysis of primary data.¹⁴⁴ Data then indicated two children from each setting who might go on to co-construct further rich data with their families at home (Stage 3); following adherence to ethical protocols, five children and their families engaged in this process (see appendix 4).

Initial interview conversations were arranged with families at home to discuss the project. Here I established 'outsider'¹⁴⁵ status so families retained power and intrusion was minimized.¹⁴⁶ I explained and implemented ethical procedures,^{147 148} provided resources, ensured the children and families were confident with data collection methods, then handed over data collection to the families. Again, the naturalistic approach to data collection was strongly emphasized; again, thick description¹⁴⁹ of children's 'real worlds' was the identified focus.¹⁵⁰ Second visits were arranged with each family for a month later to share, discuss, review and analyse data in interview conversations.¹⁵¹

Analysis was guided by Charmaz's model for constructivist grounded theory.¹⁵² Data interpreted by participants 'in action' and 'on action'¹⁵³ informed further analysis I undertook until 'saturation'.¹⁵⁴

4.Presentation of Findings and Discussion

Analyses were conducted with all primary data and meta-data gathered with participants according to Charmaz's model of analysis.¹⁵⁵ 32 axial codes emerged, for example, 'self-regulates' and 'deductive reasoning' (see appendix 6). Table 5 provides a numerical overview of analysed data (see appendix 5). Axial codes were then organised into further categories: provocations, barriers and effects relating to children's problem-solving. Provocations include free access to resources, social interaction and time and opportunity, while the two main barriers to children's problem-solving appeared to be insufficient time or opportunity for them to pursue their personal interests as well as adult direction. A selected range of empirical findings is now presented and discussed.

Free access to physical resources and 'free flow' play^{156 157} seemed to encourage children's problem-solving,^{158 159} engaging them in cognitive processes including evaluation, synthesis and analogy.^{160 161 162} In Beech Setting Johnny tasked himself with creating a 'wristwatch' using paper, glue and scissors. He trialled a method of accurate measurement, placing a strip of paper around his wrist

and cutting a piece off the end, then readjusting the strip 4 times until satisfied with the fit. Later the ‘strap’ came unstuck and Johnny returned to the ‘making table’ to fix it successfully. Here, Johnny set and solved a problem then persevered to resolve another problem. He engaged in deductive and inductive reasoning,^{163 164} focused on something of personal interest, self-regulated¹⁶⁵ and devised a practical method to create a solution.

At Family B’s home, Billy showcased a model tank he had made; he said:

‘It’s made out of paper... I’ve even made a seat – look! This bit gives the person who’s controlling the tank here his seat. He’s not allowed to sit anywhere else – he can’t see so I made this here (periscope) so he can see.’

Billy had set himself a problem: to make a ‘tank’ that was fit for purpose. He had access to paper, sellotape and scissors to do so and his exploratory manipulation of the paper¹⁶⁶ provided ‘...a motor solution to a cognitive problem’.¹⁶⁷

Children often solved problems by employing others.^{168 169} During free-flow play¹⁷⁰ in Beech Setting, India and Amelia (girl, 5 years) opted to play in two hollow black cylinders - each 2m x 0.5m – lying on the floor. India and Amelia stood behind one cylinder, and together they rolled the cylinder forwards until its end was aligned with the end of the second cylinder to make one long cylinder. In turn, the girls then crawled through the new long cylinder. India and Amelia set and solved a problem¹⁷¹ by working together.^{172 173} They also engaged in self-regulation¹⁷⁴ and deductive reasoning¹⁷⁵ and had time and opportunity¹⁷⁶ to explore properties of the cylinders.^{177 178}

Outside on the drive of the Family D home, under his mother’s tutelage, Harry had just learned to wind the electric cable and had finished winding it for the first time.

MTHR-D said to Harry: ‘Well done. Thank you. Where does it go?’

Harry walked into the garage with the cable reel.

Harry said to MTHR-D: ‘You come and help me.’

Harry put the cable reel down.

Harry said to MTHR-D: ‘I’ll just put it down then you can sort it out.’

Harry and his mother conducted their dyad within a social-constructivist context, recognised as beneficial for problem-solving.^{179 180} Harry increasingly assumed ‘power and autonomy’:¹⁸¹ his mother had set him a problem and Harry’s solution was to employ her ‘...you can sort it out’.

Data suggest that time and opportunity may also be important for children's problem-solving;^{182 183 184} these factors seemed to affect children's capacity to both find *and seek* solutions and to engage the children in higher order thinking.^{185 186}
¹⁸⁷ In Cherry Setting, Pedro selected a practitioner-planned activity: using sugar cubes to construct a mini igloo. However, his initial attempts were unsuccessful: the activity was located on a table in a busy thoroughfare and Pedro predicted accurately that his construction would be broken by a passing child nudging the table. Consequently, Pedro decided that he would build a tower, designing and successfully constructing it with a sturdy base and a protective wall. Working alone, this process took Pedro seven minutes: he was deeply engaged,¹⁸⁸ despite activity surrounding him, and he found a solution. Pedro engaged in high-order thinking skills, including evaluation,¹⁸⁹ analogy¹⁹⁰ and deductive reasoning.¹⁹¹ Pedro explored the properties of the sugar cubes¹⁹² self-regulated¹⁹³ and autonomously set his own problem:¹⁹⁴ to construct a tower. He was also keen to preserve what he had done.¹⁹⁵

Conversely, where little time or opportunity was afforded for children to pursue their own interests, their problem-solving tended to be limited to – and by – adults' agenda; children often seemed to lack motivation in these instances. During an adult-directed lesson in Ash Setting, the learning objective was displayed: 'To be able to understand what it was like for people in South Africa in the 1960s'. While his teacher gave an exposition, interspersing it with questions, Billy sat quietly with his peers and fidgeted with his fingers, traced his thumb with the opposite forefinger, sucked his thumb, looked out of the window, stretched and looked intently at a table. Billy conformed by sitting quietly but he did not appear motivated to find solutions for the teacher's questions. He appeared more deeply engaged with the table than the teacher's agenda,¹⁹⁶ suggesting he did not find the latter meaningful;^{197 198} Billy's potential for problem-solving seems to have been limited because he was not engaged in activity that was meaningful to him.^{199 200}
201

At Family's C's home, Gemma filmed a 'guided tour' of her house with the camcorder. Gemma's mother asked her: 'What have you got here?' and Gemma focused the camcorder on her father sitting on the sofa. This closed question is characteristic of 94.5% asked in ECEC settings;²⁰² these limit opportunities for young children to construct their thinking. Gemma was not motivated to respond verbally but physically demonstrated her filming, reproducing prior knowledge while engaging in inductive reasoning.²⁰³

Adults' direction of children, sometimes coupled with children's apparent desire to please, also seemed to limit children's problem-solving^{204 205 206} and often there was focus on outcome rather than process. Adult direction even appeared to confuse children sometimes. During a literacy lesson in Ash setting, Annie seemed

enthusiastic initially, raising her hand eleven times in quick succession. However, the teacher did not invite her to respond and Annie's manner became subdued. Finally the teacher asked Annie to respond to a question: 'What is typical of a mystery story?' whereupon Annie provided a non-sequitur: 'When he went to visit Sylvester Renard, he found one of the things Sylvester said was something that King Bling had tried to see'. Initially, Annie appeared motivated to find solutions, but as she was denied opportunities to share her solutions, she appeared less motivated. She attempted to answer the teacher's closed question²⁰⁷ but did not appear to respond logically,^{208 209} suggesting she was disengaged or confused.

At Gemma's home, her grandmother directed her to work through a literacy workbook :

Grandma: 'Why are you making your "e"s like that?'

Gemma: 'It's because I forgot how to do them' 'I don't want to do any more of these.'

Grandma: 'Let's see what's the next one.'

Gemma : 'No I don't want to do it though.'

Grandma: 'It looks easy.'

Gemma: 'No I don't want to do any more'

Grandma [reading]: 'Write each word in the correct corner of the table.'

Gemma: 'I don't want to do it.'

This vignette is one of several collected that exemplify the spread of 'schoolification' into young children's lives outside school;^{210 211 212} it indicates a narrow construction of a 'good' 'home learning environment'.²¹³ Gemma's grandmother attempted to 'scaffold' through direction,²¹⁴ but Gemma lacked motivation to solve problems presented to her.

5.In conclusion: Does young children's problem-solving in their ECEC settings and homes count as epistemology?

The present study began with PEYERs' empirical reiteration that problem-solving is research behaviour,^{215 216 217} affirming that finding solutions may 'count as knowledge and truth': Strega's definition of epistemology.²¹⁸ Children appeared to construct their own 'multiple versions'²¹⁹ of what they 'count(ed) as knowledge and truth',²²⁰ demonstrating this by engagement and involvement in some situations, whilst in different circumstances rejecting what others may 'count as knowledge and truth',²²¹ by displaying disengagement and lack of motivation.

Many examples emerged of children aged 4-8 years engaging in problem-solving in their ECEC settings and homes; a few are presented in this paper. Children found diverse solutions to diverse problems, some of which they set themselves. Provocations for their problem-solving included free access to physical

resources, time, freedom and opportunities to engage in activities of their choosing and people with whom they could co-construct solutions. Whilst the children's problem-solving was oriented to pragmatism²²² and their solutions were part of their everyday worlds,²²³ children revealed various 'components' within their problem-solving. The 'components' include high-order cognitive processes: evaluation,²²⁴ analogy,²²⁵ deduction,²²⁶ and inductive reasoning,²²⁷ as well as 'flow',²²⁸ self-regulation,²²⁹ autonomy²³⁰ and exploration of the properties of materials.²³¹

These problem-solving 'components' illuminate the children's constructions of knowledge. Many are the same 'components' that characterise '...the norms of technical rationality – the prevailing epistemology built into the research universities',²³² - home to the 'academy' - aligning this study's findings with Isaacs' view that young children are just as able as adults to engage in 'epistemic inquiry'.²³³ This study offers new empirical evidence that solving problems in their everyday lives may enable children to develop logically derived philosophies of 'what counts as knowledge and truth',²³⁴ in the same ways as adult researchers who publish peer-reviewed material. It can be argued, therefore, that in these circumstances, young children's problem-solving in their ECEC settings and homes may count as epistemology.²³⁵

However, findings also suggest that the quality of children's solutions and their motivation to initiate them was sometimes limited by adults. This indicates that current education policy in England - characterised by a centralised 'basic skills' curriculum, adult hegemony and the imposition of 'schoolification',²³⁶ at home - sometimes limits children's opportunities for autonomous thought and action. As a result, whilst adults in children's ECEC settings and homes may intend to support young children's constructions of knowledge, they may be underestimating and undermining their potential for problem-solving as well as the contribution that this could make to research, particularly in matters affecting children.²³⁷

Notes

¹ Department for Education (DfE), *The Importance of Teaching*. Last Modified: 24th November, 2010. Retrieved: 6.5.12.

<<https://www.education.gov.uk/publications/standard/publicationDetail/Page1/CM%207980>> 42-44.

² Department for Education (DfE), *Statutory Framework for the Early Years Foundation Stage* Last Modified: 27th March, 2012. Retrieved: 6.5.12.

<<http://media.education.gov.uk/assets/files/pdf/e/eyfs%20statutory%20framework%20march%202012.pdf>>

- ³ Department for Education (DfE), *The English Baccalaureate*. Last Modified: 26th April, 2012. Retrieved: 6.5.12. <<http://www.education.gov.uk/schools/teachingandlearning/qualifications/englishbac/a0075975/theenglishbaccalaureate>>
- ⁴ Philip N. Johnson-Laird, and Ruth M.J. Byrne, *Deduction*. (Hove: Lawrence Erlbaum Associates, 1991).
- ⁵ Rachel Keen, 'The Development of Problem Solving in Young Children: A Critical Cognitive Skill', *Annual Review of Psychology*, 62 (2011): 1–21.
- ⁶ Anselm Strauss and Juliet Corbin (Eds.) *Grounded Theory in Practice*. (London: Sage, 1997).
- ⁷ Paul Smeyers, 'On the Epistemological Basis of Large- Scale Population Studies and their Educational Use', *Journal of Philosophy of Education* 42, S1 (2008): 63–86.
- ⁸ John Creswell, *Educational Research*. (Upper Saddle River, NJ: Pearson Education, 2008).
- ⁹ Susan Strega, 'The View from the Poststructural Margins: Epistemology and methodology reconsidered', in *Research as Resistance: Critical, Indigenous, and Anti-oppressive Approaches*, eds. Leslie A. Brown and Susan Strega (Toronto: Canadian Scholars' Press, 2005), 199–235.
- ¹⁰ Susan Isaacs, *Intellectual Growth in Young Children* (London: Routledge and Sons Ltd., 1930).
- ¹¹ Jean Piaget, *The Principles of Genetic Epistemology*. (London: Routledge Kegan Paul, 1972).
- ¹² United Nations Committee on the Rights of the Child, *Convention on the Rights of the Child* (New York: United Nations, 1989). Last modified 18th November, 2002. Retrieved 11.5.12. <<http://www2.ohchr.org/english/law/crc.htm>>
- ¹³ Lorna Warren and Kathy Boxall, 'Service Users In and Out of the Academy: Collusion in Exclusion?', *Social Work Education: The International Journal*, 28, 3 (2009): 281–297. (281).
- ¹⁴ Ibid, 281.
- ¹⁵ Loretta Lees, 'Critical geography and the opening up of the academy: lessons from 'real life' attempts', *Area* 31, 4 (1999): 377–383. (382)
- ¹⁶ David Bridges, 'Research for Sale: moral market or moral maze?', *British Educational Research Journal*, 24, 5 (1998): 593–607.
- ¹⁷ Gerry Redmond, 'Children's Perspectives on Economic Adversity: A review of the literature'. Innocenti Discussion Paper No. IDP 2008-01. Florence: UNICEF Innocenti Research Centre. Last modified 2008. Retrieved May 11th, 2012. <http://www.unicef.org/socialpolicy/files/Childrens_Perspective_on_Economic_Adversity.pdf>.
- ¹⁸ United Nations Committee on the Rights of the Child (UNCRC). 'General comment no. 7 (2005): Implementing child rights in early childhood', Last

modified 20th September, 2006.

<http://www2.ohchr.org/english/bodies/crc/docs/AdvanceVersions/GeneralComments7Rev1.pdf> Accessed 11.5.12.

¹⁹ Philip Gammage, 'Early childhood education and care: Politics, policies and possibilities', *Early Years*, 26, 3 (2006): 235–248.

²⁰ Priscilla Alderson 'Children as researchers: Participation rights and research methods', in *Research with children*, ed. Pia Christensen and Allison James (Eds.), (London: Routledge, 2008), 276–290.

²¹ Alison Clark and Peter Moss, *Listening to young children: The mosaic approach*, 2e (London: National Children's Bureau, 2011).

²² Michael Fielding, 'Students as radical agents of change', *Journal of Educational Change*, 2, 2 (2001): 123–141.

²³ Mary Kellett, 'Children as researchers: What we can learn from them about the impact of poverty on literacy opportunities?' *International Journal of Inclusive Education*, 13, 4 (2009): 395–408.

²⁴ Allison James, Christopher Jenks and Alan Prout, *Theorising childhood* (Cambridge: Polity Press, 1998).

²⁵ Peter Moss and Pat Petrie, *From Children's Services to Children's Spaces* (London: Routledge, 2002).

²⁶ William Corsaro, *The sociology of childhood*, 2e (Thousand Oaks, CA: Pine Forge Press, 2005).

²⁷ Alison Gopnik, Andrew N. Meltzoff and Pat Kuhl, (1999). *How Babies Think* (London: Weidenfeld and Nicolson, 1999).

²⁸ Pia Christensen and Allison James, eds. *Research with Children* (London: Routledge, 2008).

²⁹ Redmond, 'Children's Perspectives on Economic Adversity'.

³⁰ Strega, 'The View from the Poststructural Margins, 201.

³¹ William James, *The Principles of Psychology*. (New York: Dover, 1890)

³² Sarah Meadows, *The Child as Thinker* (London: Routledge, 2006)

³³ Rachel Keen, 'The Development of Problem Solving in Young Children.

³⁴ J.S. DeLoache, K.F. Miller, and S.L. Pierroutsakos, 'Reasoning and problem solving', in *Handbook of child psychology*, 5e, Vol 2: *Cognition, perception and Language*, eds. D. Kuhn and R. Siegler (New York: Wiley, 1998), Pp. 801-850.

³⁵ Allison F. Garton, *Exploring Cognitive Development: The child as problem solver*. (Malden, MA: Blackwell, 2004), 3.

³⁶ David Wood, Jerome S. Bruner and Gail Ross, 'The Role of Tutoring in Problem Solving', *Journal of Psychology and Psychiatry* 17, 2 (1976): 89-100.

- ³⁷ Iram Siraj-Blatchford, Kathy Sylva, Stella Muttock, Rose Gilden and Danny Bell, *Researching Effective Pedagogy in the Early Years* (London: Department for Education and Skills, 2002).
- ³⁸ Carolyn Edwards, 'Partner, Nurturer and Guide: The role of the teacher', in *The Hundred Language of Children*, eds. Carolyn Edwards, Lella Gandini and George Forman (Westport CT: Ablex Publishing, 1998), 179-198.
- ³⁹ Judy H. Helm and Lillian Katz, *Young Investigators*. (New York: Teachers' College Press, 2001).
- ⁴⁰ Elliott Eisner, *The Art of Educational Evaluation*. (Lewes: Falmer Press, 1985), 78
- ⁴¹ Clifford J. Drew, *Introduction to Designing and Conducting Research* (Missouri: C.K. Mosby Company, 1980).
- ⁴² Otto D. Payton, *Research: The Validation of Clinical Practice*. (Philadelphia: F.A. Davis, 1979).
- ⁴³ Creswell, *Educational Research*.
- ⁴⁴ David Bridges, *Fiction written under Oath*. (Dordrecht: Kluwer Academic Publishers, 2003).
- ⁴⁵ Gary Thomas, *Education and Theory: Strangers in paradigms*. (Maidenhead: McGraw-Hill Education / Open University Press, 2007).
- ⁴⁶ Eric Pappas, 'Teaching Thinking and Problem Solving in the University Curriculum: A rationale', *2004 American Society for Engineering Education (ASEE) Southeastern Section Meeting*. (Auburn University, United States, April 2004).
- ⁴⁷ Immanuel Kant, *Critique of Pure Reason*. (1781) Trans. J. M. D. Meiklejohn. Last modified 3rd July 2007 Retrieved 30.10.11
<<http://www.gutenberg.org/cache/epub/4280/pg4280.html>>.
- ⁴⁸ David Hume, 'An Enquiry Concerning Human Understanding' (1748), in *David Hume: An Enquiry Concerning Human Understanding*, ed. T. Beauchamp (Oxford: Oxford University Press, 2000): 5-123.
- ⁴⁹ David Hume, *A Treatise of Human Nature* (Oxford: Oxford University Press, 1739/2000).
- ⁵⁰ Joshua B. Schechter, 'Deductive Reasoning', in *Encyclopedia of the Mind*, ed. Harold E. Pashler (London: Sage, 2013, forthcoming).
- ⁵¹ Alfred J. Ayer, *The Foundations of Empirical Knowledge* (London: MacMillan and Co., Ltd., 1940).
- ⁵² Richard Pring, *Philosophy of Educational Research* (London: Continuum, 2004).
- ⁵³ Seymour Papert, *The Children's Machine*. (New York: Basic Books, 1993), 143.
- ⁵⁴ Pring, *Philosophy of Educational Research*.
- ⁵⁵ Gert Biesta, 'Why "What Works" Won't Work: Evidence-based practice and the democratic deficit in educational research', *Educational Theory* 57, 1 (2007): 1-22.

⁵⁶ Ibid.

⁵⁷ Alis Oancea and Richard Pring, 'The importance of Being Thorough', in *Evidence-based Education Policy. What evidence? What basis? Whose policy?* Eds. David Bridges, Paul Smeyers and Richard Smith (Chichester: Wiley Blackwell, 2009): 11-35. , 30.

⁵⁸ Egon G. Guba, and Yvonna S. Lincoln, *Fourth Generation Evaluation* (Newbury Park, CA: Sage, 1989).

⁵⁹ Karl Popper, *Objective Knowledge*, (Oxford: Oxford University Press, 1972), 132.

⁶⁰ Jean Piaget and Barbel Inhelder, *A Child's Conception of Space*. (New York: Norton, 1967).

⁶¹ Peter Cunningham 'Early years teachers and the influence of Piaget: evidence from oral history', *Early Years: An International Journal of Research and Development*, 26, 1 (2006): 5-16.

⁶² Piaget, *The Principles of Genetic Epistemology*, 12.

⁶³ Isaacs, *Intellectual Growth in Young Children*, 322.

⁶⁴ Margaret Donaldson, *Children's Minds* (New York: W. W. Norton, 1978).

⁶⁵ Barbara Rogoff, *Apprenticeship in Thinking* (New York: Oxford University Press, 1990).

⁶⁶ Richard E. Mayer, *Thinking, Problem Solving, and Cognition*, 2e (New York: W. H. Freeman, 1992).

⁶⁷ John Dewey, *Democracy and Education. An introduction to the philosophy of education* (New York: Free Press, 1916/1966).

⁶⁸ Ann L. Brown and Joseph C. Campione, 'Communities of learning and thinking or a context by any other name' In *Contemporary Issues in Teaching and Learning*, ed. Peter Woods (London: Routledge., 2002): 120-126.

⁶⁹ Helm and Katz, *Young Investigators*.

⁷⁰ Tom Lowrie, 'Designing a Framework for Problem Posing: young children generating open-ended tasks', *Contemporary Issues in Early Childhood* 3, 3 (2002): 354-364.

⁷¹ Lev, S. Vygotsky, *Mind in Society: The Development of Higher Psychological Processes*. (Cambridge, Massachusetts: Harvard University Press, 1978), 33.

⁷² Sabina Alkire and Severine Deneulin, 'The Human Development and Capability Approach', In *An Introduction to the Human Development and Capability Approach*, eds. Severine Deneulin and Lila Shahani (London: Earthscan 2009): 22-48. (32)

⁷³ Christina M. Lyon, 'Children's Participation and the Promotion of their Rights', *Journal of Social Welfare and Family Law*, 29, 2 (2007): 99-115.

⁷⁴ Moss and Petrie, *From Children's Services to Children's Spaces*, 111.

⁷⁵ Dewey, *Democracy and Education*, 183.

- ⁷⁶ Mihalyi Csíkszentmihályi, *Flow: The Psychology of Optimal Experience* (New York: Harper and Row, 1990).
- ⁷⁷ Helm and Katz, *Young Investigators*.
- ⁷⁸ David Wood, *How Children Think and Learn*. (Oxford: Basil Blackwell, 1998).
- ⁷⁹ Iram Siraj-Blatchford and Laura Manni, “‘Would you like to tidy up now?’” An analysis of adult questioning in the English Foundation Stage’, *Early Years*. 28, 1 (2008): 5-22.
- ⁸⁰ Shelley Goldman and Angela Booker ‘Making Math a Definition of the Situation: Families as Sites for Mathematical Practices’ *Anthropology and Education Quarterly* 40, 4 (2009): 369–387.
- ⁸¹ M. Elizabeth Graue and Daniel J. Walsh, ‘Children in Context’. In *Qualitative Research in Early Childhood Settings*, ed. J. Amos Hatch (Westport, Connecticut: Praeger, 1995), 135-144.
- ⁸² Gail E. Joseph and Philip S. Strain, ‘Teaching Young Children Interpersonal Problem-Solving Skills’, *Young, Exceptional Children*. 13, 3 (2010): 28-40.
- ⁸³ Barbara Tizard and Martin Hughes *Young Children Learning*, (London: Fontana, 1984), 183.
- ⁸⁴ Daniel Goleman, *Emotional intelligence* (New York: Bantam Books, 1994).
- ⁸⁵ Jennifer Ashley and Michael Tomasello, ‘Cooperative Problem-Solving and Teaching in Preschoolers’, *Social Development*. 7, 2 (1998): 143-163.
- ⁸⁶ Suzanne A. Denham, Kimberley A. Blair, Elizabeth Demulder, Jennifer Levitas, Katherine Sawyer and Sharon Auerbach-Major, ‘Preschool emotional competence: Pathway to social competence?’, *Child Development*. 74 (2003): 238-256.
- ⁸⁷ Nancy Eisenberg, Richard A. Fabes, Ivanna K. Guthrie, and Mark Reiser (2000). ‘Dispositional emotionality and regulation: Their role in predicting quality of social functioning’, *Journal of Personality and Social Psychology*. 78 (2000): 136–157.
- ⁸⁸ Susan H. Landry, Karen E. Smith and Paul Swank, ‘New Directions in Evaluating Social Problem Solving in Childhood: Early Precursors and Links to Adolescent Social Competence’, *New Directions for Child and Adolescent Development*. 123 (Spring 2009): 51-68.
- ⁸⁹ Rogoff, *Apprenticeship in Thinking*.
- ⁹⁰ Vygotsky, *Mind in Society*, 33.
- ⁹¹ H. Rudolf Schaffer, ‘Joint involvement episodes as contexts for cognitive development’. In *Contemporary Issues in Childhood Social Development*, ed. Harry McGurk (London: Routledge, 1992): 99-148.
- ⁹² Robin J. Alexander, *Towards Dialogic Teaching: rethinking classroom talk*, 4e. (York: Dialogos, 2008).
- ⁹³ Iram Siraj-Blatchford *et al.*, *Researching Effective Pedagogy in the Early Years*.
- ⁹⁴ William Damon, *Social and Personality Development* (New York: W. W. Norton, 1983).

- ⁹⁵ Norman K. Denzin, *Childhood Socialization*. (New Brunswick, NJ: Transaction Publishers, 2010).
- ⁹⁶ Ashley and Tomasello, 'Cooperative Problem-Solving and Teaching in Preschoolers'.
- ⁹⁷ Judy Dunn, *Children's Friendships* (Oxford: Blackwell, 2004).
- ⁹⁸ Andrew N. Meltzoff, 'Understanding the intentions of others: re-enactment of intended acts by 18-month-old children', *Developmental Psychology*, 31 (1995): 838–850.
- ⁹⁹ Joseph and Strain, 'Teaching Young Children Interpersonal Problem-Solving Skills'.
- ¹⁰⁰ Avigail Ram and Hildy S. Ross, 'Problem Solving, Contention, and Struggle: How siblings resolve a conflict of Interests', *Child Development*. 72, 6 (2001): 1710–1722.
- ¹⁰¹ Ralf, F.A. Cox, and Ad W. Smitsman, 'Action planning in young children's tool use', *Developmental Science*, 9, 6 (2006): 628–641.
- ¹⁰² Keen, 'The Development of Problem Solving in Young Children', 4.
- ¹⁰³ Keen, 'The Development of Problem Solving in Young Children'.
- ¹⁰⁴ Mary B. McMullen and Carol A. Darling, 'Learning from Their Mistakes: Glimpses of symbolic functioning in two-and-a-half to three-year-old children', *Early Years*, 23, 1 (2003): 55–66.
- ¹⁰⁵ Elizabeth Carruthers and Maufrey Worthington, 'Making sense of mathematical graphics: The development of understanding abstract symbolism', *European Early Childhood Education Research Journal*. 13, 1 (2005): 57–79.
- ¹⁰⁶ Maria Magnussen and Nikolas Pramling, 'The Appropriation of a Symbolic Skill in a Five-Year-Old', *European Early Childhood Education Research Journal*, 19, 3 (2011): 357–372.
- ¹⁰⁷ Gunther Kress, *Before Writing: Rethinking the paths to literacy* (London: Routledge, 1997).
- ¹⁰⁸ Edward De Bono, *Children Solve Problems* (London: Penguin, 1972).
- ¹⁰⁹ Elizabeth Bates, *The Emergence of Symbols*, (New York: Academic Press, 1979).
- ¹¹⁰ Susan W. Cook and Susan Goldin-Meadow, 'The role of gesture in learning: Do children use their hands to change their minds?', *Journal of Cognition and Development*. 7 (2006): 211–232.
- ¹¹¹ Usha Goswami and Ann L. Brown, 'Melting chocolate and melting snowmen: Analogical reasoning and causal relations', *Cognition*. 35 (1989): 69–95.
- ¹¹² Usha Goswami, 'Analogical reasoning: What develops? A review of research and theory', *Child Development*. 62 (1991): 1–22.

¹¹³ Karen E. Singer-Freeman and Patricia J. Bauer, 'The ABCs of analogical abilities: Evidence for formal analogical reasoning abilities in 24-month-olds', *British Journal of Developmental Psychology*, 26 (2008): 317–335.

¹¹⁴ Matthew Lipman, *Philosophy Goes to School*. (Philadelphia: Temple University Press, 1988).

¹¹⁵ Matthew Lipman, *Thinking in Education* (Cambridge: Cambridge University Press, 2003).

¹¹⁶ Edward De Bono, *Six Thinking Hats for Schools*. (Cheltenham, VIC: Hawker Brownlow Education, (1992).

¹¹⁷ Edward De Bono, *Teach Your Child How to Think*. (London: Penguin, 1993)

¹¹⁸ Bridges, *Fiction written under Oath*.

¹¹⁹ Helm and Katz, *Young Investigators*.

¹²⁰ Carolyn Edwards, 'Partner, Nurturer and Guide', 187.

¹²¹ Brown and Campione, 'Communities of learning and thinking', 120.

¹²² Eisner, *The Art of Educational Evaluation*, 78.

¹²³ Moss and Petrie, *From Children's Services to Children's Spaces*.

¹²⁴ Norman K. Denzin, 'Emancipatory discourses and the ethics and politics of interpretation', in *The Sage Handbook of Qualitative Enquiry*, eds. Norman K. Denzin and Yvonna S. Lincoln (Thousand Oaks, CA: Sage, 2005): 933-958.

¹²⁵ Philip F. Carspecken, *Critical ethnography in educational research* (London: Routledge, 1996).

¹²⁶ Kathy Charmaz, *Constructing grounded theory*. (London: Sage, 2006).

¹²⁷ Carspecken, *Critical ethnography in educational research*.

¹²⁸ British Educational Research Association (BERA), *Revised Ethical Guidelines for Educational Research*. London: British Educational Research Association, 2004).

¹²⁹ Priscilla Alderson and Virginia Morrow, *Ethics, Social Research and Consulting with Children and Young People* (Barkingside: Barnardo's, 2004).

¹³⁰ Charmaz, *Constructing grounded theory*.

¹³¹ Ibid.

¹³² Creswell, *Educational Research*.

¹³³ Charmaz, *Constructing grounded theory*.

¹³⁴ Robson, C. *Real World Research* (Oxford: Blackwell, 1993).

¹³⁵ Gary A. L. Fine, and Kent L. Sandstrom, *Knowing children: Participant observation with minors* (Newbury Park, CA: Sage, 1988).

¹³⁶ Andrew Pollard and Ann Filer, *The social world of children's learning*. (London: Continuum, 1996).

¹³⁷ Jane Murray, 'Knock, knock! Who's there? Gaining access to young children as researchers: A critical review', *Educate*~, 11, 1 (2011): 91–109.

- ¹³⁸ Gilbert Ryle, *The thinking of thoughts: What is 'Le Penseur' doing?*, University of Saskatchewan Lectures 18, (1968). Reprinted in Gilbert Ryle, *Collected Papers. Volume 2: Collected Essays, 1929–1968* (London: Routledge, 2009): 494–510.
- ¹³⁹ Morwenna Griffiths, *Educational research for social justice*. (Buckingham: Open University Press, 1998), 137-139.
- ¹⁴⁰ Anthony Pellegrini, *Observing children in their natural worlds*. (Mahwah, NJ: Lawrence Erlbaum Associates, 2004).
- ¹⁴¹ Charmaz, *Constructing grounded theory*.
- ¹⁴² Clark and Moss, *Listening to young children*.
- ¹⁴³ Creswell, *Educational Research*.
- ¹⁴⁴ Charmaz, *Constructing grounded theory*.
- ¹⁴⁵ Griffiths, *Educational research for social justice*, 137-139.
- ¹⁴⁶ Ann L. Lewis. 'Research Involving Young Children, in Promoting Evidence-Based Practice' in *Early Childhood Education: Research and its implications*, Volume 1, ed. Tricia David (Amsterdam, Elsevier Science, 2001): 253-271.
- ¹⁴⁷ BERA, *Revised Ethical Guidelines for Educational Research*.
- ¹⁴⁸ Alderson and Morrow, *Ethics, Social Research and Consulting with Children and Young People*.
- ¹⁴⁹ Ryle, *The thinking of thoughts: What is 'Le Penseur' doing?*
- ¹⁵⁰ Pellegrini, *Observing children in their natural worlds*.
- ¹⁵¹ Charmaz, *Constructing grounded theory*.
- ¹⁵² Ibid.
- ¹⁵³ Donald Schön, *The Reflective Practitioner* (New York: Basic Books, 1983).
- ¹⁵⁴ Charmaz, *Constructing grounded theory*.
- ¹⁵⁵ Ibid.
- ¹⁵⁶ Csíkszentmihályi, *Flow*.
- ¹⁵⁷ Tina Bruce, *Developing Learning in Early Childhood* (London: PCP, 2005).
- ¹⁵⁸ Vygotsky, *Mind in Society*.
- ¹⁵⁹ Keen, 'The Development of Problem Solving in Young Children'.
- ¹⁶⁰ Benjamin Bloom, *Taxonomy of Educational Objectives* (Boston, MA, Allyn and Bacon, 1956).
- ¹⁶¹ Goswami, 'Analogical reasoning: What develops?'
- ¹⁶² Singer-Freeman and Bauer, 'The ABCs of analogical abilities'.
- ¹⁶³ Johnson-Laird, and Byrne, *Deduction*.
- ¹⁶⁴ Ayer, *The Foundations of Empirical Knowledge*.
- ¹⁶⁵ Eisenberg, *et al.*, 'Dispositional emotionality and regulation'.
- ¹⁶⁶ Sally Goddard Blythe, *The Genius of Natural Childhood* (Stroud: Hawthorn Press, 2011).
- ¹⁶⁷ Keen, 'The Development of Problem Solving in Young Children'.

- ¹⁶⁸ Ashley and Tomasello, 'Cooperative Problem-Solving and Teaching in Preschoolers'.
- ¹⁶⁹ Rogoff, *Apprenticeship in Thinking*.
- ¹⁷⁰ Bruce, *Developing Learning in Early Childhood*.
- ¹⁷¹ Helm and Katz, *Young Investigators*.
- ¹⁷² Ashley and Tomasello, 'Cooperative Problem-Solving and Teaching in Preschoolers'.
- ¹⁷³ Brown and Campione, 'Communities of learning and thinking or a context by any other name'.
- ¹⁷⁴ Eisenberg, *et al.*, 'Dispositional emotionality and regulation'.
- ¹⁷⁵ Johnson-Laird, and Byrne, *Deduction*.
- ¹⁷⁶ Moss and Petrie, *From Children's Services to Children's Spaces*.
- ¹⁷⁷ Cox and. Smitsman, 'Action planning in young children's tool use'.
- ¹⁷⁸ Keen, 'The Development of Problem Solving in Young Children'.
- ¹⁷⁹ Vygotsky, *Mind in Society*.
- ¹⁸⁰ Rogoff, *Apprenticeship in Thinking*.
- ¹⁸¹ Lowrie, 'Designing a Framework for Problem Posing', 355.
- ¹⁸² Graue and Walsh, 'Children in Context'.
- ¹⁸³ Moss and Petrie, *From Children's Services to Children's Spaces*.
- ¹⁸⁴ Joseph and Strain, 'Teaching Young Children Interpersonal Problem-Solving Skills'.
- ¹⁸⁵ Bloom, *Taxonomy of Educational Objectives*.
- ¹⁸⁶ Johnson-Laird, and Byrne, *Deduction*.
- ¹⁸⁷ Goswami, 'Analogical reasoning: What develops?'
- ¹⁸⁸ Csíkszentmihályi, *Flow*.
- ¹⁸⁹ Bloom, *Taxonomy of Educational Objectives*.
- ¹⁹⁰ Goswami, 'Analogical reasoning: What develops?'
- ¹⁹¹ Johnson-Laird, and Byrne, *Deduction*.
- ¹⁹² Keen, 'The Development of Problem Solving in Young Children'.
- ¹⁹³ Eisenberg, *et al.*, 'Dispositional emotionality and regulation'.
- ¹⁹⁴ Lowrie, 'Designing a Framework for Problem Posing'.
- ¹⁹⁵ Alkire and Deneulin, 'The Human Development and Capability Approach'.
- ¹⁹⁶ Csíkszentmihályi, *Flow*.
- ¹⁹⁷ Dewey, *Democracy and Education*.
- ¹⁹⁸ Lowrie, 'Designing a Framework for Problem Posing'.
- ¹⁹⁹ Helm and Katz, *Young Investigators*.
- ²⁰⁰ Wood, *How Children Think and Learn*.
- ²⁰¹ Siraj-Blatchford and Manni, 'Would you like to tidy up now?'
- ²⁰² Ibid.
- ²⁰³ Ayer, *The Foundations of Empirical Knowledge*.
- ²⁰⁴ Dewey, *Democracy and Education*.

- ²⁰⁵ Helm and Katz, *Young Investigators*.
²⁰⁶ Wood, *How Children Think and Learn*.
²⁰⁷ Ibid.
²⁰⁸ Ayer, *The Foundations of Empirical Knowledge*.
²⁰⁹ Johnson-Laird, and Byrne, *Deduction*.
²¹⁰ Berry Mayall, 'The sociology of childhood in relation to children's rights', *The International Journal of Children's Rights*, 8, 3 (2000): 243–259.
²¹¹ OECD, *Starting Strong II*. (Paris: OECD, 2006): 3.
²¹² Robin J. Alexander (Ed.), *Children, their World, their Education: final report of the Cambridge Primary Review*. (London: Routledge. 2010): 3.
²¹³ Kathy Sylva, Edward Melhuish, Pam Sammons, Iram Siraj-Blatchford and Brenda Taggart, *Early childhood matters* (London: Routledge, 2010).
²¹⁴ Wood, Bruner and Ross, 'The Role of Tutoring in Problem Solving'.
²¹⁵ Strauss and Corbin (Eds.) *Grounded Theory in Practice*.
²¹⁶ Smeyers, 'On the Epistemological Basis of Large- Scale Population Studies and their Educational Use'.
²¹⁷ Creswell, *Educational Research*.
²¹⁸ Strega, 'The View from the Poststructural Margins', 201.
²¹⁹ Guba, and Lincoln, *Fourth Generation Evaluation*.
²²⁰ Ibid., 201.
²²¹ Ibid., 201.
²²² Bridges, *Fiction written under Oath*.
²²³ Iram Siraj-Blatchford, *Praxis Makes Perfect* (Ticknall: Education Now, 1994).
²²⁴ Bloom, *Taxonomy of Educational Objectives*.
²²⁵ Goswami, 'Analogical reasoning: What develops?'
²²⁶ Johnson-Laird, and Byrne, *Deduction*.
²²⁷ Ayer, *The Foundations of Empirical Knowledge*.
²²⁸ Csíkszentmihályi, *Flow*.
²²⁹ Eisenberg, *et al.*, 'Dispositional emotionality and regulation'.
²³⁰ Lowrie, 'Designing a Framework for Problem Posing'.
²³¹ Keen, 'The Development of Problem Solving in Young Children'.
²³² Donald Schön, *The Reflective Practitioner*, (London: Arena, 1995):27.
²³³ Isaacs, *Intellectual Growth in Young Children*, 322.
²³⁴ Strega, 'The View from the Poststructural Margins', 201.
²³⁵ Ibid., 201.
²³⁶ OECD, *Starting Strong II*. (Paris: OECD, 2006): 3.
²³⁷ UNCRC, *Convention on the Rights of the Child*.

Bibliography

Books and Journals

- Alexander, R.J. (Ed.) *Children, their World, their Education: final report of the Cambridge Primary Review*. (London: Routledge, 2010).
- Alexander, R.J. *Towards Dialogic Teaching: rethinking classroom talk*, 4e. (York: Dialogos, 2008).
- Alderson, P. and Morrow, P. *Ethics, Social Research and Consulting with Children and Young People* (Barkingside: Barnardo's, 2004).
- Ayer, A.J. *The Foundations of Empirical Knowledge* (London: MacMillan and Co., Ltd., 1940).
- Bates, E. *The Emergence of Symbols*, (New York: Academic Press, 1979).
- Bloom, B. *Taxonomy of Educational Objectives* (Boston, MA, Allyn and Bacon, 1956).
- Bridges, D. *Fiction written under Oath*. (Dordrecht: Kluwer Academic Publishers, 2003).
- British Educational Research Association (BERA), *Revised Ethical Guidelines for Educational Research*. London: British Educational Research Association, 2004).
- Bruce, T. *Developing Learning in Early Childhood* (London: PCP, 2005).
- Carspecken, P.F. *Critical ethnography in educational research* (London: Routledge, 1996).
- Charmaz, K. *Constructing grounded theory*. (London: Sage, 2006).
- Christensen, P. and James, A. eds. *Research with Children* (London: Routledge, 2008).
- Clark, A. and Moss, P. *Listening to young children: The mosaic approach*, 2e (London: National Children's Bureau, 2011).
- Corsaro, W. *The sociology of childhood*, 2e (Thousand Oaks, CA: Pine Forge Press, 2005).
- Creswell, J. *Educational Research*. (Upper Saddle River, NJ: Pearson Education, 2008).
- Csikszentmihályi, M. *Flow: The Psychology of Optimal Experience* (New York: Harper and Row, 1990).
- Damon, W. *Social and Personality Development* (New York: W. W. Norton, 1983).
- De Bono, E. *Children Solve Problems* (London: Penguin, 1972).
- De Bono, E. *Six Thinking Hats for Schools*. (Cheltenham, VIC: Hawker Brownlow Education, (1992).
- De Bono, E. *Teach Your Child How to Think*. (London: Penguin, 1993)
- Denzin, N.K. *Childhood Socialization*. (New Brunswick, NJ: Transaction Publishers, 2010).
- Dewey, J. *Democracy and Education. An introduction to the philosophy of education* (New York: Free Press, 1916/1966).
- Donaldson, M. *Children's Minds* (New York: W. W. Norton, 1978).

- Drew, C.J. *Introduction to Designing and Conducting Research* (Missouri: C.K. Mosby Company, 1980).
- Dunn, J. *Children's Friendships* (Oxford: Blackwell, 2004).
- Eisner, E. *The Art of Educational Evaluation*. (Lewes: Falmer Press, 1985), 78
- Fine, G. A. L. and Sandstrom, K. L. *Knowing children: Participant observation with minors* (Newbury Park, CA: Sage, 1988).
- Garton, A. F. *Exploring Cognitive Development: The child as problem solver*. (Malden, MA: Blackwell, 2004).
- Goddard Blythe, S. *The Genius of Natural Childhood* (Stroud: Hawthorn Press, 2011).
- Goleman, D. *Emotional intelligence* (New York: Bantam Books, 1994).
- Gopnik, A. Meltzoff, A.N. and Kuhl, P. (1999). *How Babies Think* (London: Weidenfeld and Nicolson, 1999).
- Griffiths, M. *Educational research for social justice*. (Buckingham: Open University Press, 1998).
- Guba, E.G. and Lincoln, Y.S. *Fourth Generation Evaluation* (Newbury Park, CA: Sage, 1989).
- Helm, J.H. and Katz, L. *Young Investigators*. (New York: Teachers' College Press, 2001).
- Hume, D. *A Treatise of Human Nature* (Oxford: Oxford University Press, 1739/2000).
- Isaacs, S. *Intellectual Growth in Young Children* (London: Routledge and Sons Ltd., 1930).
- James, W. *The Principles of Psychology*. (New York: Dover, 1890)
- James, A. Jenks, C. and Prout, A. *Theorising childhood* (Cambridge: Polity Press, 1998).
- Johnson-Laird, P.N. and Byrne, R.M.J. *Deduction*. (Hove: Lawrence Erlbaum Associates, 1991).
- Kress, G. *Before Writing: Rethinking the paths to literacy* (London: Routledge, 1997).
- Lipman, M. *Philosophy Goes to School*. (Philadelphia: Temple University Press, 1988).
- Lipman, M. *Thinking in Education* (Cambridge: Cambridge University Press, 2003).
- Mayer, R.E. *Thinking, Problem Solving, and Cognition*, 2e (New York: W. H. Freeman, 1992).
- Meadows, S. *The Child as Thinker* (London: Routledge, 2006).
- Moss P. and Petrie, P. *From Children's Services to Children's Spaces* (London: Routledge, 2002).
- Papert, S. *The Children's Machine*. (New York: Basic Books, 1993).

- Payton, O.D. *Research: The Validation of Clinical Practice*. (Philadelphia: F.A. Davis, 1979).
- Pellegrini, A. *Observing children in their natural worlds*. (Mahwah, NJ: Lawrence Erlbaum Associates, 2004).
- Piaget, J. *The Principles of Genetic Epistemology*. (London: Routledge Kegan Paul, 1972).
- Piaget, J. and Inhelder, B. *A Child's Conception of Space*. (New York: Norton, 1967).
- Pollard, A. and Filer, A. *The social world of children's learning*. (London: Continuum, 1996).
- Popper, K. *Objective Knowledge* (Oxford: Oxford University Press, 1972).
- Pring, R. *Philosophy of Educational Research* (London: Continuum, 2004).
- Robson, C. *Real World Research* (Oxford: Blackwell, 1993).
- Rogoff, B. *Apprenticeship in Thinking* (New York: Oxford University Press, 1990).
- Schön, D. *The Reflective Practitioner* (New York: Basic Books, 1983).
- Schön, D. *The Reflective Practitioner* (London: Arena, 1995):27.
- Siraj-Blatchford, I. *Praxis Makes Perfect* (Ticknall: Education Now, 1994).
- Strauss, C. And Corbin, J. (Eds.) *Grounded Theory in Practice*. (London: Sage, 1997).
- Thomas, G. *Education and Theory: Strangers in paradigms*. (Maidenhead: McGraw-Hill Education / Open University Press, 2007).
- Tizard, B. and Hughes, M. *Young Children Learning*, (London: Fontana, 1984).
- Vygotsky, L.S. *Mind in Society: The Development of Higher Psychological Processes*. (Cambridge, Massachusetts: Harvard University Press, 1978).
- Wood, D. *How Children Think and Learn*. (Oxford: Basil Blackwell, 1998).

Chapter or Other Part of a Book or Journal

- Alderson, P. 'Children as researchers: Participation rights and research methods', in *Research with children*, ed. P. Christensen and A. James (Eds.), (London: Routledge, 2008), 276–290.
- Alkire, S. and Deneulin, S. 'The Human Development and Capability Approach', In *An Introduction to the Human Development and Capability Approach*, eds. S. Deneulin and L. Shahani (London: Earthscan 2009), 22-48.
- Brown, A.L. and Campione, J.C. 'Communities of learning and thinking or a context by any other name' in *Contemporary Issues in Teaching and Learning*, ed. P. Woods (London: Routledge., 2002), 120-126.
- DeLoache, J.S., Miller, K.F. and Pierroutsakos, S.L. 'Reasoning and problem solving', in *Handbook of child psychology*, 5e, Vol 2: *Cognition, perception and Language*, eds. D. Kuhn and R. Siegler (New York: Wiley, 1998), 801-850.

- Denzin, N.K. 'Emancipatory discourses and the ethics and politics of interpretation', in *The Sage Handbook of Qualitative Enquiry*, eds. Denzin, N.K. and Lincoln, Y.S. (Thousand Oaks, CA: Sage, 2005): 933-958.
- Edwards, C. 'Partner, Nurturer and Guide: The role of the teacher', in *The Hundred Language of Children*, eds. C. Edwards, L. Gandini and G. Forman (Westport CT: Ablex Publishing, 1998), 179-198.
- Graue, M.E. and Walsh, D.J. 'Children in Context'. In *Qualitative Research in Early Childhood Settings*, ed. J. Amos Hatch (Westport, Connecticut: Praeger, 1995), 135-154.
- Hume, D. 'An Enquiry Concerning Human Understanding' (1748), in *David Hume: An Enquiry Concerning Human Understanding*, ed. T. Beauchamp (Oxford: Oxford University Press, 2000), 5-123.
- Lewis, A.L. 'Research Involving Young Children, in Promoting Evidence-Based Practice' in *Early Childhood Education: Research and its implications*, Volume 1, ed. Tricia David (Amsterdam, Elsevier Science, 2001): 253-271.
- Oancea, A. and Pring, R. 'The importance of Being Thorough', in *Evidence-based Education Policy. What evidence? What basis? Whose policy?* Eds. D. Bridges, P. Smeyers and R. Smith (Chichester: Wiley Blackwell, 2009), 11-35.
- Ryle, G. *The thinking of thoughts: What is 'Le Penseur' doing?*, University of Saskatchewan Lectures 18, (1968). Reprinted in G. Ryle, *Collected Papers. Volume 2: Collected Essays, 1929-1968* (London: Routledge, 2009): 494-510.
- Schaffer, H.R. 'Joint involvement episodes as contexts for cognitive development'. In *Contemporary Issues in Childhood Social Development*, ed. Harry McGurk (London: Routledge, 1992): 99-148.
- Schechter, J.B. 'Deductive Reasoning', in *Encyclopedia of the Mind*, ed. H. E. Pashler (London: Sage, 2013, forthcoming).
- Strega, S. 'The View from the Poststructural Margins: Epistemology and methodology reconsidered', in *Research as Resistance: Critical, Indigenous, and Anti-oppressive Approaches*, eds. L. A. Brown and S. Strega (Toronto: Canadian Scholars' Press, 2005), 199-235.
- Sylva, K., Melhuish, E. Sammons, P., Siraj-Blatchford, I. and Taggart, B. *Early Childhood Matters* (London: Routledge, 2010).

Article in a Journal

- Alderson, P. 'Children as researchers: Participation rights and research methods', in *Research with children*, ed. Pia Christensen and Allison James (Eds.), (London: Routledge, 2008), 276-290.
- Ashley, J. and Tomasello, M. 'Cooperative Problem-Solving and Teaching in Preschoolers', *Social Development*. 7, 2 (1998): 143-163.

- Biesta, G. 'Why "What Works" Won't Work: Evidence-based practice and the democratic deficit in educational research', *Educational Theory*. 57, 1 (2007): 1-22.
- Bridges, D. 'Research for Sale: moral market or moral maze?', *British Educational Research Journal*, 24, 5 (1998): 593-607.
- Carruthers, E. and Worthington, M. 'Making sense of mathematical graphics: The development of understanding abstract symbolism', *European Early Childhood Education Research Journal*. 13, 1 (2005): 57-79.
- Cook, S.W. and Goldin-Meadow, S. 'The role of gesture in learning: Do children use their hands to change their minds?', *Journal of Cognition and Development*. 7 (2006): 211-232.
- Cox, R.F.A. and Smitsman, A.W. 'Action planning in young children's tool use', *Developmental Science*, 9, 6 (2006): 628-641.
- Cunningham, C. 'Early years teachers and the influence of Piaget: evidence from oral history', *Early Years: An International Journal of Research and Development*, 26, 1 (2006): 5-16.
- Denham, S.A., Blair, K.A., Demulder, E., Levitas, J., Sawyer, K. and Auerbach-Major, S. 'Preschool emotional competence: Pathway to social competence?', *Child Development*. 74 (2003): 238-256.
- Eisenberg, N., Fabes, R.A., Guthrie, I.K. and Reiser, M. (2000) 'Dispositional emotionality and regulation: Their role in predicting quality of social functioning', *Journal of Personality and Social Psychology*. 78 (2000): 136-157.
- Fielding, M. 'Students as radical agents of change', *Journal of Educational Change*, 2, 2 (2001): 123-141.
- Gammage, P. 'Early childhood education and care: Politics, policies and possibilities', *Early Years*, 26, 3 (2006): 235-248.
- Goldman, S. and Booker, A. 'Making Math a Definition of the Situation: Families as Sites for Mathematical Practices' *Anthropology and Education Quarterly* 40, 4 (2009): 369-387.
- Goswami, U. 'Analogical reasoning: What develops? A review of research and theory', *Child Development*. 62 (1991): 1-22.
- Goswami, U. and Brown, A.L. 'Melting chocolate and melting snowmen: Analogical reasoning and causal relations', *Cognition*. 35 (1989): 69-95.
- Joseph, G.E. and Strain, P.S. 'Teaching Young Children Interpersonal Problem-Solving Skills', *Young, Exceptional Children*. 13, 3 (2010): 28-40.
- Keen, R. 'The Development of Problem Solving in Young Children: A Critical Cognitive Skill', *Annual Review of Psychology*, 62 (2011): 1-21.
- Kellett, M. 'Children as researchers: What we can learn from them about the impact of poverty on literacy opportunities?' *International Journal of Inclusive Education*, 13, 4 (2009): 395-408.

- Landry, S.H., Smith, K.E. and Swank, P. 'New Directions in Evaluating Social Problem Solving in Childhood: Early Precursors and Links to Adolescent Social Competence', *New Directions for Child and Adolescent Development*. 123 (Spring 2009): 51-68.
- Lees, L. 'Critical geography and the opening up of the academy: lessons from 'real life' attempts', *Area* 31, 4 (1999): 377-383.
- Lowrie, T. 'Designing a Framework for Problem Posing: young children generating open-ended tasks', *Contemporary Issues in Early Childhood* 3, 3 (2002): 354-364.
- Lyon, C.M. 'Children's Participation and the Promotion of their Rights', *Journal of Social Welfare and Family Law*, 29, 2 (2007): 99-115.
- Magnussen, M. and Pramling, N. 'The Appropriation of a Symbolic Skill in a Five-Year-Old', *European Early Childhood Education Research Journal*, 19, 3 (2011): 357-372.
- Mayall, B. 'The sociology of childhood in relation to children's rights', *The International Journal of Children's Rights*, 8, 3 (2000): 243-259.
- McMullen, M.B. and Darling, C.A. 'Learning from Their Mistakes: Glimpses of symbolic functioning in two-and-a-half to three-year-old children', *Early Years*, 23, 1 (2003): 55-66.
- Meltzoff, A.N. 'Understanding the intentions of others: re-enactment of intended acts by 18-month-old children', *Developmental Psychology*, 31 (1995): 838-850.
- Murray, J. 'Knock, Knock! Who's there? Gaining access to young children as researchers: A critical review', *Educate*, 11, 1 (2011): 91-109.
- Ram, A. and Ross, H.S. 'Problem Solving, Contention, and Struggle: How siblings resolve a conflict of Interests', *Child Development*. 72, 6 (2001): 1710-1722.
- Singer-Freeman, K.E. and Bauer, P.J. 'The ABCs of analogical abilities: Evidence for formal analogical reasoning abilities in 24-month-olds', *British Journal of Developmental Psychology*. 26 (2008): 317-335.
- Siraj-Blatchford, I. and Manni, L. "'Would you like to tidy up now?'" An analysis of adult questioning in the English Foundation Stage', *Early Years*. 28, 1 (2008): 5-22.
- Smeyers, P. 'On the Epistemological Basis of Large- Scale Population Studies and their Educational Use', *Journal of Philosophy of Education* 42, S1 (2008): 63-86.
- Warren, L. and Boxall, K. 'Service Users In and Out of the Academy: Collusion in Exclusion?', *Social Work Education: The International Journal*, 28, 3 (2009): 281-297. (2011).
- Wood, D. Bruner, J.S. and Ross, G. 'The Role of Tutoring in Problem Solving', *Journal of Psychology and Psychiatry* 17, 2 (1976): 89-100.

Website

Department for Education (DfE), *The Importance of Teaching*. Last Modified: 24th November, 2010. Retrieved: 6.5.12.

<<https://www.education.gov.uk/publications/standard/publicationDetail/Page1/CM%207980>>

Department for Education (DfE), *Statutory Framework for the Early Years Foundation Stage* Last Modified: 27th March, 2012. Retrieved: 6.5.12.

<<http://media.education.gov.uk/assets/files/pdf/e/eyfs%20statutory%20framework%20march%202012.pdf>>

Department for Education (DfE), *The English Baccalaureate*. Last Modified: 26th April, 2012. Retrieved: 6.5.12.

<<http://www.education.gov.uk/schools/teachingandlearning/qualifications/englishbac/a0075975/theenglishbaccalaureate>>

Kant, I. *Critique of Pure Reason*. (1781) Trans. J. M. D. Meiklejohn. Last modified 3rd July 2007. Retrieved 30.10.11.

<<http://www.gutenberg.org/cache/epub/4280/pg4280.html>>.

Redmond, G. 'Children's Perspectives on Economic Adversity: A review of the literature'. Innocenti Discussion Paper No. IDP 2008-01. Florence: UNICEF Innocenti Research Centre. Last modified 2008. Retrieved May 11.5.12.

<http://www.unicef.org/socialpolicy/files/Childrens_Perspective_on_Economic_Adversity.pdf>

United Nations Committee on the Rights of the Child (UNCRC). 'General comment no. 7 (2005): Implementing child rights in early childhood', Last modified 20th September, 2006. Retrieved 11.5.12.

<<http://www2.ohchr.org/english/bodies/crc/docs/AdvanceVersions/GeneralComment7Rev1.pdf>>

United Nations Committee on the Rights of the Child, *Convention on the Rights of the Child* (New York: United Nations, 1989). Last modified 18th November, 2002. Retrieved 11.5.12. <<http://www2.ohchr.org/english/law/crc.htm>>

Research Reports

Organisation for Economic Co-operation and Development (OECD), *Starting Strong II*. (Paris: OECD, 2006).

Siraj-Blatchford, I., Sylva, K., Muttock, S., Gilden, R. and Bell, D. *Researching Effective Pedagogy in the Early Years* (London: Department for Education and Skills, 2002).

Conference Papers

Pappas, E. 'Teaching Thinking and Problem Solving in the University Curriculum: A rationale', *2004 American Society for Engineering Education (ASEE) Southeastern Section Meeting*. (Auburn University, United States, April 2004).

Appendices

List of appendices

- 1) Table 1: Stage 2 participants
- 2) Table 2: Multi-modal approach to collecting data
- 3) Table 3: Stage 2 - Setting 'Focus' Children
- 4) Table 4: Stage 3 'Home' Focus Children
- 5) Table 5: Numerical overview of analysed data
- 6) Table 6: 32 Axial Codes emerging from children finding solutions

1) Table 1: Stage 2 participants

Ash Setting	7-8 year-old boys and girls (n=32) and their practitioners (n=3). Inspection grade: 'Good'.
Beech Setting	4-5-year-old boys and girls (n=46) and their practitioners (n=7). Inspection grade: 'Good'.
Cherry Setting	4-5-year-old boys and girls (n=60) and their practitioners (n=6). Inspection grade: 'Good'.

2) Table 2: Multi-modal approach to collecting data

<u>Table 2:</u> <u>Multi-modal approach</u> <u>to collecting data</u> <u>(Clark and Moss,</u> <u>2011)</u>	Documents (e.g. planning, school prospectus)	Practitioners' Analysis sheets
Parent Analysis sheets	Live Observations	Interview conversations
Children's Artefacts	Child Analysis sheets	Focus Groups
Photographs	Video observations	Field notes

3) Table 3: Stage 2 - Setting 'Focus' Children

Table 3: Stage 2 - Setting 'Focus' Children					
Setting	Pseudonym	Girl	Boy	Age (years) during setting fieldwork	Home language
Ash Setting	Annie	√		7	English
	Billy		√	8	
	Costas		√	8	
	Demi	√		8	
	Edward		√	8	
	Florence	√		8	
Beech Setting	Gemma	√		5	English/French
	Harry		√	5	
	India	√		5	English
	Johnny		√	5	
	Kelly	√		4	
	Laura	√		5	
Cherry Setting	Martin		√	5	Turkish
	Nora	√		5	
	Oscar		√	5	
	Pedro		√	5	
	Querida	√		4	English

4) Table 4: Stage 3 'Home' Focus Children

Table 4: Stage 3 'Home' Focus Children	Ash Setting		Beech Setting		Cherry Setting
Pseudonym	Annie	Billy	Gemma	Harry	Martin
Gender	Girl	Boy	Girl	Boy	Boy
Age during home fieldwork	8 years	8 years	5 years	5 years	5 years
Living with	Mother (MTHR-A) Father (FTHR-A)	Mother (MTHR-B) Father (FTHR-B) Sister (SIS-B) – aged 9 yrs	Mother (MTHR-C) Father (FTHR-C) Brother (BRO-C) – aged 8 yrs	Mother (MTHR-D) Father (FTHR-D) Brother (BRO-D) – aged 4 yrs	Mother (MTHR-E) Father (FTHR-E) Sister (SIS-B) – aged 4 yrs
Description of home	Modern, detached 4 bedrooms, on a development in an established large English Midlands town. Garden	Modern, detached 4 bedrooms, on a development in an established large English Midlands town. Garden	Modern, detached 4 bedrooms, on a development in an established large English Midlands town. Garden	Modern, detached 4 bedrooms, on a development in an established large English Midlands town. Garden	Modern, detached 4 bedrooms, on a development in an established large English Midlands town. Garden
Home language	English	English	English	English and French (bilingual)	English
Social Class category*	A	A/B	B	A	A/B
FAMILY	A	B	C	D	E

*Market Research Society, *Occupation Groupings*. London: Market Research Society. Retrieved: 18.4.12

<<http://www.mrs.org.uk/publications/publications.htm>>

5) Table 5: Numerical overview of analysed data

Table 5: Numerical overview of analysed data	n = Analyses featuring children finding solutions	n = Incidences of children finding solutions	n = Axial codes for the category 'find a solution'
Data from settings	56	179	505
Data from homes	36	126	584
Combined data from settings and homes	92	305	1089

6) Table 6: 32 Axial Codes emerging from children finding solutions

5 categories: children finding solutions:	<u>32 Axial Codes emerging from children finding solutions</u>
Control by others : BARRIERS	4. Following adult's direction 5. Responding to adult's closed questions 6. Responding to adult's semi-open questions 7. Reproducing knowledge s/he already had 8. Believes s/he has failed
Solution is unrecognised: BARRIERS	9. Denied opportunity to share solution 10. Solution not shared with or witnessed by others: unconfirmed 11. Solution not shared with or witnessed by others 12. Solution unconfirmed
EFFECTS when solution is unrecognised	1. Gives up 2. Has become disinterested 3. Unmotivated
Antecedents / contexts for 'Find a solution': PROVOCATIONS	13. Self-regulates 14. Creates a problem to solve 15. Time and freedom to explore, investigate, experiment with something of personal interest 16. Focused on something of personal interest 17. Exploring properties 18. Perseveres to resolve problem 19. Devises practical method to create solution 20. Applying rule to create solution 21. Deductive reasoning 22. Inductive reasoning 23. Finds own solution 30. Employs others to help with finding a solution 31. Able reader 32. Theory of mind
EFFECTS of finding a solution	24. Finds practical use for solution 25. Resolves another person's problem 26. Shares solution 27. Motivated by finding solution 28. Excited by finding solution 29. Wants to preserve what s/he is doing

Jane Murray worked as an early childhood teacher for twenty years before moving to the University of Northampton where she teaches undergraduate and postgraduate students and engages in research. Her research interests include epistemological issues in early childhood education and care, ‘new sociological’ issues relating to early childhood and early childhood pedagogies.