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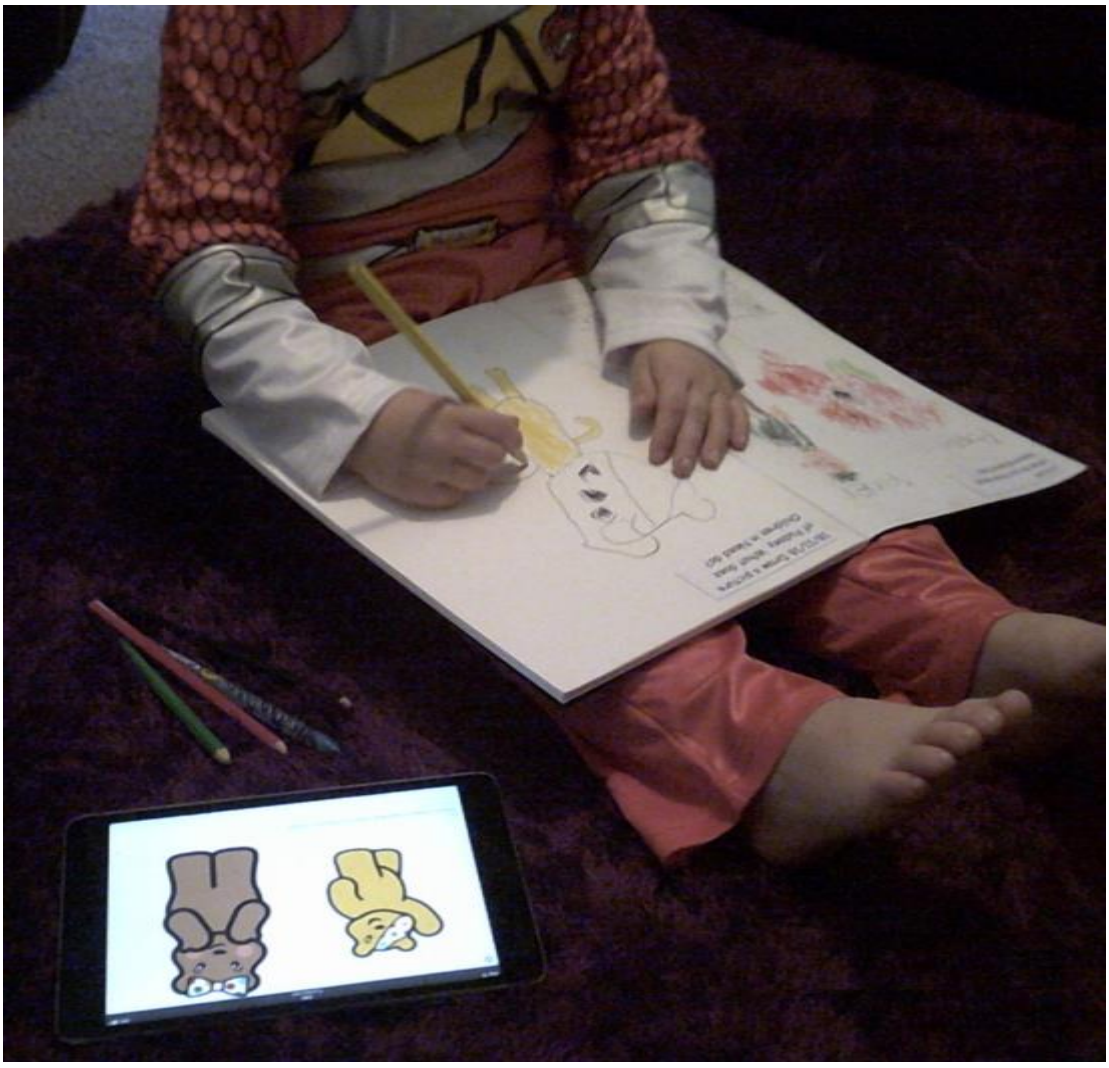
# NP3

# New Purposes

# New Practices

# New Pedagogy

## Meta-analysis – Executive Summary

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# Executive summary

NP3 (New Purposes – New Practices – New Pedagogy) was funded by the Society for Educational Studies to explore the digital practices that children engage with outside school and the extent to which these are recognised, valued and influencing teachers' pedagogy inside primary schools.

The project was underpinned by a sociocultural theortical position, which informed its approach and was reflected in its five key research questions (RQs):

RQ1 What are the digital practices that pupils bring to their learning in school?

RQ2 Across subject domains what do teachers' intended and enacted pedagogic practices indicate about their awareness of and the value accorded to pupils' digital competencies, and how do pupils experience these pedagogic practices?

RQ3 What institutional circumstances and practices enable or undermine how pupils' digital competencies and practices are recognised (RQ1) and integrated into teachers' practice (RQ2)?

RQ4 What are the consequences of the answers to RQs 1-3 for learning in terms of social justice, and across and within subject domains?

RQ5 How does the research inform how to represent and model a participative pedagogy of mutuality (Bruner, 1996; Wenger, 1998; Alexander, 2000; Murphy & Wolfenden, 2013) and engage teachers with that pedagogy?

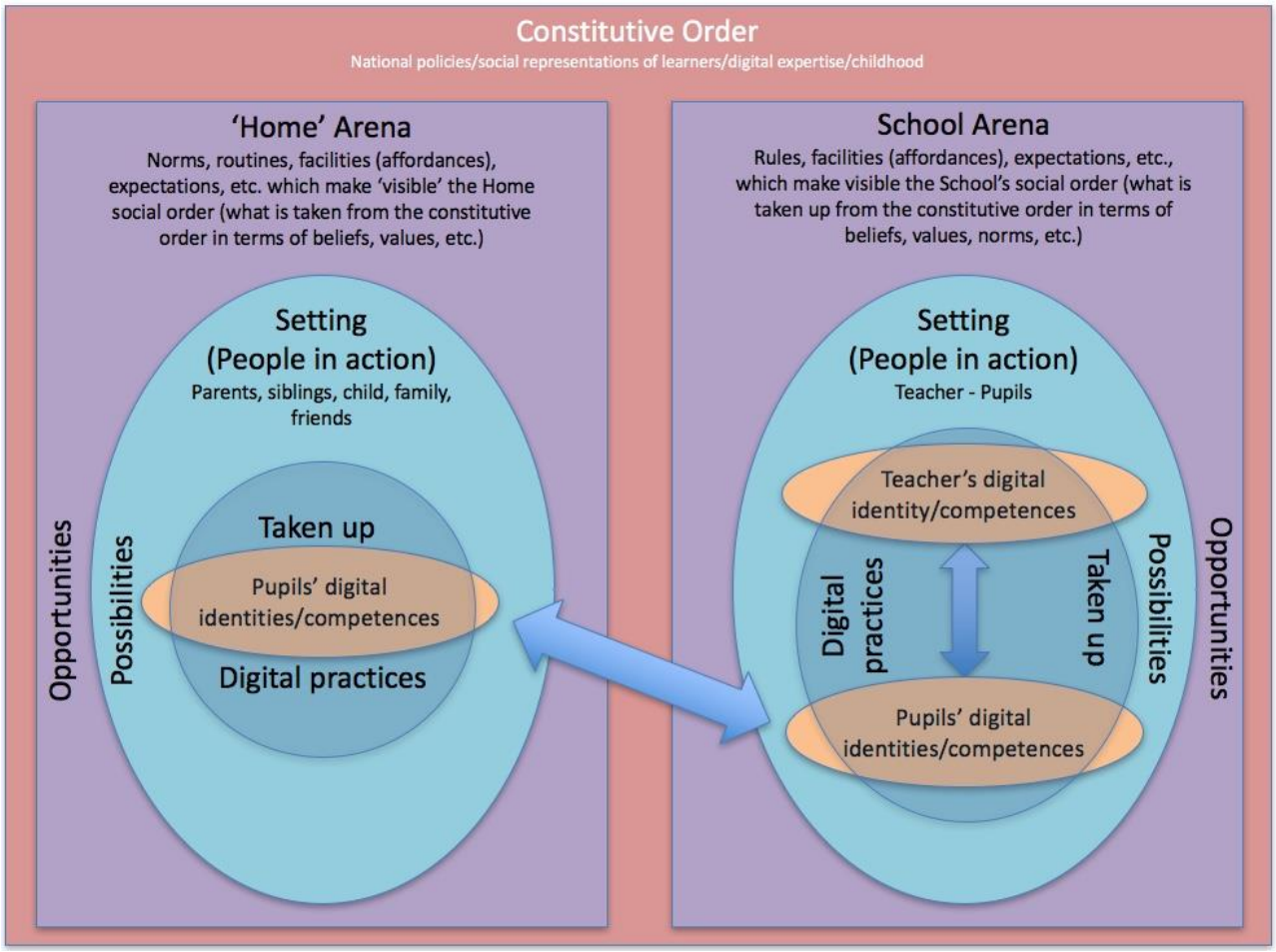
## Data collection and analysis

Over a two year period over 100 children and more than 60 teachers in 13 schools took part in the study. 43 'log children' used digital cameras to capture evidence of the ways in which they used ICT 'at home' (which included any use outside school/school clubs) and were each interviewed individually at least once. More than 20 carers of these 'log children', mostly mothers, were interviewed individually about their child's home context and use of ICT. 31 teachers were observed teaching at least one lesson, with some being observed three times. These teachers were each interviewed at least twice (generally before and after each observation). Roughly six children from each of the observed lessons took part in a group interview following the lesson, and in addition at least one group of children from the older year group in the school was interviewed about ICT use in the school more generally. **See Sections 3 and 4 of the Meta-analysis report.**

The data collection and analysis were informed by a sociocultural framework (see Figure 1), which focussed attention on:

- The constitutive order – the broad context within which homes and schools sit, which for example includes: national policies; social representations of learning, childhood, and ICT.
- The arena of the school/home – the enduring features of the school/home that reflect how the constitutive order has been taken up in terms of beliefs and values. This would, for example, include: norms, routines, rules, facilities, and expectations. The arena frames the opportunities that are available.
- The setting (people in action) – the people within the arena who interact with each other and with the child. Through their actions people within the arena create and/or constrain what the child can do. The setting (People in action) frames the possibilities that are available.
- What is taken up, what individuals do within the setting (people in action), which is a reflection of their identities - what they see as being possible for them to do within the wider possibilities offered by the setting (people in action).

**Figure 1 NP3's sociocultural framework**




**See the literature review (Meta-analysis report Section 2.1)** for an academic introduction to the sociocultural underpinnings of the project, and **Section 3.3 of the Meta-analysis report for a more detailed explanation of the project's sociocultural framework** (Figure 1).

# Contributions and findings related to RQ1

All of the 'log children' lived in homes where ICT was readily available, including access to mobile devices and WiFI connected to the Internet. It needs to be noted that the children and carers who took part in the study may be atypical for a variety of reasons. **See Section 6 of the Meta-analysis report.**

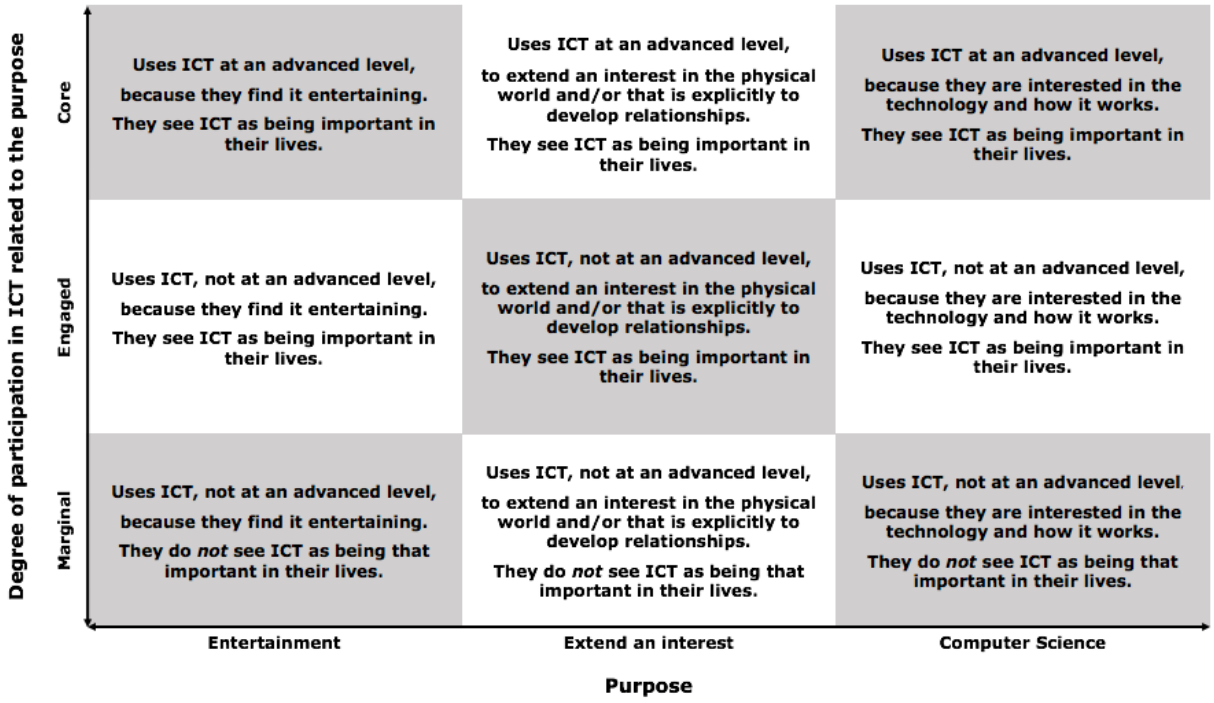
**Key contribution 1**: This study provides rich descriptions of children's use of ICT outside school and insights into their digital practices.

Children engaged in a wide variety of uses of ICT outside school, including, but not limited to:

- Playing games ranging from simple 'arcade' style games such as Snake or Angry Birds through to sophisticated use of virtual worlds such as Minecraft.
- Finding information, either using a web search engine such as Google or, very often, searching within YouTube.
- Creating, editing and sharing images, videos and music, ranging from using painting apps, through to taking still photographs or videos with their mobile device, to sophisticated editing of video and audio and uploading to the web (e.g. to their own YouTube channel).
- Communicating with family and friends, and much less often with people they didn't know in the physical world. This included 'in game' communication (e.g. using built-in chat tools or other channels such as Skype).
- For some children sustaining relationships was the main purpose and specific communication tools such as WhatsApp, Facebook and/or Facetime were used.
- Programming/coding whilst less common, was mentioned, usually as a minor interest compared with the other out of school uses of ICT.
- Other 'fun' uses of ICT, including downloading and/or listening to music, watching videos/TV (often using a service such as Netflix or catch-up TV), reading e-books.

**Key contribution 2:** In order to make sense of the vast array of uses of ICT, and equally importantly the ways in which children used it outside school, the Digital Practice Framework (DPF) was developed (Figure 2). The Digital Practice Framework encapsulates key aspects of children's digital practices and relates to why they use ICT (Purpose), and the level of sophistication of that use combined with the way in which children position themselves in relation to other users of ICT (Participation). The Digital Practice Framework has the potential to be used more widely by those interested in ICT use outside school.

**Figure 2 The Digital Practice Framework (DPF)**



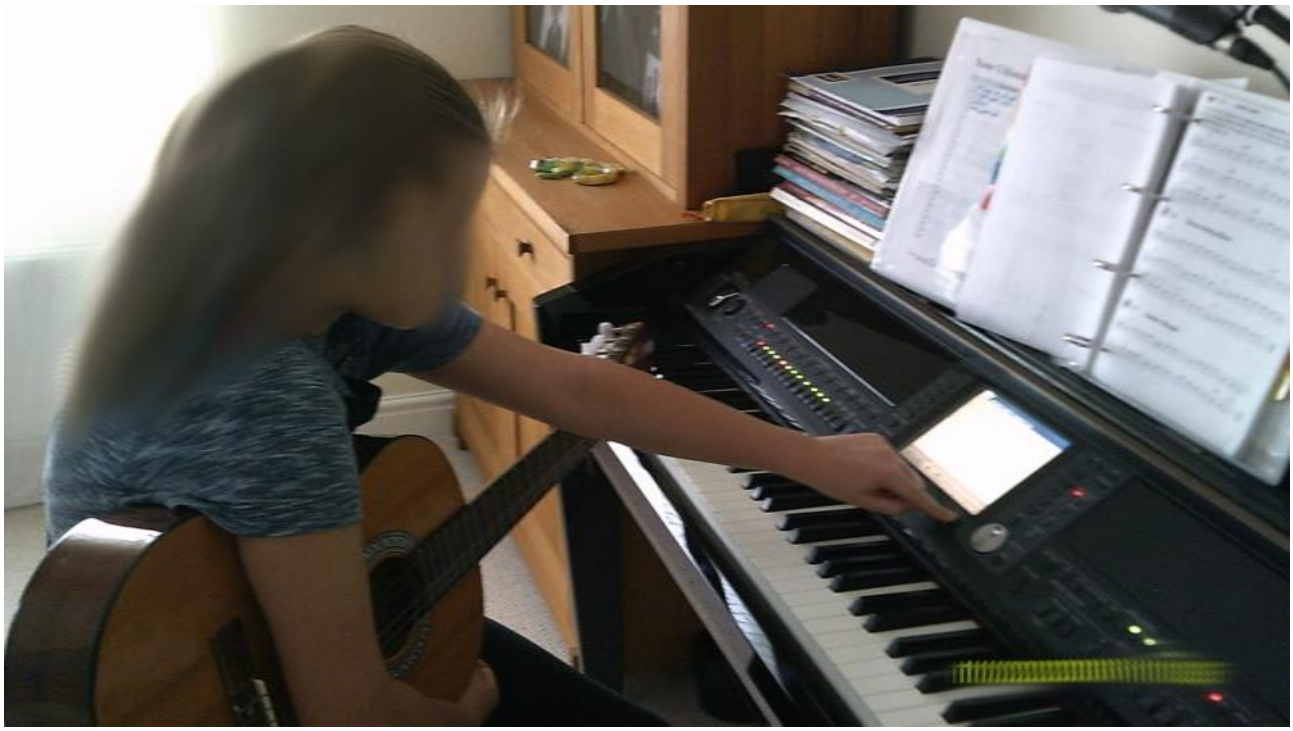
The 43 children's digital practices were categorised against the DPF. Key similarities and differences between children whose practice 'fitted' into the different cells within the DPF (e.g. Entertainment/Marginal, Entertainment/Engaged, Extend an interest/Marginal, etc.) were looked for in relation to:

- the home arena, more specifically: level of ICT provision; family routines; rules/time constraints and access to the Internet; and parents' views);
- people in action and children's identities (including gender identities).

**Key finding 1:** There was a wide variation in levels of engagement and sophistication of ICT use. This was often due to constraints placed on the child's use of ICT within their home arena or due to lack of support due to parents' own levels of ICT competence and/or concerns about children using ICT. This challenges commonly held assumptions about the majority of children being highly competent users of ICT. Gender did appear to influence children's digital practices.

**Key finding 2:** Whilst the majority of children use ICT primarily for entertainment, others purposively use it to extend physical world interests. Children were agentic, they pro-actively and independently searched for information about things that they were interested in.

**See Section 6 of the Meta-analysis report for a fuller discussion of the findings relating to RQ1.**



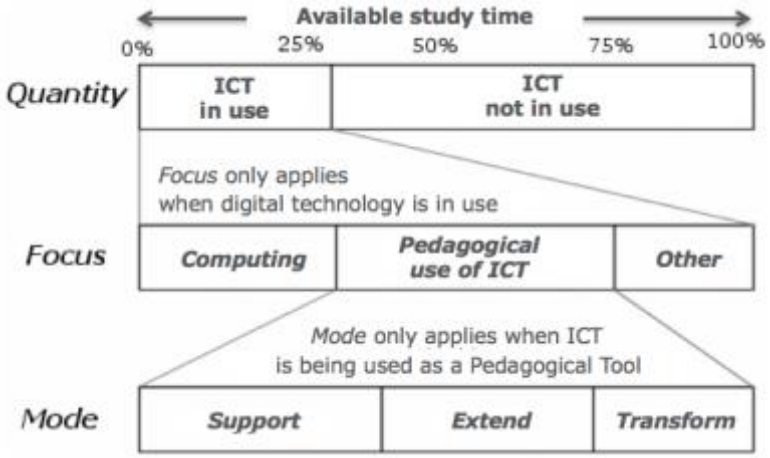
## Contributions and findings related to RQ2

To establish the extent to which pedagogy (linked to ICT use) in primary schools aligned with children's digital practices outside school, uses of ICT inside school were analysed against the Digital Practice Framework (DPF). **See Section 7 of the Meta-analysis report.**

**Contribution 3**: The report provides a wide range of examples of ICT use that illustrate both the ways in which ICT is being used in primary schools, and highlights where these are impacting on practice or ways in which they might do so if implemented differently.

**Contribution 4**: In order to analyse the impact of ICT use in schools the ICT Innovation Framework (ICTIF) was introduced (see Meta-Analysis Report Section 4.5.1). This is an updated version of the Computer Practice Framework (Twining 2002a, 2002b, 2004, 2008) – See Figure 3. The ICTIF has the potential to be used more widely by those interested in ICT use in schools.

**Figure 3 The ICT Innovation Framework (ICTIF)**




**Key finding 3:** There were a small number of examples of pedagogic practices that did, or had the potential to, align with children's digital practices outside school. These related to:

- the use of school radio stations, where children became radio presenters;
- digital leaders programmes, where they went beyond carrying out routine tasks such as managing equipment;
- some uses of social media (such as class blogs), where teachers relinquished control;
- programming, for a small minority of children;
- and giving children control to decide, without having to ask permission, when and how to use mobile devices.

**A school radio station**

**Key finding 4:** In almost all instances within the study schools, ICT use did not align with children's digital practices outside school. Children didn't feel that their out of school digital practices were relevant in school (except in relation to homework, where they often had a greater degree of agency).

**Key finding 5:** The lack of alignment between teachers' pedagogical practices and children's digital practices outside schools seems at least in part to be related to constraints that

teachers have to work within. As a result, the purposes underpinning ICT use in school were almost always the school's or teacher's purposes rather than the children's.

**Key finding 6:** Schools seldom replicated how children's digital practices develop outside school, especially with regard to providing opportunities for sustained and increasing participation with others who shared similar interests. Instead, children's ICT use in schools tended to be short term and discrete.

**Key finding 7:** There were many examples of effective use of ICT in the study schools, despite the lack of alignment between teachers' pedagogic practices with ICT and children's digital practices outside school. **See Section 8 of the Meta-analysis report**.

**Key finding 8:** A further analysis using the ICT Innovation Framework (see Meta-analysis report Section 4.5.1) of the 159 observed or reported uses of ICT by children in schools revealed:

- there were large differences in the proportion of time that pupils spent using ICT both within and across the study schools (see Section 8.1 of the Meta-analysis report);
- there appeared to be a threshold level of ICT provision that was necessary in order for ICT to be used in ways that changed, or had the potential to change, what and/or how children were taught;
- of the 91 instances of observed or reported use of ICT in classes where ICT was estimated to be used by children more than 10% of the time:
    - 11 (13%) changed what and/or how the children were taught in ways that could not realistically have been achieved without ICT;
    - a further 36 (40%) had the potential to change what and/or how children were taught in ways that could not realistically have been achieved without ICT, but either there were insufficient data to determine whether this had happened, or they were implemented in a way that undermined this transformative potential.
- of the total of 139 instances of ICT use that were categorised as pedagogic use of ICT across the curriculum (PICT on the Focus dimension of the ICTIF), which included instances where the quantity of use could not be estimated with any confidence:
    - just over 60% had the potential to change what and/or how children were taught in ways that could not realistically have been achieved without ICT;
    - fewer than 20% did change what and/or how children were taught in ways that could not realistically have been achieved without ICT.

**See Section 8.2 of the Meta-analysis report for examples of ICT use in the study schools that did, or had the potential to, change what and/or how the children were taught and could not realistically have been achieved without ICT.**

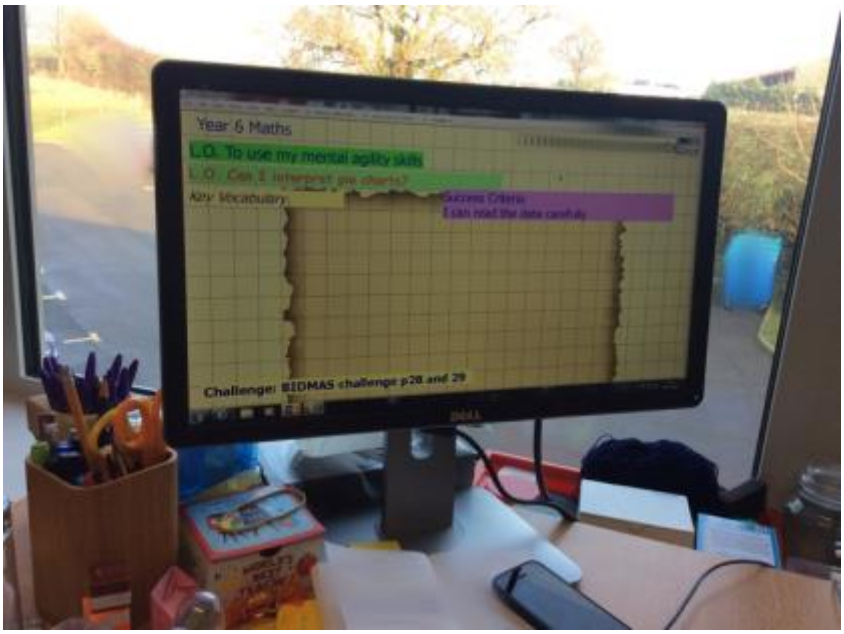
## Contributions and findings related to RQ3

This research question was expanded to include consideration of factors that impacted on all use of ICT in schools, rather than the narrower original focus on the factors that impacted on the degree of alignment between teachers pedagogic practices related to ICT use and children's digital practices outside school. **See Section 9 of the Meta-analysis report**.

**Contribution 5**: The report provides evidence about key features of the constitutive order and school arena that impact on ICT use in primary schools, and illustrates a range of different ICT strategies.

**Key finding 9:** The data from the study schools did not support the view that there was a relationship between how remote a school was and the degree to which they had embraced ICT, however this may have been due to the sample of schools in the study.

**Key finding 10**: Significant elements from the constitutive order, namely curriculum, assessment and accountability requirements, appeared to be major factors preventing teachers' pedagogic practices from aligning with children's digital practices outside school. This was less strongly evident in the independent schools, where accountability to parents seeming to be more important than accountability to formal inspection. The curriculum, assessment and accountability regimes in Scotland were less important constraints on practice then those in England.




**Key finding 11**: A range of different ICT strategies were evident across the study schools, often reflecting their overall educational vision and priorities (though these were often in conflict). Different schools met the same priorities in different ways, for example meeting requirements to teach computing by using a timetabled set of laptops rather than an ICT suite.

**Key finding 12:** There was a general move towards greater use of mobile devices.

**Key finding 13:** Older children were often provided with more access to ICT (at least in terms of resources allocated) than younger children.

**Key finding 14**: There appeared to be a minimum threshold of provision below which the level of ICT use was minimal. However, once this threshold had been exceeded, there was no clear relationship between the model of ICT resourcing and the extent to which or ways in which ICT was used. This seemed to be more down to the agency of individual teachers.

**See Section 9 of the Meta-analysis report for more details of the institutional factors impacting on ICT use.**

## Contributions and findings related to RQ4

RQ4 was concerned with consequences of the answers to the previous research questions for learning in terms of social justice, and across subject domains. This analysis focussed primarily on differences in ICT use: across subjects; with children labelled as having different 'abilities'; and in relation to gender. **See Section 10 of the Met-analysis report**.

**Contribution 6**: The report provides evidence about differences in the ways in which ICT is used across subject domains in primary schools. It illustrates differences in ICT use for children when they are grouped by 'ability', and highlights some of the consequences for learning of differences in ICT use outside school (which were identified in response to RQ1).

**Key finding 15**: The assumption that SES determines ICT access at home may need to be re-examined as the data did not show there to be a definitive link between socio-economic status and children's access to devices, access to the internet or use of ICT.

**Key finding 16:** The teachers' perceptions of the nature of the different curriculum subjects and their views of 'knowledge', strongly influenced how ICT was used in practice, although there was clearly scope for ICT to be used effectively across subjects. ICT use had greater impact (or potential to impact) on what and how children were taught where subjects were perceived to be less 'fact based' and 'procedural', such as in history and music, compared with maths.

**Key finding 17:** Much of the ICT use in English and Maths provided opportunities for 'drill and practice' types of learning, which supported the development of children's ability to meet national curriculum requirements.

**Key finding 18:** In English, ICT was used in a variety of ways to enhance writing where the writing itself was or could have been changed by use of ICT (e.g. using rich immersive worlds offered powerful opportunities to stimulate and scaffold writing). ICT also provided opportunities to explore new forms of composition and write for real audiences (e.g. using blogs).

**Blabberize – animated picture with audio**

**Key finding 19**: In maths, ICT provided the possibility for children to articulate, share and co-construct understandings of particular mathematical methods (e.g. using Explain Everything). In maths, some teachers tried to increase children's independence through providing access to video clips to explain various aspects of mathematics

**Key finding 20**: To use ICT effectively, teachers need to be confident in the use of the software and aware of the pedagogical reason for choosing to use ICT in a particular way with a particular group of children.

**Key finding 21:** In those schools using 'ability' grouping, the data suggest children in 'lower ability' groups often have less opportunity to use ICT than children labelled as 'high ability'. Children in 'lower ability' groups also seemed to spend a higher proportion of their time using ICT for 'drill and practice' activities. Those labelled 'more able' seemed more likely to be allowed to work more independently and on richer tasks that offered more scope for children to be agentive, collaborative, co-creators of knowledge. This difference in provision was evident in both KS1 and KS2.

**Key finding 22:** There were some patterns of children's ICT use at home that teachers need to be aware of in order to consider ways in which their pedagogy can be inclusive and does not lead to or perpetuate gender-based inequities in children's use of ICT and development and learning. More knowledge of children's home digital practices would help teachers to not view girls and boys in binary terms or as homogenous groups, and to recognise how gender is mediated by other factors such as ethnicity or social class.

**See Section 10 of the Meta-analysis report for more details of the consequences of the answers to the previous research questions for learning in terms of social justice, and across subject domains.**

## Contributions and findings related to RQ5

RQ5 was concerned with the extent to which teachers' pedagogic practices aligned with a sociocultural model. **See Section 11 of the Meta-analysis report**.

**Contribution 7**: The report introduces the Innovative Pedagogy Framework (IPF), which was developed by Patricia Murphy for NP3. This is a powerful tool for analysing teachers' pedagogic practices. The IPF defines five theoretically informed models of pedagogy in terms of their key features. See Figure 4.

**Contribution 8**: Ways in which the Innovative Pedagogy Framework can be used are illustrated, and possible relationships between the pedagogical model adopted and the quantity and impact of ICT use are identified.

**Key finding 23:** the data suggested a relationship between a school's over-arching pedagogical model (based on the Innovative Pedagogy Framework) and the Quantity and Mode of ICT use (as defined by the ICTIF), specifically, a Traditional pedagogical model having less ICT use with less impact on what and/or how children are taught than a Constructivist or Innovative pedagogical model.

**Key finding 24:** Whilst the school arena is important, an individual teacher's identities and pedagogical stance may be more important determinants of their practice related to ICT use.

**Key finding 25:** Irrespective of their pedagogical stance, teachers who position themselves as ICT users and see ICT as being an important part of their identity are more likely to make more use of ICT in their teaching, which may also involve using it in ways that change what and/or how the children are taught.

These findings are tentative and need further investigation.

**See Section 11 of the Meta-analysis report for full details of these findings.**

**Figure 4** **The Innovative Pedagogy Framework (IPF)** developed by Patricia Murphy for NP3

| Categories | Behaviourism / information processing | Constructivism | | | Innovative - Sociocultural |
|---|---|---|---|---|---|
| | | Cognitivist Piagetian | Radical | Social | |
| **Purpose of schooling/ educational goals** | Forming habits, or rules and procedure and associations between them. | Organised, abstract mental models and procedures for applying them. Transferable across situations. | | | Becoming competent in productive and valued social practices. Competence relies on developing the shared repertoire of communities (concepts, terms, tools including symbols, procedures, routines, stories and ways of doing things) and understanding their joint enterprise and how to deploy the tools in achieving these |
| **View of learner and learning** | Learners are **receivers** and processors of information and **passive** in the learning process. | Learners are **active** constructors of knowledge | | | Learners are **agentive** but agency is distributed across people and tools both physical and psychological. Learning is mediated by the tools available that enable learners to take particular actions. A dynamic affordance is what becomes possible when knowledge is used as a tool in interaction with the social and physical world.<br><br>Agency is relational; learning relies on productive relationships with others it is **collaborative**.<br>Learners belong to different communities and have multiple identities and associated competences within those communities in which they participate.<br>Learners' histories of participation are diverse and mediate their learning in school.<br>Children's multiple identities mediate how they are positioned and how they position themselves in schools and classrooms |
| | **Motivation** is extrinsic, learners | **Motivation** is intrinsic as learners seek to understand and make sense | **Motivation** is intrinsic but it is to understand how others in | | **Motivation** is intrinsic to engage with, and achieve stand-alone competence |

| | | | | | |
|---|---|---|---|---|---|
| | react to the environment<br><br>Learning is by imitation or acquisition<br><br>Learning is an individual activity | of the world and resolve cognitive conflicts. Learners are self-directed and self-regulating<br><br>Learning is a process of mutual adaptation and internalization and self organisation of knowledge to better fit reality<br><br>**Reciprocity** is crucial and depends on equality in knowledge and power between learners in interaction. Cognitive conflict for older children is enabled through **co-operation** with other learners. Meaning making remains an individual activity | | society have constructed ways of seeing and understanding the world that provide the learner with power to be self-determined, make informed and socially aware decisions and be socially responsible - a literate citizen.<br><br>Learning occurs in dialogue with others in activity. It is through dialogue that meanings emerge between people. Dialogue relies on **collaboration** between learners and learners and teachers actively establish joint contingency | in socially valued activities and to belong to particular communities.<br><br>Learning occurs in **participation** with others as children move through understanding as their competence evolves. Learning is not towards outcomes, it is ongoing and evolving. Participation relies on mutuality, the ability to negotiate meanings which emerge between people and are social through and through. Accountability to the shared endeavour is a responsibility of all participants, children and teachers.<br>Learning is an **appropriation** of shared social understanding. What is appropriated depends on what is made available and for whom.<br>Learning is a transformation of identity and is a process of **belonging** to the communities where the practices are situated and **becoming** part of that community as competence evolves. |
| **Views of teachers and teaching** | Teachers are the holders of knowledge – the authority.<br>Teaching is by drill and practice in behaviourism.<br>Metaphors for the teacher – lion tamer, sculptor or petrol pump attendant.<br>In information processing the teacher sets pre-defined | Learning occurs in activity.<br>Younger children need concrete experiences<br>older children can begin to abstract and create models grounded in practical problem-solving activity | | Teachers are the authority in scaffolding learning to achieve established knowledge claims.<br>Learners and teachers have responsibility for the reflexive co-creation of the classroom subject culture, the ground rules and ways of acting and problem solving. Both are reflexively agentive | Teachers construct learning opportunities from the perspective of the learner not the subject.<br><br>Teachers connect classroom activities to mature practices in the world so children can bridge their understanding by recognising potential affordances between school activities and the lived world and vice versa.<br>Teachers have to enable children to experience mutuality and recognise the identity work that entails. This involves |

| | | | | | |
|---|---|---|---|---|---|
| | problems solved by algorithms stored in the head.<br>The teacher limits the information to be processed (stepwise pedagogy).<br>Teachers use pace and competition often to maintain motivation<br><br>**Metaphor** for teachers - **parent bird** regurgitating pre-processed information in sequenced blocks | Teachers **guide** learning they do not instruct, children direct their own learning<br><br>**Metaphor** for the teacher – **gardener** providing the conditions for learning | Teachers **elicit** children's prior knowledge and **model** learners' knowledge through process of testing and retesting. They provide **contingent guidance** moving individual learning towards specified curriculum goals. | Teachers do not guide but actively direct experience through **scaffolding** and the dialogue between children until they achieve stand-alone competence in conceptual understanding and subject specific problem solving or ways of doing. Teachers direct learning through the zone of proximal development.<br><br>**Metaphor** for the teacher – **tourist guide** or **Sherpa** negotiating learners' journeys across subject terrains | recognising what children bring into the classroom from their histories of participation in multiple communities.<br><br>Teachers practice is shaped by institutional practices and values.<br><br>Within a setting teachers **reify** emergent individual and collective meanings for all to use and make sense of within the context of the activity. The teacher with learners **orchestrates** support for different learning trajectories within the shared endeavor of the subject classroom.<br><br>**Metaphor** for the teacher - expert in social valued practices and activities and reifier of collective and individual meanings. |
| **View of knowledge** | Knowledge represents how the world really is. The world is given not constructed | Knowledge is constructed it doesn't represent an objective external reality | | | Knowledge is used in action and knowing is part of action. Knowledge is a tool of knowing within situated action. |
| | Symbols like words and numbers carry meanings which are stable across all learners | Knowledge is **viable** if it fits experience | | Symbols and words do not carry meaning. Meaning comes into existence between people in dialogue | Knowledge is possessed by individuals and groups in both explicit and tacit form. Each does different epistemic work. Knowing emerges in action and is part of it |
| | Knowledge is independent of context i.e. the situations in which it is acquired and is transferable | Knowledge is abstracted and available for transfer across situations | | Knowledge emerges in social communities and is collectively verified and individually acquired | Learner competence is what they 'do' well not just how much they know |
| | Knowledge is explicit and a property of the individual | | | | |

## Recommendations

**Recommendation 1**: If **parents** want their child to move from being Marginal to Engaged, or Engaged to Core users of ICT (as defined by the Digital Practice Framework) and to learn how to manage their online presence effectively then parents should, from a young age:

- induct their child into using games or other ICT apps that the child is interested in;
- progressively support their child in connecting up with trusted others who have a shared interest;
- maintain regular open communication with their child about their ICT use.

**Recommendation 2**: **Policy makers** need to be clear about what they see the purpose(s) of school to be, and what outcomes they want children in schools to achieve, and should ensure that they align their policies and regulations with those purposes and intended outcomes.

**Recommendation 3**: More specifically, **policy makers** should implement the recommendations of the Educational Technology Action Group (ETAG), which can be downloaded from http://etag.report.

**Recommendation 4**: **Schools** need to be clear about their educational priorities and should use the Innovative Pedagogy Framework (IPF) to help them clarify their pedagogical beliefs. They should ensure that their ICT strategy aligns with those priorities and their pedagogical model.

**Recommendation 5**: **Senior leaders** should carefully plan the roll out of their ICT strategy, taking heed of the plentiful advice that is available, including, for example about the implementation of mobile devices (e.g. see http://edfutures.net/Digital_technology_strategies), and effective professional development (e.g. Twining & Henry, 2014; Twining, Raffaghelli, Albion & Knezek, 2013).

**Recommendation 6**: **Schools** should embrace the fact that children are accessing the internet outside school, and should work with children to educate them about how to do so in a safe and effective manner.

**Recommendation 7**: **Schools** should more proactively seek out information about digital practices 'in the home'. However, schools should avoid trying to manage or formalise children's out of school digital practices.

**Recommendation 8**: **Teachers** should acknowledge that teacher agency is one of the most important determinants of what happens in classrooms.

**Recommendation 9**: **Teachers** should use the Innovative Pedagogy Framework (IPF) to clarify their pedagogical beliefs. They should share their pedagogical beliefs with colleagues.

**Recommendation 10**: In schools in which children have access to a high level of ICT resourcing, and in particular 1 to 1 mobile device provision, **teachers** should give children much greater freedom to decide when and how to use ICT in order to achieve desired outcomes.

**Recommendation 11**: **Teachers** should ensure equity of access, both in terms of time and types of use, for *all* children.

**Recommendation 12**: **Teachers** should provide opportunities for discussion of the children's out of school digital practices.

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