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Abstract

Adopting a social practices approach to literacy, we discuss the potential of iPads for classroom-based early literacy learning in three different educational settings. We propose that iPads offer new opportunities for innovative early literacy learning activities that can be woven into the fabric of classroom practice and curriculum delivery. The study draws on data from an exploratory study, where we lent iPads to a Children's Centre nursery (3-4 year olds), a primary school Reception class (4-5 year olds) and a Special School (7-13 year olds). We observed how the iPads were integrated into each setting over a two-month period and conducted pre- and post-interviews with staff, while parents completed short questionnaires about home uses of new technologies. There was some variability in the ways iPads were used across the settings, but a commonality was that well-planned literacy-related iPad activities stimulated children's motivation and concentration, and offered rich opportunities for communication, collaborative interaction, independent learning and enthusiastic learning dispositions. Practitioners particularly valued the opportunities iPads afforded to deliver national curriculum guidelines in new and different ways, and to help equip all children with higher levels of technological confidence and competence.

Keywords

Early literacy, iPad, digital, touch screen, apps, inclusive literacy practices, learner identity

Introduction

The literacy practices of young children and their families are currently characterised by the everyday use of an array of digital technologies, which over the past decade have become increasingly portable, affordable and efficient (author, 2012; Lynch and Redpath, 2012). These new and powerful cultural tools ‘create and shape the learning environments in which our children grow up’ (author, 2013), so it is hardly surprising that many young children are keen to imitate and master their use: as Vygotsky pointed out, it is ‘real life’ that educates (Vygotsky, 1997: 345). Yet research evidence has consistently shown that there is ambivalence and resistance to the incorporation of new technologies in early literacy education. While some enthusiastically embrace the use of new technologies (e.g. Galloway, 2009), some argue vociferously that new technologies have no place at all in early learning as they may have a negative impact on children’s imaginative play (House, 2012). Many early years practitioners have found it difficult to integrate digital technology into their literacy planning and practice, partly due to narrow curricular definitions of literacy as primarily paper-based, and partly due to lack of time and expertise to explore available hardware and supporting software, lack of understanding of the potential of new technologies to promote early literacy, and lack of confidence in their own ability to use digital devices effectively in the classroom (Lankshear et al., 1996; Turbill, 2001; Carrington, 2005; author, 2011). In the meantime, technological invention has continued apace, with a step change in functionality following the development and widespread use of mobile touch-screen devices such as the Apple iPad.

We therefore devised this study with the aim of enabling early years practitioners in preschool and primary settings, and teachers of children with complex learning and physical needs, to explore the educational potential of digital technologies with touch-sensitive screens. We focussed specifically on classroom-based uses of the iPad, and were interested in exploring how the affordances of these portable devices (with full operating systems, touch screen sensitivity and a multiplicity of apps) might open up new possibilities for learning and teaching early literacy.

Early literacy and digital devices: the literature

Research has begun to evidence how diverse digital devices are becoming integral to young children's early experiences of literacy in their homes and communities (Plowman, Stephen and McPake, 2010; Wohlwend, 2010; co-author and author 1, 2010; author 1, 2012). Much of the emerging research in this field is founded on sociocultural conceptualisations of learning (Vygotsky, 1978; Wertsch, 2007), where mental processes are viewed as social in origin and mediated through interaction using symbolic representations such as language and with cultural artefacts that have evolved over time. By learning how to use new 'digital tools', young children are able to engage in the meaning-making practices that characterise contemporary culture. Young children's everyday immersion in digital communication occurs at a critical period in their lives when their emerging literacy skills (speaking, listening, reading, and writing) are being moulded by the conventions of the social and cultural worlds in which they live. New terms have been coined, such as 'Digital Natives' (Prensky, 2001) and 'the Net Generation' (Tapscott, 1998) to describe the first generation of children growing up in Westernised societies, surrounded by digital media including games consoles, cameras, music players, video cameras, mobile

phones, tablets and many other toys and tools that characterise the digital era.

However, the potential of new technologies for young children's literacy development remains largely untapped in educational settings, and research has identified a 'digital divide' where some young children are developing considerable skills and knowledge about new technologies by participating in supported activities at home, whilst others have little or no opportunity to engage with digital technology at home and even less so in education (van Dijk and Hacker, 2003; author, 2010).

As Burnett (2009) discusses, there is a growing call from education research for educational curricula to incorporate digital technologies into literacy teaching programmes. This would reflect not only children's interests, but also the profound and extensive changes brought to contemporary literacy practices through the ubiquitous use of digital media (see Hisrich and Blanchard, 2009; Kalantzis et al., 2010; Underatuin, 2011). Yet in the UK, for instance, government-sponsored evaluations of early years, primary and secondary education have reported that technology has only erratically been integrated into learning (OFSTED, 2008).

Although educational curricula may nod towards the need for the innovative use of technologies in the literacy classroom (DfE, 2012), there remains a dominant focus on print-based skills. Recently in England, this focus has narrowed even further with an insistence on the teaching and testing of synthetic phonics, which is currently portrayed in policy documentation as the key to early reading and writing (author, 2013). Even in educational settings where new technologies have been introduced to support classroom-based literacy learning, research has revealed that there is a tendency to use these new tools to replicate existing pedagogical approaches (Burnett, 2009). One of the many reasons for this state of affairs is that in addition to a lack of

curricula guidance, whole school support and ICT teacher training, busy teachers and practitioners understandably need time to build their familiarity, confidence and expertise with new digital devices before they can begin to change their practice in ways that will raise the quality of pupils' experience of learning with a range of media (Moss et al., 2007).

A growing body of research has begun to piece together specific evidence regarding the classroom learning opportunities offered by diverse digital media, including interactive whiteboards (Moss et al., 2007; Smith et al., 2005; Twiner et al., 2010; Warwick et al., 2010), computers (author, 2011; 2012; Plowman, Stephen and McPake, 2010), digital games (Apperley and Walsh, 2012), digital texts (Thoerner and Williams, 2012) and a range of new media (Burnett and Merchant, 2012; Calvert & Wilson, 2008; Carrington and Robinson, 2009; Wohlwend, 2009, 2010). Research into iPad use has found that their user-friendly design presents very few technical challenges for young children, who quickly become enthusiastic and competent users (Lynch and Redpath, 2012) although with some apps, children may encounter difficulties such as unintentionally deleting their work (Hutchison, Beschorner and Coffey, 2012). With older children, iPads have been found to encourage intuitive participation in open-ended games and apps (Verenikina and Kervin, 2011). However, to date, very little is known about how touch-screen technologies can be used to enhance young children's classroom-based early literacy learning.

The present study

In our study we therefore aimed to explore the potential benefits of a specific touch-screen device, the iPad, for early literacy in three different educational settings.

Rather than adhering to conventional definitions of literacy as the decoding and encoding of meaning when reading and writing paper-based texts, we drew on broader definitions of literacy as embedded in social, cultural and historical practices (Street, 1995, 1997) which involves learning to 'read', 'write' or 'design' texts using combinations of different modes, such as images, words and sounds, in a range of printed and digital media (author, 2013). In line with sociocultural conceptualisations of learning processes (Vygotsky, [1934] 1978) we regard literacy learning as social in origin and mediated through action and interaction using cultural artefacts. These artefacts evolve over time as societies develop, and in the current era, we argue that literate activity is characterised by the use of both print and digital media.

Particularly when using digital devices, meanings can be expressed through multiple modes of symbolic representation, such as combinations of spoken and written language, images, icons, sounds, layout and animation. Therefore, this study aimed to investigate the educational use and potential of iPads, with a particular focus on finding out how learners and practitioners leverage the potential of iPads for classroom-based early literacy education/learning.

Introducing iPads to three different settings

We trialled and evaluated the use of iPads in three different educational settings in central England: a city suburb Sure Start nursery for 3-4 year-olds; a primary school reception class for 4-5 year-olds on the outskirts of a city; and a primary class for children aged 7-13 in a special school on the outskirts of a town. At the outset of the study, none of the settings had an iPad dedicated for classroom use, but they all regularly used digital cameras and computers. Interactive whiteboards were used daily in the primary and special school, but were not available in the nursery. This

project therefore offered the opportunity for staff to explore the potential of a new device for a limited period of time, supported by our team.

We distributed a short questionnaire to parents and education practitioners in each setting about home and school uses of new technologies, followed by pre-study semi-structured interviews with practitioners about their beliefs and practices regarding early literacy and new technologies. During an initial visit to each research site, we observed and made video recordings of a range of literacy activities with new and traditional technologies (books/ comics/computer/ alternative and augmentative communication (AAC) systems). We then discussed with staff the possible uses of the iPad for their setting, and lent each setting an iPad for two months. Each device was pre-loaded with a research-based, multi-media app (reference withheld, referred to as OS hereafter) which was developed by us and colleagues at the (reference withheld University), to give staff a starting point for understanding the potential of this tool. The OS app allows children, their parents and/or carers to create, record and share their own digital stories (reference withheld). We encouraged staff to download and use further apps as they deemed appropriate to their particular educational context, and offered support with any queries or problems. We then conducted a second round of video-recorded observations after a further three to four weeks, and interviewed staff regarding their experiences of using the iPad to support early literacy. Finally, we contacted staff in the following term to see if they had integrated iPads into their longer term literacy practice.

The interview data were transcribed, and after multiple viewings of the video observations and data discussions, the research team agreed on common themes and

conceptual categories, working within an interpretive analytic framework. The interview and video data were coded systematically using computer assisted qualitative data analysis software Atlas.ti, and questionnaire responses were analysed using Statistical Package for the Social Sciences (SPSS).

This rich array of data enabled us to gain insights into the varied uses of iPads in classroom-based literacy learning. The questionnaires and interviews increased our understandings of the children's experiences with new technologies in their home and school lives, and our own observations of classroom practice gave us an insight into the actual use of iPads by the practitioners and the children. Within this broader framing, we identified themes which were common across the three settings

Findings

Children's technology use and literacy at home

The parent questionnaires offered fixed choice responses ('often', 'sometimes' or 'rarely') about how frequently children played with 'traditional' and 'new' toys and technologies. The responses revealed a trend for children from all settings to engage more frequently in traditional activities such as building with bricks, pretend play and sharing books than activities involving 'new technologies'. However, watching TV, videos or DVDs featured amongst some of the most frequent activities for nursery aged children and older children who attended the special school. For the Nursery and Reception- aged children, activities with the computer and Internet were mostly rated between 'rarely' and 'sometimes', suggesting that many children only occasionally used interactive digital technologies when at home. Children with

learning impairments were reported by parents as being the most frequent users of computers, internet and handheld game devices.

Practitioners' views on new technologies before using iPads in the classroom

At the beginning of the study, practitioners in all three educational settings reported that children had less frequent access to new technologies in the setting than they did at home. Before using the iPads, practitioners said they valued the potential of new technologies to offer stimulating learning opportunities, yet they also voiced concerns about their potential harm. For example, some felt children were being denied early language learning opportunities due to the ubiquitous use of mobile devices:

‘... a lot of people nowadays run their lives via their mobile phone...they’re walking along with the pram and they’re talking on their phone and not to the baby’

Practitioners also worried about the potentially addictive and ‘over-stimulating’ nature of many digital games, particularly for children with behavioural difficulties who could become ‘a bit obsessive’. They felt children could become ‘over-reliant’ on digital devices, spending ‘not enough time outside ... too much sitting down’, and were concerned about children accessing inappropriate internet sites if left on their own with networked devices. Others feared that the highly motivating and responsive nature of digital games could have negative consequences for the kinds of patient and persevering learning dispositions needed for the occasionally arduous process of learning to read and write. The cost of digital equipment was a further issue for staff in all settings, along with concerns about technical problems, a lack of confidence in

their ability to overcome these and a lack of easily accessible technical support.

Despite their concerns, there was a strong consensus amongst staff that in order to help prepare children for their lives in a digital world, education settings should ‘make sure they’re ready for all the other things that are happening so quickly’, ‘keeping a balance’ between learning activities with traditional and new media, and making the most of new technology ‘to enhance teaching’, as encapsulated in the thoughts of one early years practitioner:

‘... one of the things we’re supposed to teach them in the new EYFS is about the world as a whole and how those children are going to be able to move into that world and technology that is there for them in the future and it’s forever evolving ... so therefore introducing it to them is one of those key skills we’re teaching them’

Practitioners’ views on iPads during the study

In our interviews and conversations with staff after they had been using the iPads in the classrooms for a few weeks, and in our observations of classroom practice, staff began to couch their concerns in a more positive framing: some accepted the risks as essential; some preferred to pass the responsibility of using iPads to more expert colleagues; and some were keen for children to use the iPad but reluctant to hand over control of the device to children, which curtailed the ways that children could engage with the device. Across the settings, children’s play with iPads was sometimes presented as a ‘reward’ for children after they had completed other (possibly more

irksome) tasks. In these instances, the iPad assumed the place of a precious and venerated object which could only be entrusted to children for a limited time period.

Thus, whilst practitioners had initially been reserved about the role of digital media in the literacy classroom, their enthusiasm grew once they had had time to familiarise themselves with the OS app, and also to identify further apps which they deemed suitable for classroom use. Towards the end of the study, many spoke of the ‘endless possibilities’ the iPad offered to extend and vary classroom-based activities. Once the study had been completed, the practitioners also spoke retrospectively about how easily iPad-based activities slotted into their delivery of the national curriculum guidelines, providing new and different ways to present core literacy concepts and knowledge. They also spoke of the ways the iPad activities stimulated children’s motivation and concentration, enriched the communicative environment and facilitated collaborative and independent learning in playful and creative ways. Below, we elaborate on the main themes which we identified in practitioners’ interviews and our observations in relation to the potential of the iPad to enrich early literacy learning.

Experts and novices in the classroom

Through the interviews and observations we were able to identify a progression of shifts in practitioners’ attitudes towards using the iPad in the classroom, and these were common across the three settings. Once the iPads had been in use for a short time, we saw how staff opted either for the role of ‘expert’ or ‘novice’ user. When asked in the pre-observation interviews whether they were confident computer users, staff responses fell broadly into three categories: 1) ‘confident, regular users’ of

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computers and/or touch screen devices (primarily iPhones) at work and home, including social networking; 2) 'less confident but keen' and 3) 'lacking confidence and fearful', or as one practitioner put it, 'frightened of breaking it'. In each class, one self-defined 'confident' adult technology user was assigned or assumed the role of iPad expert. In each classroom, the adult experts were, perhaps not wholly by chance, the most senior member of staff. Although less confident staff tended initially to steer clear of engaging with the iPad, towards the end of the comparatively short time of the study, many had been drawn to the devices by the children's enthusiasm.

Adults were certainly not the only experts in the classroom. Practitioners in each setting reported that some children had already used touch-screen devices at home, particularly smartphones, and were highly confident in their use. 'Novice' children were keen to learn how to use them and 'picked it up really well'. Some children were considered to be 'ahead' of staff with new technologies, 'brilliant at computers' and able to 'teach the teacher'. Our observations began to suggest that using popular new cultural devices, such as iPads, offer some potential to redress the knowledge/power imbalance between adults and children in educational settings and raise the status of young learners by offering empowering 'expert' identities, whilst at the same time increasing their knowledge and skills with digital devices.

'Open' and 'closed' apps

Throughout the study, we heard how the adult technology experts had dedicated many hours of personal time outside the classroom searching for suitable apps to include in their planning. Although they encountered a surfeit of commercially-available apps

offering ‘edutainment’ (purporting to combine education with entertainment), they found very few literacy-related apps which they felt offered high quality learning potential. Many of the apps they ultimately selected for classroom use had interactive yet repetitive game formats with ‘closed’ content, that is, the content could not be changed or extended by the user. As Lynch and Redpath (2012) discuss, whilst commercially-produced apps may use state-of-the-art imagery, they are mostly based on outmoded behaviourist and/or transmission theories of learning, where the user practises particular skills and is rewarded with tokens of accomplishment and progress. We observed how these games were sometimes used effectively to support learners’ independent practice of, for example, learning the alphabet or the names of animals, yet they positioned children as recipients of narrowly defined literacy knowledge, rather than as independent or collaborative and creative producers of original materials. Furthermore, during our observations many children soon tired of the repetitive nature of these games.

Using more ‘open content’ apps (such as OS) engaged children more deeply in their own learning. With the OS app, children were able collaboratively to create their own stories, initially by selecting a sequence of photographs which they or their teacher had taken, then developed this by adding, for example, voice recordings and/or typed text and also, as seen in the special setting, extending the story creatively through re-enactments and staged performance.

The flexibility offered by the open content of the OS app permitted all children, and more reticent adults in the classrooms, the opportunity and motivation to develop digital expertise whilst also engaging in the creation of personal stories in multiple

media. Furthermore, the social sharing of stories within the school resembled many children's out-of-school digital practices, and led to the more central inclusion of some children who had been previously only peripherally involved.

Motivation and positive learning dispositions

Teachers commented on 'the magical awe and wonder' engendered by iPad activities which motivated children to learn. Unpicking this enthusiasm, staff noted how children particularly enjoyed the facility to undo and review stages of their work, which reduced the consequences for them of making mistakes and appeared to be conducive to positive and confident learning dispositions. For example, in the special setting, 13-year-old Robert, who had limited fine motor control became engrossed in using 'My Colouring Book Free' app (Pedersen, 2009) to colour in a range of animal-related scenes. Although this app had 'closed' content, it did offer a wide range of colouring template options and allowed users a degree of creative expression by selecting colours from an on-screen palette, tapping the chosen colour, and tapping the chosen section which then coloured in automatically (see Figure 1).

-Figure1 to be inserted about here-

Robert's attentive teacher supported his engagement in this activity by offering a commentary to his actions at strategic points in his decision-making, for example, when he pointed to the cow's legs, the teacher responded: 'his legs, you could colour his legs in'. When he took time to choose a colour and tapped very precisely on a section of the screen illustration to colour it in, his teacher smiled at his accomplishment, gently congratulating him. Throughout, both the teacher and the app

were responsive to Robert's choices and rewarded the effort he was investing in carefully controlling his use of touch to complete his drawing. This was a highly satisfactory learning and teaching episode, where Robert was motivated to reflect on which colours he wanted to use, to reverse his decisions if he did not like the result, to try out new ideas, to reflect and consider the overall effect, and to take pleasure in the successfully accomplished process and product of colouring in – something which he could not yet achieve with traditional pencils or pens.

Children in all the settings relished the responsive nature of many iPad-based activities and the immediacy of the results they produced. As Underatun (2011) discusses with regard to online literacy practices, we saw how the flexibility and responsiveness of digital literacy activities constituted new hybridised literate activities that combined characteristics of traditional literacy resources with the speed and feedback of oral literacy. As a further example, children in the Reception class used the iPad and 'OS' app to take photographs of their outdoor activities, and then used these as the basis for story creation - just moments after the photographs had been taken. These instant products were much appreciated by teachers, who not only valued the way 'OS' motivated children's engagement with story-telling, but also allowed them to print out displays of classroom work with comparative ease. This combination of immediate feedback, along with tangible and satisfying end products, motivated children to engage deeply with iPad-based literacy activities, which as one practitioner commented, attracted their attention like 'bees to a honeypot'.

Such uses encouraged children to develop positive dispositions towards literacy, with many children displaying more advanced alphabetic and spelling knowledge than staff

had previously given them credit for. Nursery staff noted this particularly for children with English as an additional language, and for 'quiet' children. Similarly, the Reception class teacher was 'blown away' by the quality of some of the work the children produced, including those who previously had not willingly engaged in conventional writing activities:

'what they really like is ... filming activities they've done ... putting together little plays ... based on what we've been doing ... certain children who if it was a written exercise they would do nothing but they are in the forefront ... children who do lots of writing are also at the forefront'

For some children, the iPad offered gateways into revealing their true reading potential. For example, the Reception teacher was taken aback by 5-year-old Harry who was playing the app 'Doodlefind', which is designed to promote accurate word spelling:

'he's been reading Level 7 reading books and all of a sudden he could read every single word that flashed up and get really high scores and I sat down with him with the reading books and we've moved him up 7 reading levels because I didn't realise ... you show them the reading books and they think 'oh that's boring I don't want to read that' but then because he could read these words (on the screen) we went back to the reading books and he was zooming away with his reading so we've moved him on now'.

This episode points to the iPad's potential to support the close relationship between children's learning, their motivation to engage in classroom-based activities, and the relevance of an activity to their interests.

Independent learning with the iPad

A key contributory factor to children's motivation appeared to be the possibilities offered by the iPad for independent work. We observed one simple example of such independence being appreciated by staff as well as children in the Reception class, where the teacher had identified a series of 'closed' content apps that encouraged children to spell words more accurately, and to use appropriate punctuation, such as 'Doodlefind'.

In the special setting, in addition to the iPad's touch-screen sensitivity and responsivity, the device's mobility further facilitated children's independent learning. Almost all the children in this setting were able to use iPads more easily than other 'new technologies', such as computers with keyboards, which require very precise touch with considerable control of pressure on each key, or interactive whiteboards, where their fixed position often rendered them inaccessible for children reliant on wheelchairs and other physical supports. Figure 2 shows a series of video stills where 11-year-old Matthew is learning to use the iPad by tapping the screen icons to progress through the app 'English Alphabet for kids' (Capitan Media, 2011). In the initial two frames, the teacher helps Matthew to make a pointing gesture, and then gently supports the weight of Matthew's hand as he taps the screen. In the third video still, we can see how the teacher continues to support Matthew's hand near the screen as he watches the story activity unfold on-screen, so he is able independently (and

with comparative ease) to point to and tap the relevant on-screen icon to make the story progress.

-Figure2 to be inserted about here-

In some cases independent learning necessitated purpose-made devices to secure the iPad to the arm of a wheelchair. However, the small size and easy portability of the iPads enhanced their use within the classroom, opening up new and comfortable spaces where digital technology could be used for learning.

iPad and concentration

Linked to children's motivation and independence, staff in all settings commented on how iPads heightened children's concentration levels, describing iPads as 'a good way of engaging the children in the work you're trying to get them to concentrate on'. Children were willing to go through multiple levels of planning with iPads: writing, acting out their writing, and then making recordings 'because at the end they get to use a camera or to film it that's their goal and they're quite willing to do all the work that leads up to it ... (that's a) huge factor and relevant to their lives'. In this sense, increased concentration was intimately linked with a feeling of empowerment for children who used the device.

For example, in the special school, staff noted how some children with complex learning and physical disabilities and very short attention spans persisted for extended periods with the iPad ('all afternoon'), encouraged by the interactive nature of certain apps, which focused their attention and led to engaged learning. However, without

the support of more experienced others, rich learning outcomes were not always assured, and the potential benefits of increased concentration were not harnessed. In the nursery setting in particular, we observed children becoming frustrated as they did not know how to complete some more complex activities, and/or staff sometimes lacked the time or skill to support them. In situations, where children were unsupervised and vied for possession of the iPad, the tool caused considerable frictions among the children who each demanded access to a precious resource. Too many fingers on the screen made some applications not function as intended, and meant that content was lost which caused considerable frustration for the children who had produced it.

-Figure3 to be inserted about here-

Enriching communication and collaboration with the iPad

Although adults were not always on hand to support all children's learning, we observed how more experienced children frequently supported their peers. Indeed, staff in all settings commented on the collaborative nature of interaction around the iPad: most children shared activities, took turns, supported each other's learning and rejoiced in each other's successes. Teachers were able to build on this spirit of collaborative endeavour by sharing their achievements as a class (see Figure 4).

-Figure4 to be inserted about here-

Staff also commented on the value of iPads in stimulating and enhancing the children's language and communication. Nursery staff noted how children with

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English as a second or third language were able to name things on some apps, and shy children started talking more:

‘...even the quiet ones were gaining an awful lot out of it ... it was making the noisier ones be quiet because they were concentrating and the quiet ones use more language’

They also mentioned how working with the iPad engaged many different children and led to them practising essential communication skills, although this did not always resolve smoothly:

‘some of the nicest interactions were when there was a whole group of children around it and they were all talking between themselves so that was good ... it wasn’t just the person who was touching the iPad but lots of talk lots of turn-taking ... sometimes there were tears but that’s part of learning that you’re not the only one’.

In addition to staff comments about how iPads stimulated children’s talk, we observed many examples of teachers using the iPad apps purposefully to extend children’s vocabulary and to embed new vocabulary that had been introduced during other activities. For example, the Reception teacher encouraged children to find more images to put in pictures they were making on an app, leading to the naming and finding of items which extended their vocabulary.

Staff in the special setting welcomed the touch-responsive screen for children who did not have the motor skills to write with a pen or pencil, and they valued the

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opportunities this offered to diversify their support for children's communication. For some children, computer keyboards had opened up new communicative possibilities, and touch screens extended these by enabling children to communicate with pictures and icons alongside or instead of words. Staff found iPads 'even better [than PCs] because they have to have a certain amount of skill to use a keyboard but a touch screen is more sensitive so it's getting used to it ... without keyboards a lot of our children wouldn't be able to write so technology is a fantastic thing for that'. In our observations we witnessed many instances of iPads enabling children with motor difficulties to communicate and collaborate in several whole class and small group activities.

Creative use and integration with the national curriculum

In line with Foundation Stage and Key Stage 1 objectives to use new technology for creative and independent work (OFSTED, 2008), children worked creatively across modes and media. As one teacher commented, iPads afforded more possibilities than conventional computers through their easy access to combinations of audio and visual modes 'adding another level to the work they produce'. Teachers found the iPad dovetailed with existing technologies in the classrooms, and provided another source of stimulation, so staff felt they could offer children 'as many different ways as we can to do the (same) thing over and over again but to engage them as well as ... get more work out of them'. For example, the Reception teacher used a jigsaw app to make a jigsaw from a digital photo, uploading this to the classroom IWB, where they completed the puzzle as a class, promoting topic-focused learning whilst also providing a rich platform for language and communication, collaborative problem-solving, negotiating meanings and sharing experiences.

Practitioners particularly valued the opportunities iPads afforded to deliver national curriculum guidelines in new and different ways but despite many advantages described above, there were some drawbacks. Notably, teachers who recognised the iPad's potential for their practices had to spend many extra, out-of-school hours searching for appropriate iPad apps to support particular learning objectives, and they dedicated considerable effort and time to planning activities around specific iPad apps. Often, despite their best intentions, the iPad or the software did not perform as they wished and there was a lack of support in the school for this kind of work. Although these teachers were able to integrate the iPad creatively into classroom literacy practices, they nonetheless occasionally encountered technical difficulties which disrupted the flow of learning-teaching episodes. Nevertheless, the practitioners were hopeful this would improve as they became more familiar with the device and gained more confidence in its use.

Discussion

Our findings suggest that incorporating touch-screen technology in the repertoire of young children's everyday literacy experiences offers new opportunities for early literacy education. The range of literacy related activities that we observed support a view of literacy as reading and writing in combinations of modes, such as images, words and sounds in multiple media. However, unless 'new' digital devices are woven innovatively into the fabric of classroom practice, then their potential could all too easily, and understandably given the lack of support and training for teachers, be reduced to being no more than a device for delivering potentially repetitive curriculum content, albeit with added interactive multimedia appeal.

Underlying our findings was the observation that the portability of iPads and their touch-responsive interface make them particularly conducive to stimulating children's concentration and engagement with early literacy activities in both independent and collaborative learning environments. Yet the devices on their own could not achieve this. For learning/teaching episodes to be rewarding, careful planning and sensitive support was needed by confident practitioners, with clear learning goals. Only then did we observe effective use of these new devices to promote early literacy. As Hall (2008) suggests, the 'contexts and histories of participation, in this case (teachers') digital histories, are highly relevant to how they support their learners' digital literacies'. In this study, practitioners' own experiences and expertise in using digital technologies inevitably shaped how they and the children used the iPad in each classroom. Initially, more experienced and confident senior staff embraced their potential whilst less confident adults stood back. Over time, we saw small but significant shifts in how less confident practitioners began to respond to the children's enthusiasm and encouragement, and ultimately engaged actively in iPad-based learning activities.

The children, seemingly regardless of their expertise, were all keen to use the new device, and their interest may be partly attributable to the kudos associated with new media, along with the iPad's intuitive interface, which most children were soon able to master – although there were also considerable frustrations when children's work was lost due to technical glitches. A significant point however is that motivation was present and when combined with innovative pedagogy, appeared to have notable potential for fostering both independent and collaborative learning, along with

sustained concentration and opportunities for communication across diverse expressive modes.

All in all, the iPads enabled children and practitioners to experience enjoyable and flexible learning episodes that enhanced classroom practice. At the outset of this study, staff in all the settings were somewhat reticent about the role of iPads as tools for classroom-based educational endeavour. Certainly, as Lynch and Redpath (2012) identify, the broader policy and curriculum context for early years literacy provide little encouragement for meaningful engagement with new media. However, with just a little support from our team and a lot of teacher dedicated time - spurred on by the children's enthusiasm - the practitioners discovered creative uses for the iPad in their classrooms. These were of benefit for children's self-esteem, their engagement with a range of literacy-related activities and also corresponded to the standards and outcome-based teaching and learning agendas to which all staff were accountable.

Whilst there may well have been a certain novelty value to staff and children's initial responses to the 'borrowed' iPads, we found sustained interest during our continued contact with the settings, particularly with the primary and special schools.

Furthermore, we observed how working alongside the 'expert teachers', less confident members of staff began to support children through specific activities, and by working together, staff and children mutually gained confidence in using the iPads in class. Indeed, the special school found that iPads offered more affordable and more flexible learning opportunities than established static and highly expensive devices. This setting subsequently invested in purchasing numerous iPads for each classroom, which are now being incorporated creatively in daily classroom practice.

Beyond these considerations, we observed in this study how the iPads were valued as highly desirable artefacts by young learners, who recognised them as powerful arbiters of communication, information and entertainment in contemporary society. In this respect we argue that new digital technologies have a higher level role to play in classrooms through their invocation of figured worlds that are empowering for young children. The concept of a figured world is a socially and culturally constructed 'realm of interpretation in which a particular set of characters and actors are recognized, significance is assigned to certain acts, and particular outcomes are valued over others' (Holland et al, 1998: 52). Figured worlds are part of Holland et al.'s (1998) larger theory of self and identity, which draws on the work of Vygotsky and Bakhtin to illustrate how identities are formed through the day-to-day processes of social activity and practice. Through activity, individuals engage in collective imaginings of figured worlds (e.g. in a school context, of ability, learning disposition, gender etc.), which are enmeshed with local systems of power and privilege. Within these differently figured worlds, certain positions are offered to individuals (such as a "quiet child", a "poor reader", a "child with low attention", a "disabled child" etc). By negotiating their way through these systems, using actions and mediational tools within those systems, individuals are able to effect changes in the ways they are perceived by others in their social worlds, and to form new self-understandings and identities through their performance. Hence, amongst many other examples, we saw how the iPad motivated Harry to engage in higher level reading activities, which in turn changed how he was perceived by his Reception class teacher as a more competent reader. We also saw how the teacher began to understand Robert's creativity through his use of a painting app and how 'quiet' children began to talk.

Furthermore, introducing new media into the classroom enabled practitioners and children to develop digital skills and move towards being expert users. This in turn could help to bridge the differential access experienced by many, due to a lack of material access to physical devices and a lack of support to develop digital skills (van Dijk and Hacker, 2003; author, 2010).

For children growing up in today's world, digital technologies are 'as unremarkable and ubiquitous as electricity was for our generation, becoming visible only in their absence' (Carrington, 2007: 105). Despite this, integrating new technological devices, such as the iPad into classroom practice and using their potential to support literacy, requires a great deal of thought and commitment from teaching staff. This includes not just finding and selecting appropriate software, but also developing a local curriculum and pedagogy that integrates the devices, and supports their creative use. Our study was exploratory, where we had no particular agenda other than enquiry. However, having completed the study and spoken with practitioners, we stand convinced that if innovative uses of new technologies continue to remain absent from the school curriculum and from pedagogy, then we risk turning our backs on a powerful switch that can provide new directions to light up this generation's learning.

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Figures

Figure 1: Colouring activity which motivated independent activity



Figure 2: Supporting Matthew's iPad use



Figure 3: Unsupervised use of the iPad in the Nursery class



Figure 4: Sharing an iPad activity in Reception class



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