New directions for early literacy in a digital age: The iPad

Rosie Flewitt
Institute of Education, University of London, UK

David Messer
The Open University, UK

Natalia Kucirkova
The Open University, UK

Abstract

In this paper, we discuss how iPads offer innovative opportunities for early literacy learning but also present challenges for teachers and children. We lent iPads to a Children's Centre nursery (3- to 4-year-olds), a primary school reception class (4- to 5-year-olds) and a Special School (7- to 13-year-olds), discussed their potential uses with staff in pre- and post-interviews and observed how they were integrated into practice over a two-month period. We found variability in the ways iPads were used across the settings, but a commonality was that well-planned; iPad-based literacy activities stimulated children's motivation and concentration. They also offered rich opportunities for communication, collaborative interaction, independent learning, and for children to achieve high levels of accomplishment. In some cases, this led teachers favourably to re-evaluate the children's literacy competence, and enabled children to construct positive images of themselves in the literacy classroom. Practitioners particularly valued the opportunities iPads afforded to deliver curriculum guidelines in new ways, and to familiarise all students with touch-screen technologies.

Keywords

Corresponding author:
Rosie Flewitt, Early Years and Primary Education Institute of Education, University of London, 20 Bedford Way, London WC1H 0AL, UK.
Email: r.flewitt@ioe.ac.uk

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 (Lynch and Redpath, 2014). Together with these new and powerful cultural tools 'we all create and shape the learning environments in which our children grow up' (Kucirkova, 2013), so it is hardly surprising that young children are keen to master their use. Yet research evidence has consistently shown there is ambivalence towards the incorporation of new technologies into early literacy education. While some enthusiastically embrace new media (e.g. Galloway, 2009), others argue vociferously that they have no place in early learning (House, 2012), that they are developmentally inappropriate and risk exposing children to unsuitable content and uncritical engagement with information (Miller, 2005). Many early-years practitioners have found it difficult to integrate digital technology into their literacy planning and practice due to several constraining factors, including a curriculum focus on literacy as primarily paper-based, lack of time to explore available digital resources, absence of guidance about the potential of new technologies to promote early literacy and low confidence in using digital devices effectively in the classroom (Carrington, 2005; Lankshear et al., 1996; Turbill, 2001). 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 education practitioners to explore the potential of iPads for supporting classroom-based early literacy learning. We were interested in how the affordances of these portable devices (with touch screen sensitivity and a multiplicity of 'apps') might open up new possibilities for learning and teaching early literacy in diverse educational settings, including mainstream nursery and early primary classrooms, and also in special education where teachers support the early literacy development of young and older children with learning disabilities.

Early literacy, digital devices, power and identity

A growing body of research evidences how integral digital devices have become to early experiences of literacy in homes and communities (Flewitt, 2011; Plowman et al., 2010; Wohlwend, 2010; Wolfe and

Flewitt, 2010). Much of the emerging research in this field is founded on sociocultural conceptualisations of learning (Vygotsky, 1978), where by mental processes are viewed as social in origin and mediated through interaction using symbolic representations such as language and cultural artefacts that have evolved over time (Wertsch, 2007). In the communication practices of contemporary culture, these artefacts include an array of digital devices, including iPads. 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 increasingly ubiquitous and powerful digital media.

Children's immersion in digital communication occurs at a critical period in their lives when their emerging literacy skills (speaking, listening, reading and writing) and identities as effective and competent learners are being moulded by the conventions of the social and cultural worlds in which they live. As part of a larger theory of self and identity, Holland et al. (1998) discuss how children 'figure' whom they are through the 'worlds' they participate in, through the cultural tools they use in those worlds, and through their relationships with others. They coined the term 'figured worlds' to describe a '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). That is, through action and interaction with human and physical resources in particular social worlds, individuals engage in collective imaginings of themselves as 'competent', 'smart', 'incompetent', 'delinquent', etc. As mediating artefacts, we posit that iPads are one of many cutting-edge, culturally powerful yet enigmatic technological tools with the potential to invoke empowering 'figured worlds' for young learners concerning themselves and their attitudes towards literacy. This important issue is one that we return to in the discussion.

Research suggests that the potential of new technologies for young children's literacy development remains largely untapped in educational settings, with a 'digital divide' such that some children develop considerable digital skills and knowledge by participating in supported activities at home, whilst others have little or no opportunity to engage with new media at home and even less so in education (van Dijk and Hacker, 2003; Wolfe and Flewitt, 2010). As Burnett (2009) discusses, there is a growing call from education researchers for curricula to incorporate digital media into literacy teaching programmes and to reflect children's interests and the profound and extensive changes in contemporary literacy practices (Hisrich and Blanchard, 2009; Kalantzis et al., 2010; Underatuin, 2011). Yet in the UK, government-sponsored evaluations

of early years, primary and secondary education report that technology has only erratically been integrated into learning (Office for Standards in Education, 2008). Although educational curricula may nod towards the need for the innovative use of technologies in the literacy classroom (Department for Education, 2012), there remains a dominant focus on print-based alphabetic skills. Recently, in England, this focus has narrowed even further with an insistence on the teaching of synthetic phonics, which is portrayed in policy documentation as the key to early reading and writing (Flewitt, 2013). Even in classrooms where new technologies are used, there is a tendency to replicate existing pedagogical approaches rather than realise their potential to transform learning and teaching (Burnett, 2009). This is partly due to a lack of curriculum guidance, whole school support and ICT teacher training, but also because many teachers and practitioners need time to build their familiarity, confidence and expertise with new media before they can begin to change their practice in ways that will raise the quality of pupils' experience of learning with a range of technologies (Moss et al., 2007).

Empirical research has begun to piece together evidence regarding the teaching/learning potential of new technologies, including phonological awareness, vocabulary learning, reading comprehension and language development (Burnett, 2010; Burnett and Merchant, 2012). The potential of specific media has been studied, including interactive whiteboards (IWBs) (Moss et al., 2007; Smith et al., 2005; Twiner et al., 2010; Warwick et al., 2010), computers (Flewitt, 2012; Plowman et al., 2010), digital games (Apperley and Walsh, 2012), digital texts (Labbo et al., 2002; Thoermer and Williams, 2012) and diverse new media (Burnett and Merchant, 2012; Calvert and Wilson, 2008; Carrington and Robinson, 2009; Wohlwend, 2010). With regard to iPads, research 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, 2014) although some encounter difficulties, such as unintentionally deleting their own work (Hutchison et al., 2012). With older children, iPads have been found to encourage intuitive participation in open-ended games (Verenikina and Kervin, 2011). However, to date, very little is known about how touch-screen technologies can be used to enhance classroom-based early literacy learning.

Early literacy as embedded in everyday practices

Rather than adhering to approaches to literacy that focus on the decoding and encoding of meaning in paper-based texts, we draw on sociocultural

conceptualisations of learning processes (Vygotsky, 1978) and broader definitions of literacy as embedded in social practice (Street, 1995) and mediated through action and interaction using cultural artefacts. These artefacts evolve over time as societies develop; and in the current era, literate activity is characterised by the use of both print and digital media, where meanings are often expressed through multiple modes of symbolic representation, such as combinations of spoken and written language, images, icons, sounds, layout and animation (Flewitt, 2013). As Zammit and Downes (2002) argue, an understanding of literacy in the current era must include a diverse set of texts and technologies.

In our study, we therefore aimed to investigate the potential of a specific media device, the iPad, in order to investigate the opportunities created by its affordances for early literacy learning. We were interested in the views of practitioners working in nursery, early primary and special education, particularly regarding their experiences with iPads, the possibilities they felt that iPads provided for early literacy, and whether using iPads in the classroom might change their perceptions of individual children's literacy competence.

Methodology

The methods chosen for this study and the processes of data interpretation reflect our sociocultural perspective that children's learning is defined by interpersonal, institutional and socio-political circumstances (Vygotsky, 1978). The methods also reflect our aim to gain insights into how children's literacy learning is mediated through the use of one contemporary literacy artefact – the iPad – across a range of settings delivering early literacy. We therefore observed episodes of interaction around iPads, conducted interviews with staff to explore attitudes towards new technologies before and after using the iPads in class, and we talked with some of the child participants about iPads. The participating schools were sent a preliminary research report and were invited to comment on it.

The sites for study were chosen purposefully, as they represented variation in local provision for early literacy in terms of the ages of the children and types of setting. The three chosen sites were located relatively close to each other, in central England, and had responded positively to our initial enquiries about using new technologies to support learning. They included: a city suburb Sure Start nursery with places for 16 three- to four-year-olds (with variable attendance) led by a practice manager, lead practitioner and support workers; a primary school reception class for 4- to 5-year-olds on the outskirts

of a city (class size 30 children) led by a class teacher, teaching assistant and volunteer teaching assistant; and children aged 7–13 with learning disabilities in a special school on the outskirts of a nearby town, led by a class teacher and three teaching assistants. At the outset of the study, none of the settings had any iPad for classroom use, but all regularly used digital cameras and computers. IWBs were used daily in the primary and special school, but were not available in the nursery. This project therefore offered an opportunity for staff to explore the potential of a new device for a limited period of time, supported by our team.

The research followed the British Educational Research Association's (BERA, 2011) ethical guidelines and approval for the study was obtained from the Open University Ethics Committee. In line with the research team's established ethical practice (Flewitt, 2005), once initial consent had been granted by the lead practitioner in each setting, we asked all practitioners for opt-in written consent, and all parents were offered opt-out consent for their children to participate. During the study observations, we gained the verbal, and in some cases non-verbal, assent of participating children, and all participants were made aware they could withdraw from the study at any time. Pseudonyms are used in research write-ups, and each setting was given a full final report of the study findings.

We conducted pre- and post-study semi-structured interviews with practitioners about their beliefs and practices regarding early literacy and new technologies, using 'responsive interviewing' (Rubin and Rubin, 2005: 79), whereby the researcher and interviewee establish a conversational partnership which facilitates discussion (see Appendix 1 for an outline of interview questions). We also video-recorded interactions during diverse literacy activities with new and traditional technologies (books/comics/computers/ alternative and augmentative communication systems), discussed with staff the possible uses of iPad in their setting, and lent each setting an iPad for two months. To give staff a starting point, each device was pre-loaded with a research-based, multi-media app Our Story[1] (developed by us and colleagues at the Open University to promote early story writing), and we encouraged staff to download and use further apps as they deemed them appropriate to their particular educational context. Throughout the study, we offered support for any queries or problems.

We conducted a second round of video-recorded observations after a further three to four weeks, and conducted a second round of interviews with staff regarding their experiences of using an iPad to support early literacy. Finally, we contacted staff during the following term to see if they had

integrated iPads into their longer term literacy practice. Limited funds did not permit us to gift iPads to the settings, only to allow practitioners to experiment with them prior to deciding on their longer term usefulness (see Flewitt et al., 2014).

The interviews were transcribed, and after multiple viewings of the video observations and data discussions, patterns were recognised and categories agreed by the research team. The interpretive framework and systematic coding were supported by Atlas.ti, a computer-assisted qualitative data analysis software package. Overarching conceptual themes emerged through a process of inductive and deductive coding and theme development, constantly comparing across the data sets (Fereday and Muir-Cochrane, 2008).

Findings

We begin by reporting on practitioners' views about classroom uses of new technologies, which set the context for the key themes in our findings. These include: how iPads offered scope for adults and children to be regarded as experts in the classroom; how different apps shaped teaching/learning opportunities; how iPads contributed to children's motivation and concentration, enriched the communicative environment and facilitated collaborative, creative and independent learning in playful ways that slotted into curriculum delivery, yet also presented practical challenges.

Practitioners' views on new technologies in the classroom

At the beginning of the study, all practitioners recognised the potential of new technologies for learning, yet many also voiced concerns about their potential harm. Some were wary of the addictive and 'over-stimulating' nature of digital gaming and felt children were spending 'not enough time outside… too much time sitting down'. They were also concerned about children being denied early language learning opportunities as their carers/parents spent time 'texting rather than talking' to their children. Others feared that the fast-moving pace of digital games would ill prepare young learners for the patient perseverance needed when learning to read and write. The cost of digital equipment was a further issue, along with concerns about technical problems, a lack of confidence in their ability to overcome these and a lack of technical support in the classroom.

Despite their concerns, there was a strong consensus amongst practitioners that, in order to help prepare children for life in a digital world, schools

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 technology 'to enhance teaching'; as expressed by one nursery 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 . . . introducing it to them is one of those key skills.

After they had been using iPads in the classrooms for a few weeks, most fears began to subside, and through our analysis of the interview and observation data, we began to identify themes which we elaborate upon below.

Experts and novices in the classroom

Through interviews and observations, we identified a progression of shifts in practitioners' attitudes towards using iPads in class, with most staff initially adopting the role of either 'expert' or 'novice' user. When asked about their confidence as computer users before using iPads in class, staff responses fell into three categories: (1) 'confident, regular users' of 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 early years practitioner put it, 'frightened of breaking it'. In each class, one self-identified 'confident' adult technology user was assigned or assumed the role of iPad expert. Although less confident staff initially steered clear of responsibility for the iPad, towards the end of the study many had been drawn to the devices by the children's enthusiasm.

Yet adults were not the only experts: staff commented on how some children were familiar with touch-screen devices at home, particularly smartphones, whilst 'novice' children were keen to learn and 'picked it up really well'. Some were considered to be 'ahead' of staff with new technologies, 'brilliant at computers' and able to 'teach the teacher'. Our findings suggest that using these popular new cultural artefacts in the classroom creates opportunities to redress the knowledge/power imbalance between teachers and children, offering young learners empowering 'expert' roles, whilst at the same time increasing their knowledge and skills with digital devices.

How 'open' and 'closed' apps shape learning

Throughout the study, we heard how the adult technology 'experts' dedicated hours of personal time searching for suitable apps to include in their literacy planning. They found a surfeit of commercially available 'edutainment' apps (purporting to combine education with entertainment), which had interactive yet repetitive game formats with 'closed' content, i.e. the content could not be changed or extended by the user. As Lynch and Redpath (2014) 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 develop learners' vocabulary or phonics, yet they positioned children as recipients of narrowly defined literacy knowledge, rather than as creative producers of original materials, and some children soon tired of their repetitive format. The most effective use of these 'closed' content apps was when they were introduced strategically by teachers to offer alternative routes for children to master particular skills through practice, such as processes related to letter recognition and spelling.

By contrast, 'open content' apps, where users could personalise activities, engaged children more deeply and creatively in learning tasks. For example, while using the Our Story app, children collaboratively created their own stories, initially by selecting a sequence of photographs which they or their teacher had taken, then developed this by adding voice recordings and/or typed text (Kucirkova et al., 2013). In the special setting, Our Story was developed into a drama project, with children collaboratively writing, planning and acting out a play based on a school outing. Across the settings, the flexibility offered by open content apps permitted all children and adults with the opportunity and motivation to develop digital expertise whilst also engaging in the creation of personal stories in multiple media.

Motivation

In interviews, teachers commented on 'the magical awe and wonder' engendered by iPad activities, and how this motivated children to learn. Our observations confirmed that children particularly enjoyed the facility to undo and review stages of their work, which reduced the perceived consequences of making mistakes and appeared to increase confidence. As one of many observed examples across the settings, we noted how 13-year-old Robert,

Figure 1. Colouring activity which motivated independent activity.

who had limited fine motor control, became engrossed in using 'My Colouring Book Free^{TM}'[2] app to colour in animal-related scenes. Although this had 'closed' content, it promoted fine motor control, offered 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 then the chosen section which coloured in automatically (see Figure 1).

Robert's attentive teacher supported him by verbalising his actions, 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 tap precisely on a small section to colour it in, his teacher smiled at his accomplishment, gently congratulating him. Throughout, both teacher and app were responsive to Robert's choices and rewarded the considerable effort he expended in controlling his hand movements. This was a highly satisfactory learning and teaching episode, whereby Robert was motivated to reflect carefully on his colour choices, to reverse his decisions if he did not like the result, to try out new ideas, to take pleasure in the successfully accomplished process and product of colouring in – something which he could not achieve with traditional pencils or pens. As Underatuin (2011) discusses with regard to online literacy practices, we observed how the flexibility and responsiveness of digital media offer students new hybridised activities that combine some of the characteristics of traditional literacy resources with the speed and feedback of oral literacy.

Children in all the settings relished the responsive nature of iPad activities and the immediacy of the results they produced. For example, reception class children used the iPad to take photographs of their outdoor activities and imported them to 'Our Story' as the basis for story creation – just moments after the photographs had been taken. These instant products were much appreciated by teachers, who valued the way they motivated children's engagement, and they could also be used to print out displays of classroom work with comparative ease. Children's motivation to succeed in iPad activities sometimes led them to display more advanced literacy skills than staff had previously given them credit for. For example, the reception class teacher was 'blown away' by the quality of some children's iPad work, including those who were not keen on 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's spelling when using the app 'Doodlefind[TM],[3]':

> 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.

These examples evidence how the combination of immediate feedback with tangible and satisfying end products motivated children to engage with and commit to iPad-based literacy activities, and to be drawn to them like 'bees to a honeypot' (nursery practitioner).

Independence

A key contributory factor to the children's motivation appeared to be the possibilities offered by the iPad for independent work. In the special setting,
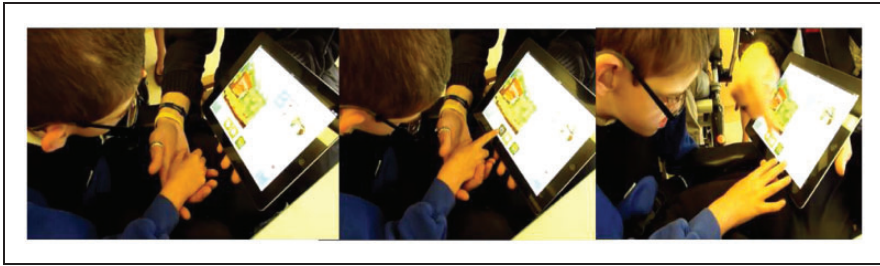
Figure 2. Supporting Matthew's iPad use.

the device's mobility enabled students' independence, and their touch screens were more accessible than computer keyboards, which require precise touch and pressure on each key. The iPads also enabled students with limited mobility to access the IWBs, where the issue of their inaccessible height was overcome by connecting the iPad to the IWB.

As one of many observed examples of independent learning, Figure 2 shows a series of video stills where 11-year-old Matthew is tapping screen icons to progress through the app 'English Alphabet for kids[4]'. 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.

This setting developed purpose-made devices to secure an iPad to the arm of a wheelchair, hence the small size and portability of the iPads opened up multiple new independent spaces for learning.

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'. Part of the reason for this may have been the novelty of the apps, but we have subsequently observed similar effects after iPads had been available for a longer period of time (Flewitt et al., 2014). 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

Figure 3. Sharing an iPad activity in reception class.

the work that leads up to it. . . (that's a) huge factor and relevant to their lives' (Reception Class Teacher). Across the settings, staff noted how children with usually short attention spans persisted for extended periods with the iPad, possibly due to the interactive nature of certain apps which helped focus their attention.

Enriched communication and creative collaboration

Staff in all settings commented on the children's collaboration around the iPad: they frequently and patiently 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 3).

We observed how more knowledgeable children frequently supported their peers during iPad use, and staff commented on the value of iPads in stimulating and enhancing language and communication. Nursery staff in particular noted how children with English as an additional language were able to name things on 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.

We observed many instances of teachers using iPad apps to extend and embed new vocabulary that had been introduced during other activities. In line with official guidance on using new technology for creative and independent work (OFSTED, 2008), iPads offered rich opportunities to work creatively across modes and media and diversified communicative possibilities by offering pictures and icons alongside or instead of words. This enabled quiet children, children with English as an additional language and children with motor difficulties to communicate and collaborate more effectively in whole class and small group activities.

Furthermore, teachers found that iPads offered new ways to deliver the curriculum: 'to do the (same) thing over and over again but to engage them as well as. . . get more work out of them'. For example, as part of a class project, the reception teacher used a jigsaw app to make a jigsaw image from a digital photo and uploaded this to the classroom IWB. Together, the class then completed the puzzle, providing a rich platform for language and communication, collaborative problem-solving, negotiating meanings and sharing experiences.

Challenges of using iPads in class

Despite the many advantages described above, there were drawbacks. Notably, teachers had to spend many out-of-school hours searching for appropriate apps to support learning objectives, and they dedicated considerable effort and time in planning activities around apps. Teachers also encountered technical difficulties which sometimes disrupted the flow of learning–teaching episodes. Nevertheless, they were hopeful this would improve as they gained more confidence and expertise in using iPads.

Furthermore, rich learning outcomes for children were not always assured. In the nursery setting in particular, we observed children becoming frustrated if they did not know how to complete activities. Unsupervised children often vied for possession of the iPad, causing considerable friction, and too many fingers on the screen led to apps not functioning as intended or content being lost, causing frustration for the children who had produced it (see Figure 4).

Discussion

In line with a growing body of research into technology and literacy, our findings suggest that incorporating touch-screen devices in the repertoire of classroom-based activities offers promising opportunities for early literacy education. The portability of iPads and their touch-responsive interface

Figure 4. Unsupervised use of the iPad in the nursery class.

make them particularly conducive to stimulating children's concentration and engagement with early literacy activities in both independent and collaborative learning environments. Yet for learning/teaching episodes to be rewarding, careful planning and sensitive support are needed by confident practitioners, with clear learning goals so that the use of iPads is embedded within the broader context of children's learning. Unless 'new' digital devices are woven innovatively into the fabric of classroom practice, then their potential could all too easily be reduced to being no more than a device for delivering repetitive curriculum content, albeit with added interactive multimedia appeal. As Parette et al. (2010) observe, substantial changes are needed to professional training so that practitioners are supported in their endeavours to integrate new media creatively and effectively in the literacy classroom.

Hall (2008) suggests that 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 staff more readily embraced the possibilities of the technology

and they were more familiar with the ways of operating the iPads, 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 creating iPad-based learning activities.

The children, seemingly regardless of their expertise, were all keen to use iPads. Their interest may be partly attributable to the kudos associated with new media, the novelty of using iPads in school and the iPad's easy-to-use interface, which children were soon able to master, even if they experienced technical glitches and frustration if their work was lost. A significant point here is that motivation was present, and this could be harnessed to enable more autonomous forms of learning which involved both independent and collaborative activities, along with sustained concentration and opportunities for communication and creative endeavours across diverse expressive modes and media.

All in all, the iPads enabled children and practitioners to experience enjoyable and flexible learning episodes that enhanced literacy learning. At the outset of this study, practitioners in all the settings were somewhat reticent about using iPads in the literacy classroom. Certainly, as Lynch and Redpath (2014) identify, the broader policy and curriculum context for early literacy provide ambiguous 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 iPads in their classrooms, and recognised benefits for children's self-esteem and enthusiastic engagement with a range of reading and writing activities. In addition, creative tasks, such as the Our Story picture-based narratives, corresponded to the outcome-based teaching and statutory responsibilities for which the teachers were accountable.

Whilst there may well have been a certain novelty value to staff and children's initial responses to the 'borrowed' iPads, we have found sustained interest during our continued contact with these settings, particularly in the primary and special schools. For children with learning and physical difficulties, iPads offer more affordable and more flexible learning opportunities than some static, highly expensive devices. This school subsequently purchased multiple iPads for each classroom, and these have been incorporated creatively into daily classroom practice (Flewitt et al., 2014). The primary school has purchased and begun to use iPads across age ranges, but due to staff changes in the nursery, the iPad project has been interrupted – this points to the key role played by enthusiastic 'expert' individuals in educational settings.

The study further evidenced how these new media devices were valued as highly desirable artefacts by young learners, whose ardent enthusiasm to use them suggested a nascent awareness of their power, prestige and gratification. In this respect, we argue that digital technologies have a role to play in developing children's identity as effective learners in the classroom, through their potential to offer not only stimulating and varied pathways into literacy but also 'figured worlds' (Holland et al., 1998) that are empowering for young learners in mainstream and special education. Children's engagement in iPad-based literacy activities sometimes brought about changes in the ways they were perceived by their peers and teachers in the classroom, which in turn offered the potential for them to form new identities as 'good spellers' and/or more able readers (as in the case of Harry), or as 'good drawers' (as in the case of Matthew) or being seen as 'talkers' rather than 'quiet' children (as mentioned by the reception and nursery teachers). 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 children, due to a lack of material access to physical devices and a lack of support to develop digital skills (Flewitt, 2010; van Dijk and Hacker, 2003).

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). Yet, integrating iPads (or any new device) into classroom literacy practice 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 supports their creative use. As Reinking et al. (2000) perceptively argue, new technology is often merely assimilated to existing teaching practices, yet greater use can be made of its potential if practitioners are supported in its creative use. Our study was exploratory, we had no particular agenda other than enquiry. However, having completed the study and maintained contact with the participants, we stand convinced that if innovative uses of new technologies continue to remain absent from the school curriculum and from pedagogy, then we risk failing to turn on a powerful switch that can light up this generation's learning.

Acknowledgements

Notes

1. The Our Story app is picture-based and allows children, their parents and/or carers to create, record and share their own digital stories (see http://www.you tube.com/watch?v = Z76jcP-np60).
2. My Colouring Book App is a free app for iPhones, iPads and iPod touch which allows children to colour various pictures with a simple finger tap. There are several templates which can be coloured in, e.g. animals, flowers, popular scenes, etc.
3. Doodlefind is a 'closed' content app designed to promote accurate word spelling. It is free and based on a social hidden object game where users can play alone or compete against their friends connected via social networks. This latter feature was not explored in the present study.
4. English Alphabet for kids for iPad^{TM} is an app developed by Capitan Media Ltd. It offers 26 cartoons, verselets and pages of an audiobook for each letter of the English alphabet.

References

Apperley T and Walsh C (2012) What digital games and literacy have in common: A heuristic for understanding pupils' gaming literacy. *Literacy* 46(3): 115–122.

BERA (2011) *Ethical Guidelines for Educational Research*. Available at: http://www.bera.ac.uk/researchers-resources/publications/ethical-guidelines-for-educational-research-2011 (accessed 28 March 2014).

Burnett C (2009) "That's more like how they know me as a person": One primary pre-service teacher's stories of her personal and 'professional' digital practices. *Literacy* 43(2): 75–82.

Burnett C (2010) Technology and literacy in early childhood educational settings: A review of research. *Journal of Early Childhood Literacy* 10(3): 247–270.

Burnett C and Merchant G (2012) Learning, literacies and new technologies: The current context and future. In: Larson J and Marsh J (eds) *The SAGE Handbook of Early Childhood Literacy*, 2nd ed. London: Sage, pp. 575–586.

Calvert S and Wilson B (2008) *The Handbook of Children, Media, and Development*. Oxford, UK: Blackwell.

Carrington V (2005) The uncanny, digital texts and literacy. *Language and Education* 19(6): 467–482.

Carrington V (2007) Social inclusion and digital literacies. In: Bearne E and Marsh J (eds) *Literacy and Social Inclusion*. Staffordshire: Trentham Books Ltd, pp. 103–114.

Carrington V and Robinson M (eds) (2009) *Digital Literacies: Social Learning and Classroom Practices*. London: Sage.

Department for Education (DfE) (2012) *Statutory Framework for the Early Years*. Available at: https://www.education.gov.uk/publications/standard/AllPublications/Page1/DFE-00023-2012 (accessed 28 March 2014).

Fereday J and Muir-Cochrane E (2008) Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International Journal of Qualitative Methods* 5(1): 80–92.

Flewitt RS (2005) Conducting research with young children: Some ethical considerations. *Early Child Development and Care* 175(6): 553–565.

Flewitt RS (2010) *Multimodal literacies in the early years ESRC end of award report*, RES-000-22-2451. Swindon: ESRC. Available at: http://www.esrc.ac.uk/my-esrc/grants/RES-000-22-2451/outputs/read/9903d111-60f7-48f8-8323-2281a5cef7bd (accessed 28 March 2014).

Flewitt RS (2011) Bringing ethnography to a multimodal investigation of early literacy in a digital age. Qualitative Research Special Issue: *Multimodality and Ethnography: Working at the Intersection* 11(3): 293–310.

Flewitt RS (2012) Multimodal perspectives on early childhood literacies. In: Larson J and Marsh J (eds) *The SAGE Handbook of Early Childhood Literacy*, 2nd ed. London: Sage, pp. 295–309.

Flewitt RS (2013) Early literacy: A broader vision. TACTYC Occasional Paper 3. Available at: http://tactyc.org.uk/occasional-paper/occasional-paper3.pdf (accessed 28 March 2014).

Flewitt RS, Kucirkova N and Messer D (2014) Touching the virtual, touching the real: iPads and enabling literacy for students experiencing disability. *The Australian Journal of Language and Literacy* 37(2): 107–116.

Galloway J (2009) *Harnessing Technology for Every Child Matters and Personalised Learning*. New York: David Fulton Pub.

Hall K (2008) Editorial: Contexts are fundamental. *Literacy* 42(1): 1–2.

Hisrich K and Blanchard J (2009) Digital media and emergent literacy. *Computers in the Schools* 26: 240–255.

Holland D, Lachicotte Jr. W, Skinner D, et al. (1998) *Identity and Agency in Cultural Worlds*. Cambridge: Harvard University Press.

House R (2012) The inappropriateness of ICT in early childhood education: Arguments from philosophy, pedagogy and developmental psychology. In: Suggate S and Reese E (eds) *Contemporary Debates in Childhood Education and Development*. Routledge: New York, pp. 105–121.

Hutchison A, Beschorner B and Coffey G (2012) The affordances and constraints of the iPad as a tool for reading and responding to text. In: *American Educational Research Association annual conference*, Vancouver, Canada, 13–16 April 2012.

Kalantzis M, Cope B and Cloonan A (2010) A multiliteracies perspective on the new literacies. In: Baker E (ed.) *The new literacies: Multiple perspectives on research and practice*. New York: The Guilford Press, pp. 61–87.

Kucirkova N (2013) *Response to By-passing the debate: Beyond the 'technology question' in the early years by Associate Professor Suzy Edwards*, Tactyc 2013. Available at: http://tactyc.org.uk/pdfs/Response-Kucirkova.pdf (accessed 28 March 2014).

Kucirkova N, Messer D, Sheehy K and Flewitt RS (2013) Sharing personalised stories on iPads: A close look at one parent-child interaction. *Literacy* 47(3): 115–122.

Labbo LD, Eakle AJ and Montero MK (2002) Digital language experience approach: Using digital photographs and creativity software as LEA innovation. *Reading Online*, Electronic Journal of the International Reading Association. Available at: http://www.readingonline.org/electronic/labbo2 (Accessed 27 October 2013).

Lankshear C, Bigum C, Durrant C, et al. (1996) Literacy, technology and education: A project report. *Australian Journal of Language and Literacy* 19(4): 345–359.

Lynch J and Redpath T (2014) 'Smart' technologies in early years literacy education: A meta-narrative of paradigmatic tensions in iPad use in an Australian preparatory classroom. *Journal of Early Childhood Literacy* 14(2). doi:10.1177/1468798412453150.

Miller E (2005) Fighting technology for toddlers. *Education Digest* 71(3): 55–58.

Moss G, Jewitt C, Levacic R, et al. (2007) *The interactive whiteboards, pedagogy and pupil performance evaluation. Research Report no. 816.* London: DfES.

Office for Standards in Education (OFSTED) (2008) *ICT in Primary and Secondary Schools: OFSTED's Findings 2005–2007.* London: OFSTED.

Parette HP, Quesenberry AC and Blum C (2010) Missing the boat with technology usage in early childhood settings: A 21st century view of developmentally appropriate practice. *Early Childhood Education Journal* 37: 335–343.

Plowman L, Stephen C and McPake J (2010) *Growing Up with Technology: Young Children Learning in a Digital World.* Abingdon: Routledge.

Prensky M (2001) Digital natives, digital immigrants on the horizon. Vol. 9. pp.1–6. Available at: http://www.marcprensky.com (accessed 28 March 2014).

Reinking D, Labbo LD and McKenna MC (2000) From assimilation to accommodation: A developmental framework for integrating digital technologies into literacy research and instruction. *Journal of Research in Reading* 23(2): 110–122.

Rubin HJ and Rubin IS (2005) *Qualitative interviewing: The art of hearing data.* Sage: California.

Smith H, Higgins S, Wall K, et al. (2005) Interactive whiteboards: Boon or bandwagon? A critical review of the literature. *Journal of Computer Assisted Learning* 21(2): 91–101.

Street B (1995) *Social Literacies: Critical Approaches to Literacy in Development, Ethnography and Education.* Harlow: Pearson Education.

Tapscott D (1998) *Growing Up Digital: The Rise of the Net Generation.* New York: McGraw Hill.

Thoermer A and Williams L (2012) Using digital texts to promote fluent reading. *The Reading Teacher* 65(7): 441–445.

Turbill J (2001) A researcher goes to school: Using technology in the kindergarten literacy curriculum. *Journal of Early Childhood Literacy* 1(3): 255–279.

Twiner A, Coffin C, Littleton K and Whitelock D (2010) Multimodality, orchestration and participation in the context of classroom use of the interactive whiteboard: A discussion. *Technology, Pedagogy and Education* 19(2): 211–223.

Underatuin C (2011) 'Can't we all get along?' Content, technology and the battle for literacy. *Journal of Literacy and Technology* 12(3): 86–111.

van Dijk J and Hacker K (2003) The digital divide as a complex and dynamic phenomenon. *The Information Society* 19(4): 315–326.

Verenikina I and Kervin L (2011) iPads, digital play and preschoolers. *He Kupu* 2(5): 4–19.

Vygotsky LS (1978) *Mind in Society: The Development of Higher Psychological Processes.* Cambridge, MA: Harvard University Press.

Warwick P, Mercer N, Kershner R, et al. (2010) In the mind and in the technology: The vicarious presence of the teacher in pupils' learning of science in collaborative group activity at the interactive whiteboard. *Computers and Education* 55(1): 350–362.

Wertsch JV (2007) Mediation. In: Daniels H, Cole M and Wertsch JV (eds) *The Cambridge Companion to Vygotsky.* New York: Cambridge University Press, pp. 178–192.

Wohlwend K (2010) A is for Avatar: Young children in literacy 2.0 worlds and literacy 1.0 Schools. *Language Arts* 88(2): 144–152.

Wolfe S and Flewitt RS (2010) New technologies, new multimodal literacy practices and young children's metacognitive development. *Cambridge Journal of Education* 40(4): 387–399.

Zammit K and Downes T (2002) New learning environments and the multiliterate individual: A framework for educators. *Australian Journal of Language and Literacy* 25(2): 24–36.

Appendix 1. Semi-structured staff interview schedules

Pre-interview schedule

1. What are your views and feelings on the role of new technology in your setting and young children's lives?

2. What do you think 'literacy' means these days for young children?

3. What do you see as the advantages/disadvantages of providing children with a computer and digital technologies?

4. Would you describe yourself as a confident computer user? How often do you use a computer?

5. How confident do you feel using new technologies like the iPad and other touch-screen devices?

6. How do you view your role in facilitating the use of new technologies in your setting?

Post-interview schedule

1. What activities did you carry out with the iPad? What was good/less good?

2. Did you find the children needed to work alone or was it possible to have group work?

3. How did you help the children use the iPads?

4. Did you have any difficulties using the iPad, if so, how did you overcome them?

5. Do you think iPad activities help the literacy provision in your setting?

6. What are, in your view, the challenges and opportunities of iPads in your setting?

7. How useful would you say the iPad has been for educational purposes?

8. How much did you/the children like having the iPad in the classroom?

9. Are there any other differences the iPad made or more general comments that you would like to make?

10. Did you use the Our Story app? Did you/the children enjoy it/find it useful? Why/why not? Any problems?

11. What other applications did you use? How did the children enjoy these? What learning opportunities did they offer?

12. What are your views and feelings on the role of new technology in an early years/primary/special school classroom?