PRIMARY ICT

Teaching and Learning with **ICT** in the Primary School

Second edition

Edited by Sarah Younie,
Marilyn Leask and Kevin Burden

ROUTLEDGE

Teaching and Learning with ICT in the Primary School

This new edition of *Teaching and Learning with ICT in the Primary School* introduces practising and student teachers to the range of ways in which ICT can be used to support and extend teaching and learning opportunities in their classrooms. In an increasingly technological world, it offers teachers a toolset to help children develop openness to learning about new technologies and awareness of how to use them effectively for a wide range of purposes throughout their lives.

Fully updated and expanded, with new chapters reflecting the abundant changes in the field, this timely and engaging book offers practical guidance underpinned by the latest research and teaching. It is illustrated throughout with case studies and examples, and focuses on how technology-based practices can support the teaching of individual subjects, as well as a range of teaching and learning styles. Key topics covered include:

- ICT to enhance the teaching of literacy and numeracy
- effective technologies for teaching and learning science
- understanding visual literacy
- computer programming in the classroom
- developing assessment with technologies
- e-safety
- ICT in Modern Foreign Language teaching
- nurturing developing musicians through technology
- special educational needs and technology
- ICT in the Early Years
- using mobile technologies for authentic learning
- multi-play digital games and online virtual worlds.

Written for training primary teachers, as well as more experienced teachers and ICT co-ordinators looking for guidance on the latest innovative practice, *Teaching and Learning with ICT in the Primary School* offers advice and ideas for creative, engaging and successful teaching and learning.

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Contents

Illustrations

Figures

Tables

Tasks

Case studies

Notes on contributors

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Preface

> If we teach today as we taught yesterday,
> we rob our children of tomorrow
> (Dewey, 1944, p. 167)*

You will be teaching young people, many of whom can expect to be alive in the twenty-second century. The changes they will face in their lifetime are unimaginable so it is essential that pupils are prepared to be resilient and adaptable. An openness to learning about new technologies and an awareness of how to use technologies effectively for a wide range of purposes are part of the toolset they will need to be effective citizens, family members and employees over their lifetime.

We would like to thank Paul Hopkins and Mandy Peace, authors in this book, who drew our attention to the saying above. During your career you can expect to find that education attracts a lot of attention from politicians and in some countries, there are no checks and balances to protect educators from politicians keen to create a headline by imposing change, but who have no long-term responsibility for educational outcomes in the way that educators do.

So depending on the context in which you work you may find you have to accommodate political objectives in your professional practice, which may be contrary to the professional values and knowledge about effective teaching outlined in this book.

There is, however, a worldwide collaboration of educators building an evidence base for practice that we are part of and which we hope will provide you with evidence-informed professional support during your teaching career – see MESH Guides on www.MESHguides.org. These guides will in due course present research that outlines the value to learners of the technology tools that are mentioned in this book. If you register to receive the MESH Guides newsletter you will be kept abreast of new developments.

We would like to thank all the authors who have shared their research and their ideas through this book. We hope you find the ideas stimulating and that your pupils learn more than they would do otherwise from your implementation of at least some of the suggestions outlined.

Marilyn Leask, Sarah Younie and Kevin Burden
March 2014

* Dewey, J. (1944) *Democracy and education*. New York: The Macmillan Company.

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1 Learning in the Digital Age

Developing critical, creative and collaborative skills

Marian Henry

Introduction

There are many compelling reasons to use ICT in our classrooms, from motivating students and enhancing the learning experience to facilitating planning and the organisational elements of education. All of these are significant but the focus of this chapter is broader and deals with the complex relationship between education, changes in society and children's lives. It is inspired by doctoral research that asked: 'Is learning changing in the Digital Age?' where I looked at how society and children's lives were changing outside of school and how education was responding to this. The chapter is in four parts. The first is an overview of literature and research relating to the concept of the Digital Age and education. We will then look at how children are understood within the Digital Age, their informal engagement with ICT outside of school and how this relates to ICT use in school. The third section presents some of the key findings from the empirical research that I conducted with education stakeholders and children. One of the most prominent findings was the importance of fostering children's critical, creative and collaborative abilities, as these are seen as crucial in ensuring that children can flourish in the Digital Age. The final section explores how you can do this in your teaching.

At the end of this chapter, you will be able to:

- critically reflect on literature and research relating to the Digital Age, technology and education;
- think in a deeper way about the digital generation and how we understand their existing ICT skills;
- recognise the importance of fostering children's critical, creative and collaborative skills;
- develop strategies for putting this knowledge into practice in your classroom.

The Digital Age, technology and education

The term 'Digital Age' describes how society, culture, politics and economics are increasingly suffused with digital technologies. In this way, the term is closely linked to other popular concepts such as the 'Information Society' or 'Knowledge Society'. What these titles have in common is that they place information at the heart of contemporary life. In *Theories of the Information Society* (2006) Frank Webster highlights that 'information' has become a distinguishing feature in discussions of the modern world over the past

thirty years. He points out that while theorists and scholars take many different views on how our world is changing and developing, there is some level of consensus about the salience of 'information' in contemporary society. The centrality of information is closely linked to the continuing development of digital technologies. It is against this backdrop of the growing significance of information, and the tools that promote and sustain it, that twenty-first century education finds itself.

Education and society have a dynamic and interactive relationship. This means that they influence each other. What happens in education has an impact on how society, the economy, culture and politics develop. The reverse is also true because changes in society, culture and politics have a bearing on what is expected of education. ICT in education is a clear example of this interactive relationship. The significant investment in, and promotion of, technology in education is not limited to particular schools, or districts or countries. At present, nearly every country in the world, regardless of geopolitical, economic or social circumstance, has implemented an educational technology strategy (Selwyn, 2011). Towards the late 1990s in many Western countries, the industry around information and communication was seen to have taken over from the more traditional manufacture of goods (Webster, 2006; Selwyn, 2011). This shift was perpetuated by the development of digital technologies and the use of these technologies in education was important in developing the information economy within a country. What is common among these policies is a close interlinking of education with employability, productivity and the wealth of the nation. Investing in ICT use in education is a core element in investing in the future of the national economy (Ball, 1999). This is especially important in a global competitive economy.

Not surprisingly, the attitudes to ICT in education policies tend to be enthusiastic. In Ireland, the promotion of ICT is enthused about and described as 'a pivotal force' in changing learning (DES, 2008a). However, to say that ICT changes or revolutionises learning is technological determinism – meaning that we see technology as causing change. ICT may play a role in change, but technologies can't have an impact without people to use them and to appropriate them into their lives. It is easy to get swept up in the idea that technology will or has changed learning, but this attitude is ultimately disempowering to teachers. As was found in a recent NESTA report 'Technology has no impact on its own – it all depends how we use it' (Stokes, 2012: 8). Technology is part of the story, but in order for ICT to have a positive impact on learning, we need teachers to be informed users of it in the classroom.

Children in the Digital Age

Good pedagogy builds from what children already know and understand. When it comes to the children we are now teaching do we see them as digital natives or digital novices? The concept of the 'digital native' was introduced by Marc Prensky to describe children who have spent their 'entire lives' surrounded by ICT. He claims that due to their interaction with ICT they 'think and process information fundamentally differently from their predecessors' – digital immigrants (2001: 1–2). While digital immigrants may learn and use new technologies they tend to retain their 'accent'. The problem for education then, according to Prensky, is that digital immigrant teachers are trying to teach digital natives in an outdated language. According to Prensky, these students are wired differently and learn differently, and therefore both the methodology and the content of our teaching need to change.

Don Tapscott writes about the 'digital generation' (1998). He distinguishes between how different technologies enable different forms of engagement – contrasting the 'television generation' with the 'net generation'. Television is a push medium where 'a relatively select band of producers (broadcasters) decide what content is to be created, create it and then *push* it down analogue or digital channels at audiences, which are assumed to consist of essentially passive recipients' (Naughton, 2012: 142). The net, on the other hand, is a pull medium where the consumer can actively choose what information they want to access and 'pull' it down to their computer, television, smartphone or tablet. This encourages more active, open and democratic engagement. Where television could be seen to dumb down its users, use of the net could be seen to raise their intelligence. What both Prensky and Tapscott do is equate technological change with enabling children to think, learn and engage with society in new and better ways. The job of education is to catch up with the children and use ICT more. While their assertions are popular, there are elements to their claims that are problematic.

Digital divides

The 'digital native' argument assumes that *all* children grow up surrounded by technologies, but to what extent can we be sure this is the case? Children have different levels of access to, and use of, ICT depending on their socioeconomic status, their parents' attitudes to the use of technology (Livingstone and Boville, 2001) and their own preferences (Livingstone and Helsper, 2007a). This gap between children's use of ICT is referred to as the 'digital divide' and giving children access to ICT in schools and libraries is presented as an answer to bridging the divide. This assumes that access to technology solves the problem, but research has shown that there are very few children who do not use the Internet, in contrast to adult populations, undermining an understanding of a clear divide between users and non-users. The digital divide in relation to children is less about *if* they use the ICT and more about *how* they use it. Livingstone and Helsper (2007b) argue that there is a 'continuum of digital inclusion'. This describes children's use of ICT from basic activities such as information-seeking to more sophisticated uses such as interactive and creative activities. They point out that there is not one digital divide but a number of divides that are based on gradations of inclusion. There can be divides between children of different age groups, genders and socioeconomic classes, and these divides are evolving over time (Tsatsou, 2011). Furthermore, research shows that children with access to computers and the Internet at home gain more from their experiences of ICT when they are in school and so instead of ameliorating a divide, schools may exacerbate it (Suss, 2001; Meneses and Mominó, 2010). Rather than assuming that all children are digital natives and 'wired differently', we need to think more rationally about the range of skills that children come to school with and how we can help each child develop and build on their existing skills.

Digital natives or digital novices?

Discussions of children engaging with media have long been polarised into those who champion it and those who are concerned about it, and this was the case long before digital technologies. David Buckingham (2000) writes that the media have frequently been blamed for provoking indiscipline and aggressive behaviour, for inflaming precocious sexuality and for destroying healthy social bonds. The online environment serves to

reignite and add to the list of concerns that parents, adults and policymakers may have in relation to children (Buckingham, 2011). Technological prowess can be seen as bringing young people into the adult world and 'threatening the still powerful construction of childhood as a space of innocence and imagination' (Facer and Furlong, 2001: 452). There are many books that present childhood as being under attack from advertisers and marketers (Mayo and Nairn, 2009), online bullies and predators, and that the use of ICT encourages sedentary lifestyles, withdrawal, isolation, reduced attention spans, increased anxiety and pressure (Palmer, 2006). On the other hand, in recent years there has been a move towards seeing children as heterogeneous, non-passive, autonomous, diverse and versatile agents actively appropriating the Internet in meaningful contexts of their everyday lives (Meneses and Mominó, 2010). Buckingham argues that children are presented in oppositional ways depending on who is making the point and what they wish to gain from it on behalf of children. 'The campaigners who purport to be speaking on behalf of children and defending their interests tend to present them as powerless while the marketers, who might be seen as attempting to manipulate them, present them as powerful' (2011: 21). Within education the digital environment presents a number of challenges in relation to protecting children from inappropriate content, sharing of personal information, online bullying and predators. The reaction to this might be to encourage children to avoid the digital world or to be cynical of it. However, recent research found that in the context of young people's online activities opportunities and risks are related (Livingstone and Brake, 2010). This means that the more skilled users experience both more opportunities *and* more risks. Also risk does not necessarily lead to harm. Therefore, policies that seek to limit children's risk may also limit their opportunities. While we may wish to protect children from harm, the emphasis may be better placed on preparation – giving children the tools with which to navigate the digital realm safely, responsibly and in ways that are rewarding and enriching.

How we in education can prepare children to participate in a Digital Age was one of the main areas I explored through interviews with stakeholders in the education process and the findings of this are presented below. I also wanted to hear from children about their attitudes, opinions and experiences with digital media both at home and in school to see how this might inform how we can make meaningful changes in learning in the Digital Age.

Research findings

Stakeholders

The stakeholders in education who contributed to this discussion ranged from third level lecturers and an IBM executive to teachers and a parent. The stakeholders were asked questions about their view of the Digital Age and how education is and should be responding to it. They were enthusiastic about the opportunities that ICT could afford education, but also saw a number of challenges to how we use ICT in schools. While technical skills and the use of ICT were seen as important, a key element that emerged from the interviews was the bigger question of educating children to live and learn in a digital world both as children now and also as future workers and citizens. I have summarized three of the relevant findings and the suggested implications for education in the table below.

Table 1.1 Findings from interviews with stakeholders

Finding	*Implication for education*
The Digital Age is a time of information abundance but information is not the same as knowledge.	Children need to develop critical skills to access, analyse and evaluate digital texts so that they are informed and competent communicators.
The Digital Age represents opportunities to engage with and participate in society and culture in new ways.	Children need to develop their creative skills in relation to the full range of media so that they can find their voice and express themselves in the digital environment.
In the Digital Age, there is a great emphasis on the 'collective' both in relation to working with people in different geographic locations and pursuing interests and friendships.	Children need to learn to work collaboratively – sharing with, and learning from, others.

Children

When I spoke to children, it was clear that their engagement with ICT outside school is about more than an interaction with a machine. It was a prominent element of their interactions with their family, friends and the wider world. Children spoke fondly of family time spent watching movies or playing imaginative games with friends based on their favourite TV shows. Their taste in content was a significant motivator for ICT use and 'transmedia consumption'. This means that they follow content across media; if they like a TV show they will look up the website. It is this pursuit of interests that motivates children to broaden their ICT use and experience new media rather than a desire to improve their technical skills. Their taste was also central in asserting their identities. For example, to show how grown up they are, they might declare that a particular website was for babies. In this way, children using technology outside of school is not so much about technology – it is about culture (Buckingham, 2007).

There is a tendency in policies to acknowledge children's use of technology outside of school and see education improvement as being based on incorporating this into formal learning. For example, in Ireland one report stated that children engage in information learning in 'ingenious and impressive ways' and that we need to 'incorporate these new skills' (DES, 2008b) into the formal learning environment. This may not be as easy at it first appears, however. In my own research with children, they saw ICT in school as being different to at home. Home use was characterised by fun, freedom and autonomy while in school they spoke of using the Internet to look up information but only being allowed some freedom when their "work" was done. In the Irish context, these findings were verified by both the PISA 2009 (Cosgrove *et al.*, 2011) and EU Kidsonline (O'Neill *et al.*, 2011) reports that showed very little overlap between children's use of ICT in school and at home. Furthermore, studies such as Livingstone *et al.* (2005) indicate that children's everyday interactions with technology are not necessarily ingenious and innovative; rather they are relatively banal and focused mostly on information retrieval, communicating with friends and general entertainment.

The combination of the conclusions of the literature and research and the findings from the stakeholders and children indicate that the world outside of school is changing, both with respect to children's lives now and also in relation to their employment and

social participation in the future. ICT represents ways to enhance our existing pedagogies and it also represents new lessons for children to learn. Rather than hoping that their home skills will seamlessly transition to the school environment, we should begin from children's existing knowledge and skills and where possible interests. The stakeholders felt that using technology to enhance curricular areas and develop technical skills was important but not enough. Children also need to be taught to be critical, creative and collaborative learners in order to be prepared to participate in the Digital Age. The final section explores each of these skills and outlines some tips for how you can foster them with the children in your classroom.

Fostering critical, creative and collaborative skills

Critical skills

ICT is often presented as a 'tool' for learning – a technology. What we have to remember is that these are *information* and *communication* technologies. These technologies shape how we access and share information and how we communicate. As such, they are more than simply tools; they are *media*. As David Buckingham writes, media do not ". . . offer a transparent window on the world. . . . media *intervene*: they provide us with selective versions of the world, rather than direct access to it" (2003: 3). When we interact with media – from websites and YouTube to newspapers and books – we are not looking through a transparent lens; the information has been selected and edited. The information has been *mediated*. As children navigate the World Wide Web they are interacting with 'digital texts'. Enabling them to interpret and create meaning in relation to these digital texts is closely related to the teaching of literacy and the following sections essentially are about how we can apply the deep engagement with text that you are encouraged to have in relation to books and print and to apply it to the full range of digital media.

Children need to learn with and through technology, but they also need learn *about* ICT. This enables them to develop the critical, higher-order thinking skills to engage with the full range of media they encounter both in school and at home. The extent to which they are encouraged to develop these critical skills through using media as a teaching aid – i.e., using a website about animals in a science lesson – is questionable. This is because when media are an aid to learning, the focus is on the animal content as opposed to developing the child's understanding of who made the website, who funds its development, how certain animals or issues are presented, etc. Learning about digital media develops critical skills because children are encouraged to question and make judgements about the quality and trustworthiness of the information they are accessing. In this way they are learning how to be discerning and judicious digital media users. While children may come to school with confidence and competence in using technologies, they do not necessarily come with fully developed analytic and evaluative skills. In an era where there is an abundance of information, one of the most important things we can do in education is develop these critical skills.

A good way for children to learn to be critical is through small group interaction with a teacher guiding the process. Reflecting on her own experiences of fostering critical literacy in primary school pupils, Swain reflects 'I would argue that in order for pupils to adopt critical perspectives independently, they first need opportunities to explore this

with an experienced reader, so that they can understand the principles involved.' (2010: 135). In relation to still images, moving images, sounds and websites children can be asked to discuss the authorial intent, to develop an alternative perspective, or to read against the given interpretation. The discussion should be open-ended and while the teacher can lead the discussion, it is best if the children discuss the topic without feeling that the teacher has an ultimate 'right answer' in mind. The teacher's questioning style is therefore very important. Questions should be open and begin with statements such as 'I wonder why the author said . . .' Space needs to be made for deliberation and discussion. The challenge for you as a teacher is that you have to have some sense of where the discussion may go, but at the same time, if you steer it in that direction, you are stopping the children from having their own authentic reactions. Through critical discussion, children learn to listen to their own interpretations and they also learn to listen to others.

Content creation

We would never teach children to read but not to write. Teaching children to 'write' across a range of digital media, is an integral part of helping them to learn in a Digital Age. It is important for a number of reasons. First, creating their own content enables them to see themselves as creators of content and not just consumers. Creating content in the form of a digital video, a photograph with a caption or contributing to a class wiki is empowering for children as it lets them be in control of the production process. It gives them a sense of agency also as they can represent their views, experiences, concerns and interests. In essence, giving children the opportunity to create content is about encouraging them to find their voice in the Digital Age. I have worked with children creating short movies and there is a tendency for groups of boys to want to make extended fight scenes with zombies and ninjas. My role as their educator is not to pass judgement on their taste or interests, rather I can help them define the narrative and tell the story in a way that makes sense to the audience.

How do I enable children to learn critically and creatively?

When you want to foster children's critical and creative abilities in relation to their use of ICT there are two key things to remember. The first is that critical and creative activities are closely related. As children analyse digital texts, it helps them understand the choices they make when creating their own digital texts. Similarly, when children are creating content, they learn about how to communicate with their audience and about the vast range of choices made by producers of content they enjoy. Second, developing critical and creative abilities is not about having a body of information you want children to learn. Nor is it about a list of skills or tasks you want them to complete. It is about developing their undertanding. We want children to understand the digital world, how it works and how they can engage with it in ways that are rewarding and fulfilling for them. For this, you want them to develop understanding of four key concepts – production, language, representation and audience (Buckingham, 2003). Each of these concepts is described below and strategies that you can use are outlined.

Task 1.1 Creating a class blog (see also Chapter 3)

Creating a class blog is a large-scale and ongoing task. It will develop as you and the children learn more and add and take from the content they present. The emphasis here is on the process of working critically, creatively and collaboratively. Encouraging the children to reflect on their work and to improve it is an important part of the process. Over time, you want to ensure that you are addressing each of the four concepts. Also the critical and creative processes do not need to be limited to the class blog or Internet, they can also be developed in relation to other curricular areas such as visual arts, music and civic and ethical education.

Production

Studying production with children involves helping them to understand that there are many interests at stake in media production such as understanding the role of public service broadcasters, private companies, the use of advertising and media regulation.

Critical

- Look at other class blogs or children's websites and ask the children 'Who made this?', 'Why did they make it?', 'What information do they want the reader to gain?', 'Have they left out any information?', 'Why would they do that?'
- You can also get the children to see if there are any advertisements. They could discuss why this is and how the ads are chosen for the medium or content.

Creative

- When you begin to create a class blog with the children, encourage them to think about what their key message(s) are, how much information they want to communicate and what the best way is to communicate it. As children discuss their choices and reasons for these, you can ancourage them to reflect on the choices made by other producers of media. Children should also have plenty of time to edit and rework their ideas over time.

Language

Different media and different genres use different forms of language. Each language has its own codes and conventions. For example, a television programme makes use of certain conventions in relation to the opening credits, the types of camera shots, or music used. A soap opera will have slightly different codes and conventions to a sitcom or current affairs programme.

Critical

- In the case of a class blog, the languages we have are print, sound, still images and moving images. Children can decide what is best for the information they want to impart.

- Encourage the children to look carefully at other blogs and at the images or text used.

Creative

- Children also need to decide if they want the content to be funny, serious, emotive, etc., and how different modes of communication may help this.
- They can choose fonts and colours and discuss their choices.

Representation
Media products invite us to see the world in particular ways and not others. Studying representation may prompt questions about postive or negative images, bias, stereotyping and realism. The children could be asked how a blog depicts the topics that are shown. How are the female/male, young/old, good/bad characters portrayed?

Critical

- Compare two versions of the same story.

Creative

- When children have some experience of creating digital content, you can ask them to represent it for two different audiences. This helps them to think about how different people have different perspectives. Media content is not a 'transparent window on the world'.
- Ask children to tell a well-known fairy tale from the perspective of another character.

Audiences
Studying audiences means looking at how audiences are targeted and addressed.

Critical

- Children can discuss what they think the target audiences for different websites are. Would they choose to look at this website? What do they think of the content and who it is aimed at? Advertising is also relevant for discussion in relation to audiences.
- Considering audience also involves reflecting on one's own media use, habits and patterns of use in everyday life. What or who influences their choice of media? What do they really enjoy, or not enjoy? How do they find out about new content – websites, films, television shows?

Creative

- Creating content for two different audiences (as above).

Collaborative learning

The critical and creative ideas above require that children work well together. It is important as teachers that we don't assume that children can collaborate. Group work, even for adults, can be challenging. Therefore, as part of your planning, you will need to have some strategies to help the children to work together, such as assigning clear roles. Learning to collaborate is about more than just working with others: it is about seeing others as a source of knowledge, as people we can learn from and also as the sum of the parts being greater than each individual (Poore, 2011).

One of the key elements of Web 2.0 is the idea of many people working together to create something. A good example of this is Wikipedia. Children need to be taught and guided through content creation using digital tools. Creating a class wiki, or engaging with social media through a service such as Edmodo, can give the opportunity to discuss and discover the advantages and disadvantages of communicating through these media. In this way children learn how to share information in a responsible way. It may also be upsetting for children if someone edits or changes what they have written on a class wiki but this provides an opportunity to introduce the idea that even experienced authors produce many drafts before their work is ready for publication. Working on collaborative projects can be challenging, but these are important lessons for children to learn as they are relevant to the Digital Age. Teaching and reflecting on these challenges with children is valuable in enabling them to participate in the digital environment.

Summary and key points

The overall aim of this chapter was to broaden your understanding of learning with and about ICT. It is important to teach children about, with and through ICT not simply because it 'enchants the disenchanted' child or because it makes learning 'more fun' (even though these are important), but because the children we teach live in an age where ICT is a core element of how we learn, work, play and connect with and contribute to society. The sections above challenge some of the 'common sense' attitudes to the use of ICT in education. The aim is not to undermine the use of ICT or to say that it is not necessary or relevant. My aim is to inspire a deeper and more critical perspective on the role of ICT within our society and how we can enable children to use ICT within their learning.

In the empirical research with stakeholders in education it was felt that developing children's technical skills is not enough for education to do; we must also prepare children to flourish in this new information and communication environment. This means giving them the opportunity to develop critical, creative and collaborative skills. I outlined why and how these skills can be fostered in the primary classroom, and hope that you will be inspired to incorporate these suggestions into your teaching.

If you are a student teacher check which requirements for your course you have addressed through this chapter.

Further reading

Bazalgette, C. (ed.) (2010) *Teaching media in primary schools*. London: Sage.

This is a great book about how to teach children about media in primary schools. It has chapters relating to research and lesson plans.