Professional development in pedagogy with technology in higher education: A brave new world?

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This paper explores professional development and pedagogy with technology in higher education. The research participants come from a range of professional backgrounds. The findings are relevant to all three sub-themes of this year's conference. The data is gathered from 23 academics who apply technology to their teaching with University students in England. The research is based on a qualitative inductive methodology. Loosely structured interviews have been completed with the research population to gather their views on professional development and pedagogy with technology. The findings reveal that a complex range of personal, social, and professional factors influence professional development and pedagogy with technology in higher education. The paper makes an original contribution to knowledge by outlining the challenges to professional development and pedagogy with technology in higher education. This builds on other work published in related areas (Bers 2008; Ingleby 2015; Yelland and Kilderry 2010).

Keywords: technology; pedagogy; professional development; qualitative research.

Introduction

The pre-election Conservative Party Manifesto (2015) makes 17 references to 'technology'. 'Technology' is referred to in favourable terms. It is equated with 'jobs and enterprise, getting people into work and boosting apprenticeships' (2015, 17). The research in this paper explores the complex range of personal, social and professional factors that influence selected practitioners' pedagogy with technology in higher education. The purpose of the paper is threefold. The paper begins by arguing that policymakers in England have consistently supported the use of technology in pedagogy since 1950 (Jones 1980, 33, cited in Ingleby 2015). The application of technology to pedagogy has led to significant academic research into this area (for example Bers 2008; Drotner, Siggaard Jensen, and Christian Schroder 2008; Goldberg, Russell, and

Cook 2003; Marsh et al. 2005; Plowman and Stephen 2005; Prensky 2001; Yelland and Kilderry 2010). The paper uses the work of these authors to argue that the policymakers' unequivocal support for using technology in pedagogy is not necessarily shared by academic researchers. The factors influencing pedagogy with technology are complex as they are influenced by personal, social and professional factors. We therefore reflect on the challenges for professional development when technology is used for pedagogy. We have identified that the practitioners in our research sample are influenced by personal, social and professional factors as they apply technology to pedagogy in higher education. The challenges for professional development in education that are identified by Harland and Kinder (2014) and Macfarlane and Cartmel (2012) are revealed by the participants in the research sample. We argue that pedagogical technology skills need to be met through professional development that is based on research and evidence-based practice as opposed to being driven by economic and political agendas (Leask and Younie 2013, cited in Ingleby 2015). Those teaching students with technology in higher education need professional development that takes into consideration the personal, social and professional factors influencing their pedagogy.

Research context

The research is based on the experiences of a sample of higher education lecturers in England who have taught in Universities in England since 2000. The research approach is inductive and qualitative and the findings are generated from a sample of 23 practitioners. During the research process, we reflected on our qualitative research processes (Brown, Lan, and In Jeong 2015; Thomas 2011, cited in Ingleby 2016). This led to a number of actions within the research process. The research was approved by

the authors' University school research ethics committee and the participants were informed of the protocol associated with the research process (Merriam 2009, cited in Ingleby 2016). The participants were also made aware of the research objectives (Thomas 2011, cited in Ingleby 2016). Triangulation occurred in the research process by reflecting on published research on pedagogy and technology (for example Bers 2008; Drotner, Siggaard Jensen, and Christian Schroder 2008; Goldberg, Russell, and Cook 2003; Marsh et al. 2005; Plowman and Stephen 2005; Prensky 2001; Yelland and Kilderry 2010). The emerging findings were shared with a community of scholars through a research seminar at the authors' HEI (Brown, Lan and In Jeong 2015, 143, cited in Ingleby 2016).

The research is framed by the policy landscape of 'TEL' (technology enabled learning) in England. The term TEL is defined by Kirkwood and Price (2014) as the application of information and communication technologies to teaching and learning. We argue that although there is interest in applying technology to pedagogy, there is little helpful guidance from policymakers in England as to how this can be achieved. TEL, as a term, is regarded in general as being preferable to the term 'e-learning', because of the emphasis that is placed on 'enhancing learning' through technology (Guri-Rosenblit and Gros 2011 cited in Kirkwood and Price 2014). Kirkwood and Price (2014) argue that the term 'enhancement' is important because of the association with increasing and improving quality. The current Conservative government's commitment to technology in pedagogy is evident. 'Security for families' is equated with 'jobs' and they are in turn equated with 'investing in science and technology' (Conservative Party Manifesto 2015, 17, cited in Ingleby 2016). The research in the paper is being carried out at a time when 'Britain's world-beating universities' are being encouraged 'to make money from the technology they develop' (Conservative Party Manifesto 2015, 21,

cited in Ingleby 2016). The research in the paper is highly relevant to the pedagogy that is occurring in Universities in England in 2016.

In England, there have been years of continuous support for applying technology to pedagogy. Jones (1980, 33, cited in Ingleby 2016) draws attention to the 30 years of sustained government investment in educational technology that occurred from 1950-1980 in England. This development of TEL continued through the Conservative administrations from 1979 onwards. The result saw microcomputers being introduced within schools 'so that our young people are skilled at an early age' (Thatcher 1983, cited in Ingleby 2015, 145). These Conservative administrations in England from 1979-1997 provided a consistent series of policies to increase the use of technology within the education sector. A key theme of this research paper is that the pedagogical needs of those educating with technology have not been met. This argument is exemplified with the 1981 *Micros in Schools* scheme. Although the initiative resulted in more than 4000 schools ordering microcomputers by 1992, the consideration of enabling effective pedagogy with technology is not apparent (Marsh et al. 2005, 69, cited in Ingleby 2016).

The importance of TEL is evident through establishment of the *National Council for Educational Technology* by the end of the 1980s. Despite some fluctuations in policy approaches, there has been consistent support for using technology in pedagogy in England (Wild and King 1999, cited in Ingleby 2016). The work of the Conservative administrations in supporting TEL was further developed by the New Labour administrations from 1997-2010. In David Blunkett's 'Greenwich speech', technology is referred to as a 'seismic' component of globalisation (Blunkett 2000). The New Labour administrations led to sustained educationally focused programmes aimed at developing the application of technology to pedagogy (Ingleby 2016). The challenge

that has emerged from these policies appears to be meeting the professional development needs of the practitioners who are applying technology to pedagogy. The research in this paper has explored the factors influencing the application of technology to pedagogy by selected practitioners in higher education in England in view of this policy landscape.

The research is informed by literature about pedagogy with technology (Bers 2008; Drotner, Siggaard Jensen, and Christian Schroder 2008; Goldberg, Russell, and Cook 2003; Marsh et al. 2005; Plowman and Stephen 2005; Prensky 2001; Yelland and Kilderry 2010). The literature reveals some of the complex issues that are associated with pedagogy using technology in education. We have also referred to the work of Harland and Kinder (2014) and Macfarlane and Cartmel (2012) in order to reflect on the challenges for professional development in this area. Harland and Kinder (2014) and Macfarlane and Cartmel (2012) argue that effective professional development in education depends upon nurturing leadership, scholarship and professional identity. This literature supplements the gap that appears in the English policymakers' simplistic view that pedagogy with technology represents 'best practice'. The subsequent section of the paper reveals how this literature has informed the primary research.

The literature on applying technology to pedagogy in early years reveals the pedagogical processes that need to be considered if learning and teaching in this area is to be successful (Bers 2008; Yelland and Kilderry 2010). Goldberg, Russell, and Cook (2003) do not regard pedagogy and technology in isolation. It is recommended that technology ought to be used in ways that enhance the wider pedagogy that is taking place if teaching and learning with technology is to be successful (Ingleby 2016). There ought to be a purpose to pedagogy with technology so that 'deep learning' occurs (Yelland Kilderry 2010). This notion of applying technology to pedagogy in creative

and profound ways is recommended by Bers (2008). TEL should evidence a shared synergy of creative learning and teaching. Ingleby (2016) argues that the 'so what?' question is asked of technology by these authors (Bers 2008; Goldberg, Russell and Cook 2003; Yelland and Kilderry 2010). In other words, we have technology being applied to pedagogy, so what are the educational benefits? This argument links to the work of Drotner, Siggaard Jensen, and Christian Schroder (2008). The authors explore how dominant discourses about technology combine with educators' personal and professional backgrounds. This literature suggests that a complex range of factors influence the application of technology to pedagogy (Ingleby 2016). Marsh et al. (2005, 76) focus on the 'digital divide' that results from the socially constructed view that technology is a 'male' preserve. These complex social, personal and professional factors influencing pedagogy with technology can produce what Prensky (2001) phrases as 'digital natives' (who are familiar with technology) and 'digital immigrants' (who are not familiar with technology). This literature has formed the background to the research paper.

The literature on pedagogy with technology reveals the complexities that are associated with its practice (Bers 2008; Drotner, Siggaard Jensen, and Christian Schroder 2008, Goldberg, Russell, and Cook 2003; Marsh et al. 2005; Plowman and Stephen 2005; Prensky 2001; Yelland and Kilderry 2010). Macfarlane and Cartmel (2012) argue that it is important to consider the needs of the participants who are engaging in professional development, if we are to enable 'innovative' professional practice. The authors discuss the 'circles of change' and 'circles of change revisited' professional development initiative (Macfarlane and Cartmel 2012, 845, cited in Ingleby 2016). The initial 'circles of change' initiative that is applied to the University sector, is 'revisited' by the authors and applied to professional development within a new cultural

context (Australia). The 'circles of change' (or 'COC') project enables academics, students and professionals to reflect on reciprocal and informative learning (Macfarlane and Cartmel 2012, 846, cited in Ingleby 2016). The initiative considers the complex factors influencing professional practice. Macfarlane and Cartmel (2012, 846) explain that the 'COC' initiative is based on 'deconstructing' theory related to practice alongside 'confronting' 'personal, social and systemic' issues that are associated with 'untouchable topics' (Macfarlane and Cartmel 2012, 847, cited in Ingleby 2016). 'Theories' about professional development are explored so that the practitioners can 'think otherwise' about their professional practice. This 'innovative' way of thinking about professional practice has been considered in our research. We are particularly interested in what Harland and Kinder (2014, 672) refer to as 'affective outcomes'. These 'affective outcomes' refer to emotional involvement of participants with their professional development. It is acknowledged that many professionals experience 'zones of uncertainty' (Harland and Kinder 2014, 673, cited in Ingleby 2016). Harland and Kinder's (2014) research reveals the importance of generating positive emotional involvement with professional development, if the initiatives are to be successful.

This collection of research and publication on learning and teaching with technology (and its associated professional development) reveals the complexity of TEL. A challenge rests in making pedagogy 'creative' so that it produces deep learning **(**Bers 2008; Yelland and Kilderry 2010**).** The interpretation of technology that is held by the practitioners (Plowman and Stephen 2005) and the processes leading to effective professional development also appear as further pedagogical challenges in this area **(**Harland and Kinder 2014; Macfarlane and Cartmel 2012, cited in Ingleby 2016). The complex set of factors influencing pedagogy with technology contrasts with the policymakers' simplistic message that TEL is 'best'. These theoretical themes and

considerations have been used to develop the research that is reported in the subsequent sections the paper.

Methodology

This research explores the pedagogical experiences of academics using TEL in higher education. The paper explores professional practice and professional development needs. The research examines motivation and competency in using TEL and how the tensions between employing TEL and more traditional ways of learning are mediated.

The research is guided by a relativist constructionist ontology. We have applied an interpretivist approach in order to develop a case-study on pedagogy with TEL in higher education. We base our research approach on a phenomenological approach. Our case-study methodology is informed by an interpretivist paradigm (Tight 2010; Sarantakos 2013; Yin 2009). This allows us to explore a contemporary phenomenon (TEL) in depth and detail (Yin 2009). The research approach encourages familiarity with our research informants so that we can explore their perceptions of TEL (Sarantakos 2013). Case-study research is not without its challenges (Stevenson 2004, Kyburz-Graber 2004). A case-study is inevitably local and parochial (Geertz 1995). The consequent impressionable nature of a case-study can make it challenging to generalise the findings (Dillon and Reid 2004). There is, however, the opportunity to generate a rich and concentrated description of a research context when a case-study approach is applied to a research process (Cohen, Manion, Morrison 2011).

A phenomenological approach was employed in order to enable our constructive ontology (Bennett 2012). We explored the lived experiences of our research participants as they reflected on TEL (O'Leary 2014). This enabled us to reflect on how and why academics operate in the way they do. We used narrative interviews in our phenomenological approach. These narrative interviews aimed at enabling academics to

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'tell their story' and express what is important to them. This presented us with an opportunity to explore meaning, patterns and forms of behaviour (Bryman 2012). This narrative interview approach facilitates academics to communicate personal experiences, allowing them to explore and express what is important to them. The research approach enables the participants to reflect on their thinking processes, their cultural patterns and the determinants that guide their life choices (Cohen, Manion Morrison 2011; Flick 2014; Sarantakos 2013). This research ontology has enabled us to gather unique insights into academics' experiences with TEL and their associated professional development needs (Hennink, Hutter and Bailey 2011).

The primary research comes from two main sources; semi-structured interviews with academic staff and analysis of module sites located within a University virtual learning environment. Purposive sampling was applied to the research to generate 23 semi-structured interviews over four months of primary research (Flick 2014). All the participants were made aware of the research ethical protocols associated with the research and the research transcriptions were reviewed for accuracy with the research population.

Trowler's (2008) socio-cultural theory of learning and teaching was applied to consider the emerging data from the research. We reflected on the social mediation of the curriculum in association with TEL as we reflected on the interview transcripts. Thematic analysis was applied in order to generate key research themes (Easton, Fry-McCornish, and Greenberg 2000; Ryan 2009). Nvivo 10 was applied to organise and link data in order to help our thematic analysis.

The views of the practitioners

Key theme 1: personal factors and pedagogy

The following reflections reveal the personal, emotive feelings about pedagogy that are held by the participants. These reflections reveal some of the reasons why the research participants teach in higher education. The reflections link together in outlining the emotive reasons why the participants are attracted to teaching in higher education in England.

> I feel passionately about nursing, the quality of nursing. I thought the best way I could make a difference was to pass that passion on and a job came up here, as the senior lecturer. I love teaching, I've always done some form of teaching, you know, just talking to people, or giving presentations. (Deia, HE [Higher Education] lecturer)

This reflection about 'teaching' and 'passion' is similar to 'Brian's' (HE lecturer) view that he is working in higher education for professional fulfilment as opposed to seeking to become skilled in TEL. 'When I was in practice, I enjoyed working with students. I got a lot of job satisfaction I suppose - probably the best way of describing it'. These participants do not express a wish to be skilled in TEL. They emphasise the personal feelings that are influencing their pedagogy. This theme is amplified in the following transcript:

> I've always had it in mind to teach, and when I was working in IT (Information Technology) it was always intimated to me that I was a natural communicator, in that I wasn't like a lot of other people working in IT. Yes, I was 'geeky', I was 'nerdy', but it's never enough, especially when you have to try and work with other people that need help. You know, so I was always much more approachable, I was more willing to sit down and spend time with people, so I felt I was suited for teaching. It has always been there, but it's really having the life experience, and then the confidence to be able to really think 'Well, yeah, this is the time, then, when I can maybe think about teaching. I've got enough life experience'. You know, I've done enough in my life to – to bring something to the table. (Tristan, HE lecturer)

These research respondents talk more about their personal involvement with pedagogy and less about TEL. We argue that professional development in TEL is more likely to be successful if the personal and affective domains of the research participants are met in association with TEL.

Key theme 2: social factors, pedagogy and TEL

Social factors that have shaped the participants' impressions of technology also influence the integration of TEL into pedagogical practice. These social factors include an absence of socialisation into the world of TEL. This is revealed by Jane.

> Apart from the usual PowerPoint and things like that I don't use a lot of technology, I've got to say. I think it's mainly about me. I'm definitely a laggard when it comes to technology cos I'm scared of it, basically. I seem to have missed the beginning, where it was maybe quite straightforward, and then all of a sudden when I'm looking at it, it's this really complicated thing...whereas some people seem to have got it at the beginning, and have followed the development...I seem to have gone from nothing, to 'Oh my word, I don't even know what all these things are'. So on my part, it's not that I don't want to, it's just that I am scared of it...and I think I've got a long way to go, it's not something I could just go to a session and think 'Oh, right, I know how to do it now, and that's it'. (Jane, HE lecturer)

Other participants acknowledged the benefits of TEL, but do not apply technology to pedagogy because they have not acquired the necessary skills to teach in this way. This appears to be a consequence of not being socialised into using technology for pedagogy.

> I think when I look at technology broadly, I have only been able to apply the basic part of it. I have not gone into the sophisticated part of it. I hear people who can mark on iPads, and people who mark on their phones. I don't know – I just don't know why I've not been able to integrate that sort of thing within education. (Guy, HE lecturer).

<u>Key theme 3: professional factors influencing pedagogy</u>

The participants draw attention to the professional factors influencing their application of technology to pedagogy. 'Rachel' and 'Helen' (HE lecturers) reflect on the nature of pedagogy in higher education and the shared professional understandings of the curriculum when they reflect on TEL. Both of these respondents are concerned with learning processes as opposed to concentrating on learning technologies.

> It's very student-focussed. It's all about what their experiences are. It's got to be active learning; you know, I'm not a 'chalk and talk' approach type at all. It's about helping them to learn, it's about helping them to do something with the knowledge, and, so I see it really as a facilitator role – to help them to do that, to enable them, direct them through that process. And obviously, given, my experience in terms of the subject it's very much centred about them -.... what their needs are. So when I've done programme design, as well - who are these distance learners? What are their needs going to be? (Rachel, HE lecturer)

> I see myself as a facilitator of learning, rather than an educator, and really like to draw on the group understanding and tease out what they believe and I think I'm very student-focussed and interested in student opinions. And then in probably quite a soft way, I facilitate their learning, to expose them to different things. But really, I like to work with the knowledge within the room expand that and very much pull in clinical expertise and clinical opinion by using lots of clinical examples - hopefully, enabling the students to make the links of what happens in University, and how that translates into patient practice. (Helen, HE lecturer)

In view of this tendency of the research respondents to focus more on learning processes, TEL can appear as an unconvincing aspect of pedagogy. This is revealed by 'Archie' and 'Elsa'.

> Well, I think (TEL) is a difficult area because I suppose, a lot of things that might have come under that – now – umbrella are now so commonplace that you don't really think that they're Technology Enabled Learning. I suppose anything that uses electronic media is

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Technology Enabled Learning, really so I suppose it might include things like using links to things on the internet, for example hyperlinks embedded for students in materials you give them, or showing them clips from the internet or websites or Youtube. (Archie, HE lecturer)

For me, because I have looked at this a little bit, some of the theories, like the pedagogical theories, aren't actually changing. The technology is changing, but the theories that underpin that are not. And how we learn, isn't changing. But I think the way we enhance learning is through the student experience. (Elsa, HE lecturer)

In the above reflection, Elsa emphasises wider pedagogical processes to the detriment of TEL. These wider processes reveal the professional factors that are influencing TEL in higher education within the research population.

Concluding discussion

The importance of providing a 'research-informed knowledge base' for pedagogy is recommended by Leask and Younie (2013, 274 cited in Ingleby 2015, 152). The challenges involved in providing this shared 'knowledge base' informed by 'research' are revealed by the 23 practitioners in this research sample. Leask and Younie (2013, 282) rightly argue that the provision of a national/international e-infrastructure shaped by practitioners will enrich pedagogy with technology across educational contexts. The research participants in this paper reveal some of the challenges that are present in the development of a national/international e-infrastructure. There are complex personal factors influencing pedagogy in higher education in this area. 'Deia' and 'Tristan' reflect more on their personal interpretations of pedagogy in higher education and less about the importance of TEL. Their views appear to be influenced by personal experiences of pedagogy in higher education. 'Deia' and 'Tristan' reveal that professional development in TEL depends on addressing personal interpretations of pedagogy. These reflections

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are generated from the personal philosophies of pedagogy within the research respondents.

Harland and Kinder (2014, 672) argue that it is important to consider 'affective outcomes' (emotive factors associated with professional work) if we are to be successful with professional development initiatives in education. The research participants in this study reflect on 'affective outcomes' influencing their pedagogy with TEL. The research participants reveal what Harland and Kinder (2014, 673) refer to as 'zones of uncertainty' in their interviews. The participants outline some of the social factors influencing TEL. 'Jane' and 'Guy' are not confident about TEL. We argue that these research participants have not been socialised into a world of technology. 'Guy' does not know why he is unable to apply TEL effectively. We argue that the necessary social experiences using TEL are not evident for these research participants. This results in a negative perception of TEL. A wish to be able to do more, and a crisis of confidence in using TEL are revealed by 'Jane' and 'Guy'.

We argue that Leask and Younie's (2013, 280) recommendation of providing an 'online environment' of shared teaching resources for pedagogy with technology needs careful consideration. It may be beneficial to provide a 'resource' to enable practitioners to 'move between different communities in the same environment' (Leask and Younie 2013, 280). It may also be beneficial to use this 'technology resource' so that educators can network with peers about pedagogical technology issues. It is, however, important to ensure that resources for TEL take into consideration the professional factors influencing pedagogy with technology. The research participants in this paper reveal some of these professional factors influencing TEL in higher education. 'Rachel' and 'Helen' reflect that the interpretation of pedagogy that is propagated by their professional environment influences pedagogy with technology. Both of these

participants consider the interpretation of pedagogy that is held by their HEI. This becomes a key consideration in their professional work. 'Rachel' and 'Helen' listen to the vision of teaching and learning that is disseminated within their HEI. They appear to be less influenced by the views of policymakers who are external to the University sector. We argue that it is too simplistic to assume that making resources for professional development in TEL available online will enhance professional development in this area. The practitioners in the research sample comment more on the impact of shared understandings of pedagogy within their University settings and less on policymakers recommendations to apply TEL. Ingleby (2016) argues that it seems likely that the current government in England will continue to support TEL (Conservative Party Manifesto 2015, 34). 'Archie' and 'Elsa' are less than convinced about the merits of this agenda. This appears to be based on their professional experiences of using technology for pedagogy. We may have produced a 'brave new world' of TEL in higher education. Its effectiveness can, however, be questioned if we listen to the research participants in this paper.

References

Bennett, E., 2012. *Learning from the early adopters: web 2.0 tools, pedagogic practices and the development of the digital practitioner.* Huddersfield: University of Huddersfield.

Bers. M., 2008. *Blocks to robots: learning with technology in the early childhood classroom.* New York: Teachers College Press.

Blunkett, D., 2000. Greenwich speech. Available from:http://www.cms1.gre.ac.uk/dfee/#speech [Accessed 20th July 2015].

Brown, C., Lan, Y., and In Jeong, H., 2015. Beginning to entangle the strange coupling of power within a neoliberal early education context. *International journal of early years education,* 23 (2), 138-152.

Bryman, A., 2012. *Social research methods.* Oxford; Oxford University Press.

Cohen, L., Manion, L., and Morrison, K., 2011. *Research methods in education.* Abingdon; Routledge.

Conservative Party Manifesto. 2015. Strong leadership, a clear economic plan, a brighter more secure future." Available from: https://www.conservatives.com/Manifesto [Accessed June 1st June 2015].

Dillon, J., and Reid, A., 2004. Issues in case-study methodology in investigating environmental and sustainability issues in higher education: towards a problem based approach? *Environmental educational research,* 10 (1), 23-37.

Drotner, K., Siggaard Jensen, H., and Christian Schroder, K., 2008. *Informal learning and digital media*. Newcastle: Cambridge Scholars Publishing.

Easton, K.L., Fry-McCornish, J., and Greenberg, R.., 2000. Avoiding common pitfalls in qualitative data collection and transcription. *Qualitative health research,* 10, (2) 703-707

Flick, U., 2014. *An introduction to qualitative research.* London; Sage.

Geertz, C., 1995. *After the fact: two countries four decades and one anthropologist*. Cambridge MA: Harvard University Press.

Goldberg, A., Russell, M., and Cook, A., 2003. The effects of computers on students' writing: a meta-analysis from 1992-2002. *Journal of technology learning and assessment,* 2 (1), 1-52.

Guri-Rosenblit, S., and Gros, B., 2011. E learning: confusing terminology, research gaps and inherent challenges. *Journal of distance education,* 25 (1).

Harland, J. and Kinder, K., 2014. Teachers' continuing professional development: framing a model of outcomes. *Professional Development in Education,* 40 (4), 669-682.

Hennink, M., Hutter, I., and Bailey, A., 2011. *Qualitative research methods.* London, Sage.

Ingleby, E., 2015. The impact of changing policies about technology on the professional development   needs of early years educators in England. *Professional development in education,* 41 (1), 144-158.

Ingleby, E., 2016. 2016. 'We don't just do what we're told to do!' Exploring pedagogical technology development needs. *International journal of early years education*, 24 (1), 36-49.

Jones, R., 1980. Microcomputers: their uses in primary schools. *Cambridge Journal of Education,* 10 (3), 144-53.

Kyburz-Graber , R., 2004. Does case-study methodology lack rigour? The need for quality criteria for sound case-study research, as illustrated by a recent case in secondary and higher education. *Environmental educational research,* 10, (1) 53-65.

Kirkwood, A., and Price, L., 2014. Technology enhanced learning and teaching in higher education: what is "enhanced" and how do we know? A critical literature review. *Learning, media and technology*, 39 (1), 6-36.

Leask, M., and Younie. S., 2013. National models for continuing professional development: the challenges of twenty first century knowledge management. *Professional development in education,* 39 (2), 273-287.

Marsh, J., Brooks, G., Hughes, J., Ritchie, L., Roberts, S., and Wright, K.. 2005. *Digital beginnings*: *young children's use of popular culture, media and new technologies.* Sheffield: University of Sheffield Literacy Research Centre.

McFarlane, K., and Cartmel, J., 2012. Circles of change revisited: building leadership, scholarship and professional Identity in the children's services sector. *Professional development in education,* 38 (5), 845-861.

Merriam, S.B., 2009. *Qualitative research: a guide to design and implementation.* San Francisco, CA: Jossey-Bass.

O'Leary, Z., 2014. *Doing your research project.* London; Sage.

Plowman, L., and Stephen, C., 2005. Children, play and computers in pre-school education. *British journal of educational technology,* 36 (2), 145-157.

Prensky, M., 2001. Digital natives. digital immigrants part 1. *On the horizon,* 9 (5), 1-6.

Ryan, M., (2009) Making visible the coding process: using qualitative data software in a post-structural study. *Issues in educational research,* 19, (2) 142-161

Sarantakos, S., 2013. *Social research.* Basingstoke; Palgrave Macmillan.

Stevenson, R., 2004. Constructing knowledge of educational practices from case studies. *Environmental educational research,* 10, (1) 41-51.

Thatcher, M., 1983. Cited in hansard house of commons parliamentary questions- March 29, 1983 [40/177-82]. London: Hansard House of Commons.

Tight, M., 2010. The curious case of case study: a viewpoint. *International journal of social research methodology,* 13, (4) 329-339.

Thomas, G., 2011. *How to do your case study: a guide for students and researchers.* Thousand Oaks, CA: Sage.

Trowler, P., 2008. *Cultures and change in higher education. Theories and practice.* Basingstoke: Palgrave Macmillan.

Wild, P., and King, P., 1999. Education and IT policy: virtual policy? In *Education policy and contemporary policy*, edited by J. Demaine, Basingstoke: Macmillan Press, 175-195.

Yelland, N., and Kilderry, A., 2010. Becoming numerate with information technologies in the twenty-first century. *International journal of early years education,* 18 (2), 91-106.

Yin, R.K., 2009. *Case study research.* Design and methods. London; Sage

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