

13049 CIEC REVISED Manuscript

ACCEPTED FOR CIEC 16(2) FINAL VERSION

Digital literacy practices and pedagogical moments, human and non-human intertwining in early childhood education

Author: Tove Lafton

Address: Oslo and Akershus University College of Applied Sciences

Faculty of Early Childhood Education

Pb 4 St Olavs plass

0130 Oslo

Norway

Email: tove.lafton@hioa.no

Phone: +47 970 13 199

Current position: phd-scholar

Assistant professor Tove Lafton is interested in digital literacy, pedagogical practices and leadership in early childhood education. She has conducted ethnographic studies and collaborative action research with preschool teachers in Norwegian kindergartens. Her research examines how action and reflection connect to make changes in pedagogical practices. Her current work explores the development of digital practices in early childhood education.

Correspondence: Assistant Professor Tove Lafton, Faculty of Early Childhood Education and Care, Oslo and Akershus University College of Applied Sciences, P.O.Box 4 St Olavs plass, 0130 Oslo / Faculty of Educational Sciences, University of Oslo, P.O.Box 1092, Blindern, 0317 OSLO
tove.lafton@hioa.no

Keywords: actor network theory, digital practice, early childhood practitioners, ethnography, event, forces

Digital literacy practices and pedagogical moments, human and non-human intertwining in early childhood education

Abstract

Various forms of digital devices have established themselves as resources within constructions of professional practices in early childhood education. This article is centred on the question of how we might rethink an example of digital practice based on a Foucauldian understanding of discourse and a rhizomatic understanding of digital practice through the actor network theory. The article puts forth several theoretical arguments to examine data illustrating recurring situations from an ethnographically inspired fieldwork in Norwegian kindergartens. Acknowledging how material agency destabilises human knowledge, the final section of the paper presents the Deleuzian concept of ‘event’ to examine some elements that evoke forces and actions in the network. The article argues that the potential of these forces can both open up pedagogy in relation to digital practices, as well as challenge notions of agency when non-humans are understood as actors.

Introduction

During the last decade, digital resources, from computers and cameras (Good, 2005) to iPads and smartboards (Guðmundsdóttir & Hardersen, 2012; Yelland & Gilbert, 2012), have established their presence within early childhood practice. This article explores some repercussions of extending digital literacy practices amongst early childhood practitioners, by paying attention to the relationship between human and non-human actors.

The understanding of ‘actor’ is built on the notion of actant (Latour, 2005). With this understanding, an actor can be either human or non-human because acting is not linked to intentions. Instead, the actor becomes an actor when making others act or making a difference in the network (Latour, 2005). The term ‘network’ is used similarly to rhizome (Deleuze & Guattari, 1987) and can be described as the web of traces left behind by moving agents (Latour, 2005). The network is constantly remaking itself. Still, in empirical work, the network is traced as point-to-point connections, also leaving empty spaces that are similar to masks in a net (Deleuze and & Guattari, 1994). By locking in place moments of digital practice, the network is a concept and a tool to identify and spot, without claiming to represent, a picture of what is ‘out there’.

An ethnographic piece of data, illustrating some recurring themes and situations that have

been encountered while undertaking an ethnographic study in three Norwegian kindergartens, is employed in the discussions. Reading the data as a series of open-ended systems in interaction with the environment (Lenz Taguchi, 2012) opens up a range of theoretical frames, thereby raising various questions concerning the complexities of practice. I argue that by expanding our understanding of digital literacy practices beyond individual digital competencies (Krumsvik, 2012) and acknowledging material agency and rhizomatic learning activated within networks (Latour, 2005), it becomes possible to challenge familiar conceptual ideas of practice in early childhood education.

The article begins by offering a landscape in which to situate the data before presenting it. To allow multiple entry and exit points, the data is understood as an assemblage. An assemblage is considered as a composition of bodies, both human and non-human, in a constant relationship (Deleuze & Guattari, 1987). I highlight how Foucault's (1972) work in relation to discourse and at the same time, the actor network theory (ANT) (Latour, 2005), can function as entrances into examining literacy practices. In the final section of the paper, the concept of 'event' (Deleuze & Guattari, 1987) is introduced. Working with the concept of 'event', understood as passing moments of chaos and creating new connections in the assemblage, I observe a conceptual space emerge, which I consider the creative work of forces and their implications for practice. Important theoretical elements are further elaborated as they enter the discussion.

Location of the fieldwork

In order to examine digital practices, I undertook fieldwork over a five-month period. The three kindergartens in which the study took place were selected because they had used digital devices in working with children before the fieldwork was conducted, and they all had at least one preschool teacher.¹ The early childhood practitioners who are featured in the data are all well-integrated, established staff members with several years of experience working in Norwegian kindergartens.

In Norway, children attend kindergarten between the ages of 12 months and 6 years. On average, children spend around 35 hours per week in kindergarten. The children featured in the data were between four and six years old, and each had spent more than six months in kindergarten. Consequently, they were familiar with the habits and routines of the institution. The children had various socioeconomic and cultural backgrounds. In the analysis, I have deliberately chosen not to connect the children to either gender or background, based on the

assumption that processes in a learning environment do not rely on the individual characteristics of the young participants (Nordahl, 2005). Instead, the analysis focuses on actions performed, evoking forces in the actual network.

As a researcher, I used a range of methods in the fieldwork. When present in the kindergartens, I focused my ethnographic gaze on actions and talks involving adults using digital devices together with the children, assuming that digital elements must be present in digital practices (Lafton, 2012). My findings were brought back to the practitioners in reflective talks. In this article, I draw on field notes but also refer to some interview data.

Examining digital practice

Digital practice is inextricably linked with digital literacy. Digital literacy is a broad term, and its definitions and applications include a range of trans- and interdisciplinary research agendas (Gee, 2010). Early approaches to digital literacies focused on individual competencies and skills (Krumsvik, 2012; Wilber, 2010), corresponding with an understanding of practice where actions are enacted by practitioners and demand in-the-moment decisions concerning moral, ethical and tradition-oriented dilemmas (Kemmis & Smith, 2008; Lafton, 2012).

However, in this paper, I draw on understandings of practice and digital literacy beyond an individual skill; rather, the concept is understood as located within and emerging from social networks (Latour, 2005). Thus, while competence in digital literacy can be measured, current conceptualisations of the phenomenon perceive it as a more complex and advanced skill that makes the creative and critical use of digital tools and media possible (Erstad, 2010). As Erstad noted, the development of digital technologies ‘changes our conceptions of text, of readers and writers and ultimately of literacy itself’. Erstad (2010, p.60) continued, ‘This implies that media literacy relates to changes in traditional cultural techniques, like reading and writing, and yet meanwhile opens up new dimensions’ (p. 60). In order to think about some ‘new dimensions’, I refer to data from an episode that took place in an indoor area of one of the kindergartens.

When writing about this data, I have chosen pseudonyms – Nicole and Violet – for the adults, but not for the children. This is a deliberate staging to encourage you, the reader, to focus on and perhaps even get close to the adults rather than the children. One might argue that this creates a binary because it makes the adults more recognisable and thereby more important in the episode. However, in naming the adults, I attempt to create an entrance into

the network and the subsequent analysis. This approach resonates with the overall aim of the ongoing research project to investigate how early childhood practitioners construct and are being constructed in terms of their digital practices.

Wooden, human and technological entanglements

Nicole is sitting at the end of a large wooden table in the main room. In front of her is a large wooden jigsaw puzzle containing all the letters of the alphabet. Four children aged 5 and 6 are placing the letters in the puzzle, and Nicole follows up by asking questions about the letters and contextualising them by referring to names and objects in the room. On the other end of the table is a laptop with cables on top.

Violet enters the room, smiles and says 'hello' before heading for the laptop. She connects the cables, opens the laptop and pushes the power button. An adult from one of the other departments of the kindergarten enters the room and poses some questions to Violet. Violet leaves to discuss how they will organise the day, considering the lack of personnel.

Two of the children slide away from Nicole on the wooden bench on their bottoms and position themselves in front of the laptop. They sit close together, watching the screen. Suddenly, the laptop starts playing banjo music. The screen remains dark blue. No written instructions appear. The banjo music continues playing. Nicole looks across the table; her gaze travels from the laptop to the children next to it. They look back and shrug their shoulders. Nicole walks over to the children, stops behind them and looks at the screen. 'Did the computer start playing all by itself?' she asks. None of the children glance up at her. They look at each other and then continue watching the screen. Nicole stands still, staring at the screen and holding her hands clasped tightly behind her back.

Violet returns to the room and moves towards the table. 'Everything ok?', she asks in a light tone. 'The computer started playing all by itself', Nicole says, making movements as if she is playing the banjo. Violet laughs, and Nicole smiles back. 'That happens from time to time. The computer was probably not shut down properly the last time'. Violet then types on the keyboard, and the sound of the banjo stops.

Nicole walks over to the other end of the table again. She collects the pieces from the puzzle and two books, bends over the table and says something to the children sitting there. Two of them nod and stand up. They follow Nicole into the room next door. The third child walks over to sit with Violet and the others. The computer shows the welcome window, and one of the children begins exploring to find out where to put the memory card from the camera.

Making sense of the data

A relatively traditional way of making sense of data is to look for and develop codes and categories that emerge from the data in order to both reveal and identify prominent themes (Denzin & Lincoln, 2011). A significant amount of qualitative research in relation to digital work within the context of the early years of education, both in Norway and other parts of the world, is based on these methodologies (Jernes et al., 2010; Lindahl & Folkesson, 2012; Ljung-Djärf, 2004; Stephen & Plowman, 2008). Preliminary analysis in this project followed these strategies as well. Ethnographic material was categorised and cross-case thematised, following the work of Boyatzis (1998), in order to reveal patterns and identify themes (Lafton, 2012).

The patterns and prominent themes that emerged from the preliminary analysis appeared as binaries. The themes represented in the example used in this article are: traditional/digital tools, adult-led/child-led learning, child as receiver/co-constructor of knowledge, and pedagogical and digital knowledge/non-pedagogical and digital knowledge/pedagogical and non-digital knowledge/non-pedagogical and non-digital knowledge.

In thematising and categorising the material, I became aware of my involvement in ‘separating out’ the material by making clear distinctions between one theme and another. Complexities within moments of practices were reduced to discrete elements, which could then be combined into understandable models (Suppe, 1977). While such practices followed a reasonable and rational trajectory, they nevertheless required that much of the messiness of the research, including traces of ambivalence, were sidelined or omitted (Burr, 1995).

When re-reading the material to recall some of the complexities in digital practice, I looked for rhizomatic connections as an assemblage rather than distinctive themes. By tracing the actors in the network, I was viewing the themes, individuals, computer, jigsaw puzzle and other actors’ intra-actions as similar to gears in a complex machinery (Deleuze & Guattari, 2004). The forces and movements of one gear can make another start or stop. By suspending the idea of digital practice as something that could be tied down to an understandable essence of what was occurring, the possibility of perceiving it as an immanent idea, constantly becoming (Deleuze & Guattari, 2004, p. 249), appeared. Following Jackson & Massei’s method (2012), ‘plugging in and out’ of the data using various theoretical approaches was done to investigate some of Erstad’s (2010) ‘new dimensions’ of digital literacy.

Using various theoretical approaches to show how different philosophical concepts relate to practice is clearly a challenge. The theoretical approaches are applied to give insight into how different theorists and associated concepts open up certain understandings and taken-for-granted ideas about practice and early childhood (Jackson & Massei, 2012), and not all relations between epistemological ideas in the approaches used are elaborated. Additionally, earlier understandings of what was happening through the identified themes in the preliminary analysis would affect the rhizomatic readings. This also implies that the data itself can never be 'fixed' and clear, but rather remain open-ended. Given these reservations, the different approaches are used to investigate the episode.

Making sense with discourse

In the spirit of making something happen amongst the actors, I follow the trace that was immediately offered by Nicole and her engagement with the wooden jigsaw puzzle. Turning to Foucault's work regarding discourse (1972), I consider the significance of the material within early childhood education, particularly within literacy.

Similar to the aims of practitioners in other parts of the world, one of Nicole's goals as a practitioner is to improve the language skills of the children and prepare them for the subsequent task of becoming readers. In all three of the kindergartens the study, these goals are outlined in the official framework plan (Norwegian Ministry of Education and Research, 2011) and operationalised in local plans. During the fieldwork, the practitioners often discussed how to work with language and literacy, and they valued their performed practices as good or not so good, relative to developing language skills.

In Nicole's case, we could see her translating the literacy goal into practice by using a wooden puzzle. By allowing the children to handle the wooden letters and talking to them about the letters, their sounds and relationships to actual words, Nicole drew on some of the core beliefs in relation to early childhood education. A holistic approach involving touch, sight and smell can enhance learning. In the ideological history of kindergartens, we find that Fröbel (1980), Montessori (2010) and Steiner (1996) all described wood as a natural material suitable for both play and learning. In more recent publications, wood is described as a material that children ought to have more dialogue with and a tool to be praised because it allows touch and sound and can provoke imagination (Drew & Rankin, 2004; Waterhouse, 2013). Turning to Barthes (1972), we read the following:

Wood does not wound or break down; it does not shatter, it wears out, it can last a long time, live with the child, alter little by little the relations between object and hands. If it dies, it is in dwindling, not in swelling out like those mechanical toys which disappear behind the hernia of a broken spring (p. 54–55).

Hence, we can see how wood is understood as a nonquestionable material during childhood; very seldom is it viewed as dangerous or intimidating as part of the romantic discourse that arguably, still circulates around early childhood (Hendrick, 1997). It poses no threat to the children or to Nicole. Throughout historical and ideological discourses, the alignment of wood helps produce notions of the ‘natural child’, as well as what is ‘natural’ for children to play and work with. As Weedon (1987, p.108) noted, discourses are ‘more than ways of thinking and producing meaning’. She continued:

They constitute the ‘nature’ of the body, unconscious and conscious mind and emotional life of the subjects they seek to govern. Neither the body nor thoughts and feelings have meaning outside their discursive articulation, but in ways of which discourse constitutes the minds and bodies of individuals is always part of a wider network of power relations, often with institutional bases (Weedon, 1987, p. 108).

Nicole is discursively ‘produced’ when her body, thoughts and feelings enables her to govern a situation that is understood as being natural and ordinary because it is so ingrained in practice. Nicole’s fluency in handling the letters, asking the right questions and encouraging the children position her as the knowledgeable adult. She will not only use language but will also be used by language when government documents, as well as specific forms of practitioner-oriented language, infiltrate her words. In brief, Nicole not only becomes synonymous with Foucault’s (1972, 1984) power/knowledge nexus but also echoes Foucault’s assertion that discursive practices ‘systematically form the objects of which they speak’ (1972, p. 49).

When interacting with the children and the puzzle, Nicole created a relational space. Nicole confirmed that she regarded interactions with children as a crucial element of her job. It was through *interacting, listening, talking to and addressing the children* that she felt *she was doing a good job* (reflective talk). This relational space is deeply significant in Norwegian kindergartens, where a pedagogy of care is a core foundation, with the latter being understood as crucial for learning (OECD, 2006, p. 168). Similarly, in the framework plan, adult-child and child-child relationships are emphasised, together with the relationships between amongst care, play and learning (Norwegian Ministry of Education and Research,

2011). These beliefs appear in the development of a learning environment that is different from schools. There are no desks, the material environments are created to encourage collaboration and relationships, and early childhood practitioners seldom use the word teaching; they talk about learning and pedagogical practices instead.

Rhizomatic relationships: human and non-human actors

The discursive entrance using Foucault shows that Nicole had a comfortable relationship with the wooden jigsaw puzzle, which enabled her to perform her practice as a pedagogical literacy type. By introducing the ANT as another theoretical frame with which to examine the data, I aim to pursue this notion of relationship. The ANT (Latour, 2005) destabilises the subject and thereby allows the consideration of both humans and non-humans as participants in practice. By mapping relations amongst humans, materials and discourses, the idea of human agency that is habitually assumed can be reconsidered, allowing us to recognise the forces working between humans and non-humans within a network. By destabilising the subject and investigating the connections involving both humans and non-humans (Latour, 2005), the ANT invites new discussions beyond perceiving practice as solely situated in and between the participating subjects and discourses. Additionally, the perspective welcomes considering every aspect of the process as data (Latour, 2005, p. 143), and the data is also allowed to become an actor in the process. As Latour expresses it, actors are anything that modifies other actors through a series of actions (2004, p. 75). It is not possible to predict exactly how the actors in the field are connected, but they are associated in such a way as to make others act.

However, the ANT cannot be applied to the data such as in a theoretical technology. It is more similar to a sensibility, an interruption or an invention, as a way to sense or draw nearer the phenomenon (Fenwick & Edwards, 2010, p. ix). In following Latour (2005), it is crucial not to be ‘in advance and in place of the actors, [to] define what sort of building blocks the social world is made of’ (p. 41). Turning back to the data, it would be possible for me to move into a linear account. The case of Nicole, who lacked measurable skills concerning the laptop, could be easily remedied with appropriate training aimed at her professional development. However, I suggest that this familiar way of reading the situation is impoverished because it disregards several important aspects in terms of learning and practice.

Regarding the data, the dormant laptop was brought to life through Violet's actions. Putting her mind, hands and the cables into a series of relationships, she interrupted the inactivity of the laptop so that it became powerful. It became a force – a silent one initially – that prompted *two of the children [to] slide away from Nicole on the wooden bench and position themselves in front of the laptop.*

As an actor, the laptop seemed to interrupt the discursive practices in which Nicole and the children were immersed. It beckoned the two children who slid away to approach it. Sliding, as a form of movement, is different from standing up. To slide on one's bottom across a bench maintains the height of the child while simultaneously allowing him or her to glide or maybe slither towards the still-silent laptop. To slide is a less abrupt and obtrusive movement.

Until that moment, Nicole had been an actor encouraging the children to make sounds and think of words. She had stood out as the adult who '[knew] the answers' (Yelland, 2007) and thereby the actions to perform. However, as soon as the computer was turned on, the children chose to act differently. Arguably, as an artefact (Vygotsky, 1978), the laptop could have been accessed at any time, but the relationship with Nicole was such that she maintained the interests of the children. However, it is also possible to argue that by using her power in an asymmetrical relationship between adult and child, Nicole had put the wooden puzzle into action and made it an actor. As a silent actor, the laptop had an insufficient force to attract the children away from the wooden jigsaw puzzle.

Having arrived at the laptop, the two children sat close together, connected to a blue screen. While it was devoid of text or images, the children's eyes were nevertheless drawn to it. Curiously, while the screen was vacant and bare, it conjured something anyway – a power or a force – sufficient to detract from the wooden letters and being with Nicole and the rest of the group. Of course, I cannot state categorically why the children chose to sit close together while watching the dark blue screen. Drawing on my own bodily experiences and thereby making myself another actor makes it possible to recall the comfort and warmth that another body can give. It also becomes possible to remember how another body can offer security. In sitting together to stare at a blank screen, the children might well have been drawing strength from each other to resist a set of discursive practices while waiting for the machine to do something else.

Suddenly, the laptop begins playing banjo music. According to Latour, (2005) a human or non-human becomes an actor when contributing something new to a network. The banjo music contributes sound through the laptop and affects the forces (Massumi, 2002). None of the humans have acted yet; the children are still sitting close together on the bench, their attention focused on the screen. However, the music evoke a chain of actions for Nicole. *Nicole looks across the table; her gaze travels from the laptop to the children next to it.* In early childhood education, the adult gaze is an important way of communicating with children. A gaze can invite or function as a correction. In this episode, it appears as if the gaze functions as a question, but no words are attached to it. The children answer by shrugging their shoulders. This elicits another action; Nicole walkover to the children. It seems fair to assume that Nicole would not have moved if it were not for the banjo music contributing something new and unexpected to the assemblage.

When Nicole talks to the children, she has shifted from asking questions that could have opened up new understandings and connected materials and reality to letters and language. Instead, she poses a direct question: *Did the computer start playing all by itself?* This question also serves as a force in the network. Instead of initiating a conversation about what is going on, the question leads to silence.

Law (1992) stated that knowledge always takes on a material form. If knowledge is always materialised, then it can never be transferred from one context to another, only translated (Barnacle & Mewburn, 2010). Knowledge translation is spoken of, instead of knowledge transfer, to destabilise the notion that knowledge can flow evenly. Knowledge is always oriented towards 'something'. In the data presented, 'working with language' knowledge was oriented towards the jigsaw puzzle. When the unexpected happened and Nicole faced an unfamiliar situation, her body language became more prominent than her spoken language. Her words became silenced by new forces in the network. These forces inhibited her translation of knowledge about open questions and the potential co-construction of meaning with the children in that new situation. Nicole ended up standing still, her hands clasped behind her back. She was removed from the 'adult knows' discourse by encountering something new that she did not know how to handle, and she seemed struck in a way that enabled her to materialise neither digital nor pedagogical literacy. In this way, being literate is not only a product of the practitioners themselves and their active choices but also the practitioners intertwining with others in various networks. It is tempting to ask whether this

incident could have turned into a pedagogical moment if the forces in the network had evoked other feelings and actions in Nicole.

The Deleuzian event

While Deleuze's concept of the 'event' is deeply complex, I nevertheless want to pursue it so as to reconsider the data and rethink practice and literacy. For Deleuze (1993, p. 76), 'events are produced in a chaos, in a chaotic multiplicity'. It is therefore impossible to tie or fix the event within a particular structure or to frame it within a particular analysis. This is recognisable in how the early childhood practitioners talk about practice as a concept. Perceiving practice as an experienced concept (Massumi, 2011) also implies that digital practice as an event resists temporality, so traditional methods of ordering are denied to us. In Deleuze's terms, the meaning of an event is to be produced by new machineries, and digital practice consists of those passing, in-the-moment actions. The co-construction and meaning making in the assemblage will in this way change based on the forces appearing throughout the event, and the process will not only rely on the humans involved but rather on the inextricable entanglement with the non-humans.

Deleuze & Guattari (1994, p. 11) claimed that such experimentation is a form of thinking. Nicole, the children, the jigsaw, the laptop, the music, Violet, the desk, the bench, the sliding bottoms, as well as those things that are invisible but nevertheless present, such as the discourses, altogether create the rhizome of practice. Thinking of the data as an event means that the objects are no longer bounded; rather, they are a layering of movements and moments. Similar to the event, the data is an assemblage in constant mutation and movement.

And so...

Thinking of the data in constant flux first enables us to recognise that as researchers, we are trained to write about some concepts and issues but not others. In part, this paper has attempted to suggest that there are inconvenient realities that we do not necessarily perceive (Massumi, 2002) in relation to practice. Making ourselves sensitive to them is perhaps the first step in creating a necessary conceptual space in order to think differently about digital literacies and practices.

In returning to the data, we might be tempted to think of Nicole's practice as 'hers' (Kvernbekk, 2012), something that is under her control. It would thus become her responsibility to 'do' something to develop her literacy practices in order to include digital

resources, as well as more traditional materials. However, an understanding of practice as intra-action, in which digital tools, the child and human agency are intertwined and in movement with one another continuously (Lenz Taguchi, 2010), implies that improving practice must resonate with and be sensitive to all the components of the assemblage.

As Zoumazi & Massumi (2002) argued, the complex interrelations of the elements create an uncertainty that can actually be creative inventions. Similar to opening to experiment rather than focusing on success or failure in digital literacy practices, considering practice as a series of intertwinings leads to an inability to identify the particular aspects of actions that have to be developed.

In reviewing the data, it would be straightforward to suggest that Nicole could have asked a better or more thoughtful question than *Did the computer start playing all by itself?* However, in her relationships with both the machine and the children, all parties are understood non-hierarchically as actors that are in a relationship with one another. Thus, instead of paying attention to how successful the question turned out, an alternative is to observe the sense of potential in the situation. The sensibility of what forces are playing may offer practitioners new ways of thinking about practice (Deleuze & Guattari, 1994).

By investigating practice through the ANT, neither the discourse, the surroundings nor the humans and non-humans alone constitute actions. Rather, it is the relationships in between that eventually matters. No clear border exists between discourse and materiality, and in the rhizome, they function as nonhierarchical (Lenz Taguchi, 2010). Advancing towards a more flexible understanding of practice allows us to consider the relationships between both human and non-human actors. The intertwining described above implies that we can no longer remove one aspect when investigating and working to improve pedagogical practices. Because of the tangled net of actions, discourses, materiality and knowledge, practice is messy, and the participants do not necessarily know where an action begins or ends.

I propose the idea that pedagogical moments rely on both non-human and human agency. When creating a symmetry between human and non-human, one consequence is that acquiring skills entails more than the input received by the children through connecting with an adult's knowledge. Learning rather relates to how non-humans make the participants act and engage in the processes, and what forces are evoked in the event. When tools, both digital and non-digital, appear as actors, they participate in creating pedagogical moments and lead to understanding agency as fluid. Some of the nodes in digital literacy practice are about digital skills, but they are also about more. Their scope extends to dynamic engagement and

interactions that potentially transform the actors. Perceiving practitioners as gears in a machine means that practice will evolve when the practitioners connect to the rest of the machinery, as opposed to when they do not.

References

- Barad, K. (2007) *Meeting the Universe Halfway: quantum physics and the entanglement of matter and meaning*. Durham: Duke University Press.
- Barnacle, R. & Mewburn, I. (2010) Learning Networks and the Journey of ‘Becoming Doctor’, *Studies in Higher Education*, 35(4), 433–444.
- Barthes, R. (1972) *Mythologies*. New York: The Noonday Press.
- Boyatzis, R.E. (1998) *Transforming Qualitative Information: thematic analysis and code development*. Thousand Oaks: Sage Publications.
- Burr, V. (1995) *An Introduction to Social Constructivism*. London, New York: Routledge.
- Deleuze, G. (1993) *The Fold*. London: The Athlone Press.
- Deleuze, G. & Guattari, F. (1987) *A Thousand Plateaus*. Minneapolis: University of Minneapolis.
- Deleuze, G. & Guattari, F. (1994) *What is Philosophy?* London, New York: Columbia University Press.
- Deleuze, G. & Guattari, F. (2004) *Anti-oedipus*. London: Continuum.
- Denzin, N.K. & Lincoln, Y.S. (Ed.) (2011) *The SAGE Handbook of Qualitative Research*. Thousand Oaks: Sage Publications.
- Drew, W.F. & Rankin, B. (2004) Promoting Creativity for Life Using Open-ended Materials. In *Young Children*. http://www.rediscovercenter.org/pdf/promoting_creativity1.pdf
- Erstad, O. (2010). Content in Motion: remixing and learning with digital media, in K. Drotner & K. C. Schrøder (Eds.) *Digital Content Creation. Perceptions, Practices & Perspectives*. London: Peter Lang Publishing Group.
- Fenwick, T. & Edwards, R. (2010) *Actor Network Theory in Education*. New York: Routledge.
- Foucault, M. (1972). *The Archaeology of Knowledge* (A.M. Sheridan Smith, Trans.). New York: Pantheon Books.
- Foucault, M. (1984) *The History of Sexuality. 1: an introduction*. Harmondsworth: Penguin.
- Fröbel, F. (1980) *Småbørnspædagogik. Udvalgte tekster*. København: Nyt nordisk forlag.

- Gee, J.P. (2010) Digital Media and Learning as an Emerging Field, Part I: how we got here, *International Journal of Learning and Media*, 1(2), 13–23.
- Good, L. (2005) Snap It Up! Using Digital Photography in Early Childhood, *Childhood Education*, 82(2), 79–85.
- Guðmundsdóttir, G.B. & Hardersen, B. (2012) *Småbarns digitale univers, 0-6-åringers tilgang til og bruk av digitale enheter på fritiden* [The Digital Universe of 0-6-year-olds, Access to and Use of Digital Devices in Young Children's Free Time]. Report, Oslo: Centre for ICT in Education.
- Hendrick, H. (1997) *Children, Childhood and English Society, 1880–1990*. Cambridge: Cambridge University Press.
- Jackson, A. & Masei, L.A. (2012) *Thinking with Theory in Qualitative Research: viewing data across multiple perspectives*. New York: Routledge.
- Jernes, M., Alvestad, M. & Sinnerud, M. (2010) “Er det bra, eller?” Pedagogiske spenningsfelt i møte med digitale verktøy i norske barnehager. *Nordisk barnehageforskning*, 3(3), 115–131.
- Kemmis, S. & Smith, T.J. (2008) Praxis and Praxis Development: about this book, in S. Kemmis & T. J. Smith (Eds.) *Enabling Praxis: challenges for education*. Rotterdam: Sense.
- Krumsvik, R. (2012) Teacher Educators' Digital Competence, *Scandinavian Journal of Educational Research*, 1-12.
- Kvernbekk, T. (2012) (unpublished) *My Practice. Our Practice*. Oslo: University of Oslo.
- Lafton, T. (2012) How Early Childhood Practitioners Build, Shape, and Construct their Digital Practices: the search for an analytical space, *Nordic Journal of Digital Literacy*, 3, 172–186.
- Latour, B. (2004) *The Politics of Nature: how to bring the sciences into democracy*. London: Harvard University Press.
- Latour, B. (2005) *Reassembling the Social. An Introduction to Actor Network Theory*. New York: Oxford University Press.
- Law, J. (1992) Notes on the Theory of the Actor-Network: ordering, strategy and heterogeneity. *Systems Practice*, 5, 379–393.
- Lenz Taguchi, H. (2010) Rethinking Pedagogical Practices in Early Childhood Education: a multidimensional approach to learning and inclusion, in N. Yelland (Ed.) *Contemporary Perspectives on Early Childhood Education*. Berkshire: Open University Press.
- Lenz Taguchi, H. (2012) A diffractive and Deleuzian approach to analysing interview data. *Feminist Theory*. Vol 13(3) 265-281.

- Lindahl, M.G. & Folkesson, A.-M. (2012) ICT in Preschool: friend or foe? The Significance of Norms in a Changing Practice, *International Journal of Early Years Education*, 20(4), 422–436.
- Ljung-Djårf, A. (2004) *Spelet runt datorn: Datoran- vändande som meningsskapande praktik i förskolan* (Doktorsavhandling). Malmö Högskola. Lärarutbildningen.
- Massumi, B. (2002) *Parables for the Virtual: Movement, Affect, Sensation*. Durham: Duke University Press.
- Massumi, B. (2011) *Semblance and Event: Activist Philosophy and the Occurent Arts*. Massachusetts: Massachusetts Institute of Technology.
- Montessori, M. (2010) *The Montessori Method*. Blacksburg: Earth Angels Books.
- Nordahl, T. (2005) *Læringsmiljø og pedagogisk analyse*. Rapport 19/05. Norsk Institutt for forskning om oppvekst, velferd og aldring (NOVA).
- Norwegian Ministry of Education and Research (2011) Framework Plan for the Content and Tasks of Kindergartens.
http://www.regjeringen.no/upload/KD/Vedlegg/Barnehager/engelsk/Framework_Plan_for_the_Content_and_Tasks_of_Kindergartens_2011.pdf [25.02.2012]
- OECD (Organisation for Economic Co-operation and Development) (2006) *Starting Strong II: early childhood education and care*. Paris: OECD.
- Steiner, R. (1996) *The Education of the Child and Early Lectures on Education*. New York: Anthroposophic Press.
- Stephen, C. & Plowman, L. (2008) Enhancing Learning with Information and Communication Technologies in Pre-school, *Early Child Development and Care*, 178(6), 637–654.
- Suppe, F. (Ed.) (1977) *The Structure of Scientific Theories*. Urbana: University of Illinois Press.
- Vygotsky, L.S. (1978). *Mind in Society: the development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- Waterhouse, A.-H. (2013) *I materialenes verden*. Bergen: Fagbokforlaget.
- Weedon, C. (1987) *Feminist Practice and Poststructuralist Theory*. Oxford: Blackwell Publishers.
- Wilber (2010) Special Themes Issue: beyond “new” literacies, *Digital Culture and Education*, 2(1), 1–6.
- Yelland, N.J. (2007) *Shift to the Future: rethinking learning with new technologies in education*. New York: Routledge.
- Yelland, N. & Gilbert, C. (2012) *iPlay, iLearn, iGrow*. Melbourne: Victoria University.

Zoumazi, M. & Massumi, B. (2002) Navigating Moments, in M. Zoumazi (Ed.) *Hope: New Philosophies for Change*. New York: Routledge.

¹In Norway, the law states that the kindergarten staff should include one preschool teacher per 7–9 children aged 0–3 or per 14–18 children aged 3–6. Many kindergartens do not have enough educated personnel, compared to the number of children. In this article, all the employees are called early childhood practitioners, including the preschool teachers.