MATERIALITIES, MULTILITERACIES AND MAKERSPACES

Aspa Baroutsis and Annette Woods

Introduction

With increasing digitisation and multimodality, text production forms a key element of what it means to be literate in today’s literate culture where interactions between children and young people and digital texts, tools and resources are embedded in everyday practices. This shift, along with changes to work practices and the economy, has also resulted in text production becoming a more collaborative practice. When we think about literacies for current times, we usually think about multimodality and digital technologies. Digital tools, resources and technologies have had a radical effect on how we produce texts, how we communicate with each other, the kinds of interactions we can have – the very social organisation of the spaces in which we engage. When we acknowledge this, we are acknowledging that everyday life involves an entanglement of social with material; human with non-human; technological and non-technological. These sociomaterial ways of thinking challenge our preoccupation with single individuals using literacy tools (Fenwick et al., 2011) whether traditional print or digital, in order to get things done. From this way of thinking, ‘technology’, in whatever form, is valuable, meaningful and worth studying as people actually engage with it to get things done. But we move beyond being interested just in what a young child can ‘do’ with technology, toward thinking about how the material, as well as the discursive and the virtual, works with the human and non-human world. This is the key contribution of sociomaterial theories (Fenwick et al., 2011) as ‘human’ is decentred and so knowledge is no longer conceptualised as inseparable with humans.

In this chapter we consider literacies and learning to be literate for current times and thinking, and then present data from one study of how children learn to write and produce texts in their early school years. We highlight data collected as part of one design-based research project from the larger study, where teachers and researchers worked together to plan and implement a series of lessons which began with opportunities for children to engage in makerspace activities, before moving to produce texts in other modes. We are particularly interested in the materiality of these activities and how they shifted the roles of children and adults in the classroom space.
Reflecting on literacies for current times: foregrounding text production

Much has been written about the changing nature of literacies as we adapt to being literate in the complexities of current times. The New Literacy Studies (see for example Gee, 1996; Heath, 1983; Street, 1993) brought to the fore understandings of how texts produced by people were linked to the everyday practices in which they engaged. It is within these foundational ideas that we find the beginnings of our understandings of multimodality. In putting forward a pedagogy of multiliteracies, the New London Group (1996) extended thinking about literacy pedagogy in light of multimodality and new social, economic and political spaces. Central to their theorising are the links between literate practice and our civic, work and leisure lives.

The shifts in thinking about literacies though, are about more than literacy as a social practice and multimodality. Instead, they also involve shifts between the receptive and productive dimensions of literacy. Brandt (2015) explains that while the implications of the shift to digital ways of working has been foregrounded as instrumental in our understandings of literacies, there has been a subtler shift that is highly relevant to educators and to education systems and society more generally – although to date, one that has been largely ignored. This shift, to use Brandt’s term, is the rise of mass writing. With the shift from an industrial state focused on manufacturing things, toward a knowledge state that relies on production and supply of services, texts and information become both the fundamental means of production and the most likely output of the production cycle.

As a result, our society has moved to an increasingly sharp focus on writing rather than reading as the foundation of being literate (Brandt, 2015). Writing and text production are now paramount to all that we do. This is different from even our recent past where there has been an assumption that ‘readers would be many and writers would be few’ (Brandt, 2015, p. 3). What it means to ‘be’ literate in today’s society across many dimensions of our economic, social and political lives, involves the ability to produce texts, unlike previous historical periods of time.

As educators we should be interested in what happens when everyday literate experience is about writing as well as reading. As such, text production must take up a more equal or balanced place in our understandings of literacy, and this will require shifts in our understandings of the partnership between the receptive and productive dimensions of literacy. The challenge for educators is to ensure our social institutions, tasked with preparing children and young people for learning, work and leisure, catch up with these changes, and that curriculum teaching and learning parallels this shift in literate practices (Brandt, 2015). Current education research has ensured that we know less about writing and text production and how people learn to write, than we do about reading and the receptive dimensions of literacy. Current debates about literacy and literacy policy continue to focus on reading and phonics or decoding, and less on writing and text production (see for example the recent edited collection by Clark, 2017). We also know little about how writing is impacted upon by the current situation in classrooms, where old and new technologies are often drawn together for a variety of purposes, or about the implications of considering writing as a collective or collaborative process, rather than an individual one.

In Australia at least, we do know that children often do better at learning to read than they do at learning to write. Students’ writing performance is regularly reported to lag behind reading, despite significant resources being focused on possible solutions to this gap in achievement. Here, we use an Australian example to demonstrate our point. On standardised measures of literacy such as the National Assessment Program – Literacy and Numeracy¹ (NAPLAN) there is traditionally a gap in all cohorts between writing and reading. While 2017 saw improvements in writing as compared to reading for children in year 3 (ACARA, 2017), as children spend more time in school the
gap between reading and writing increases. By year 9, 10% fewer young people meet the minimum standard in writing than they do in reading (81.5% in writing as compared to 91.7% in reading reach minimum standard) (ACARA, 2017). Outcomes are even lower for Aboriginal and Torres Strait Islander students and those in remote areas, where the attainment of National Minimum Standard in writing of year 9 students is as low as 30.5% (ACARA, 2017) in some instances. Of course, these standardised measures are only one way of thinking about writing, and they focus only on print-based text production, but they provide some insight into performance levels of children in learning to write that warrants additional investigation. There is also evidence that this is not an issue specific to Australia. In a recent report of writing outcomes of children in primary school, Fischer and colleagues (Fisher & Twist, 2010) claimed that literacy data collected as part of accountability initiatives in the UK provided evidence that standards in writing trail reading and that there are concerns ‘pupils are leaving primary school without necessary skills to flourish in the secondary system’ (p. 14). Whether children and young people are learning to write and produce texts well in classrooms or not, we do know that they are being expected to use the skills of writing and text production to demonstrate competence in all other dimensions of schooling life, every school subject and most assessment tasks. Writing and text production matter in schools because of their role in demonstrating skills, understandings and knowledge across all disciplines. This heightens the importance of learning to successfully write and produce texts in schools.

So, as mass literacy has become more focused on the productive dimensions of literacy, digital tools and ways of working have shifted the relationship between text production and print. Therefore, it is important to think more about how children and young people are being taught, and how they learn to be producers of texts. Additionally, educators need to think about literacy as a material practice as well as a social practice (Kuby et al., 2015; Kuby & Rucker, 2016). In the rest of this chapter we further unpack these ideas and provide examples of how these things might come together in classroom spaces.

Working with teachers to reconceptualise literacy theory and pedagogy: methodology and conceptual thinking

The data presented here is drawn from a larger project which investigates what it means to learn to write and produce texts in the early years of school, when growing up in communities of high poverty. In this project, our focus was to think about socially just literacy education, so our research is located in communities of high poverty where access to new technologies, resources and tools continues to be problematic in at least some school contexts. The aim of the larger project was to find out more about how schools were dealing with what it means to teach young children how to write and produce texts, and to problematise the relationship between learning to write traditional texts and producing texts using digital technologies.

Material changes to text production and how we use texts to communicate with others (and how we learn to do these things) have pedagogical implications. We argue that it is not useful to separate engagements with print texts from those with digital texts, and as such, nor is it useful to separate our ways of working or researching them. We know that print texts have certainly not been made redundant by digital technology, but we are interested to know more about the implications of material changes brought about when new and old technologies sit on the same school desks, and when children look toward whiteboards and smartboards more often than blackboards and butcher’s paper. Our interest is in how this changes how children are, and could be, learning to write and produce texts in schools.

To investigate these ideas further we need first to conceptualise three approaches that inform our work. We begin by detailing our thoughts on design-based experiments as a way to support
research partnerships between teachers and researchers in classrooms. We also lay out our thoughts on sociomaterial understandings of literacy, before briefly discussing makerspace as a pedagogical approach.

**Design-based experiments**

Gutiérrez and Jurow (2016) suggest that when researchers work with teachers on projects such as design-based research experiments, we are able to ‘promote social equity and learning’ that can expand and transform the ‘educational and social circumstances’ of communities (p. 565). As such, design-based experimental methodology provides an approach that supports the underlying social justice imperatives of our work. By working with researchers, teachers can develop an ‘inquiry stance’ (Cochran-Smith & Lytle, 2009) that can span their careers. This approach allows for experiences, knowledge and interactional expertise to build and generalise beyond specific contexts, and for a worldview that is connected to broader social formations and agendas. These formations include a focus on social justice and achieving quality literacy pedagogy for children growing up in communities of high poverty.

This empirical chapter provides an example of design-based research that was centred on a technological intervention to improve the writing of 6–7-year-old children in one classroom setting. We used design-based experiment methods that recognise the importance of researchers collaboratively working with teacher practitioners to improve teaching and learning. The purpose of this approach was to highlight links between designing quality pedagogy and conceptualising theories about how teaching and learning literacy occurs. In this instance, we were acutely interested in how children learn about writing, but also how literacy is taught to facilitate this learning. In the examples provided later in this chapter, the researchers support the teacher in developing and implementing an instructional intervention (Bradley & Reinking, 2011) with the goal of motivating children to write, by considering links between making meaning through production of texts across a range of modes and with a range of materials.

We draw on the work of Cobb et al. (2003) and their strategies for implementing design-based experiments that ‘result in greater understanding of a learning ecology – a complex, interacting system involving multiple elements of different types and levels – by designing its elements and by anticipating how these elements function together to support learning’ (p. 9). Design-based research is framed by the notion that ‘systematic and disciplined inquiry into real problems in authentic classrooms is vital to developing workable solutions to support teachers if they are to implement instructional practices that benefit children’ (Bradley & Reinking, 2011, p. 305). Importantly, when researchers and teachers work collaboratively on authentic classroom inquiries they ‘close the gap between research and practice’ (Bradley & Reinking, 2011, p. 306) as well as providing teacher professional learning that works towards improving ‘teachers’ instructional practice and transforming classroom environment’ (Bradley & Reinking, 2011, p. 309). As such, design-based experiments, while taking place in a naturalistic context, are highly interventionist and iterative (Anderson & Shattuck, 2012; Barab & Squire, 2004; Cobb et al., 2003). Consequently, research undertaken through design-based classroom experiments ‘moves beyond simply observing and actually involves systematically engineering these contexts in ways that allow us to improve and generate evidence-based claims about learning’ (Barab & Squire, 2004, p. 2).

Design-based experiments can adopt various approaches, with the intent of informing practices and accounting for any changes to teaching and learning. In this way, design-based experiments focus on developing particular forms of learning experiences and systematically studying the outcomes (Cobb et al., 2003). Barab and Squire (2004) identify numerous studies that utilise the various design-based approaches. One of the reviewed studies theorised about students’
learning gains based on the degree of collaboration during learning, developing a set of guiding practices for implementing collaborative learning (Barab & Squire, 2004). In another example, the Design-Based Research Collective (2003) reviews additional examples of education-related design-based approaches – for example, a study that developed theoretical principles related to interest-based curriculum development. In a final example, Kucirkova et al. (2017) investigate the effectiveness of tablet applications such as iPads in increasing children’s narrative skills. As can be seen here, the various approaches to design-based experiments can develop locally based ideas for modifying practices and/or theoretical principles that can drive change across many contexts.

**Sociomateriality and literacies**

Sociomaterial ways of thinking about literacy require us to move beyond thinking about the learning environment as creating certain conditions for learning literacy, thereby seeing where, when and with what children learn literacy, as a substantial component of literacy or becoming literate. The importance of material, social and spatial elements of literate practice are therefore brought to the fore in our thinking. However, human actors remain important in the networks of people, tools, resources and texts that form literate practice – or in this case, the practice of producing texts. As children engage with texts, in certain spaces and within certain timescales, they are engaged in making and naming their worlds. Consequently, there is a strong relationship between the material, human and what Burnett (2015) has labelled the (im)material. As materials of literacy events shift, or the ways of working shift, so too do the patterns of interaction between the humans involved in the event, and the relationships between the humans, materials and spaces in which the event is occurring. However, ideas or knowledge used in any literacy event are connected to other ideas, meanings, knowledge and emotions. That is, the intangible things that are not part of the material space but which are still central to the meaning making that will occur (Burnett, 2015). When we engage in literacy or being literate, we rarely work in novel meaning making practices, instead connecting and building on the many experiences that have come before and also those that will follow.

Therefore, it is important to consider the texts, tools and resources – the with-what of literacy events – as well as an individual’s use of materials and the emotions, cognitions, understandings and capacities of the individual. By focusing on literacy as an individual pursuit, the result is to background the collaborative nature of literacy or becoming literate. The data we present in this chapter demonstrates the collaborative nature of the literacy experience, that is, the role of the teacher and other adults, the children and the many complex experiences that they bring to the literacy events described as part of this design-based experiment. The individual capacities available in classrooms are a resource for all to draw on when the pedagogical approach allows – and the classroom interactions evident can be shifted once collaborative practice is enabled.

**Makerspace pedagogy**

Makerspaces are defined as ‘sites for creative production . . . [using] digital or physical technologies to explore ideas, learn technical skills, and create new products’ (Sheridan et al., 2014, p. 505). This approach acknowledges the multimodal nature of literacy and that it comprises language as well as other modes such as ‘image, gaze, gesture, movement, music, speech, and sound–effect’ (Kress & Jewitt, 2003, p. 1). A significant aspect of makerspaces is that they follow a collaborative mind-set where children ‘do-it-with-others’ (Peppler & Bender, 2013, p. 23). As the name suggests, makerspaces involve children ‘making’ something.

The concept of makerspaces has evolved from a hobbyist paradigm. There are numerous websites and books such as Graves and Graves (2016) that provide teachers with ideas for maker
projects. However, more recently in the field of education, there is significant interest in how the engaging nature of makerspaces can be utilised to develop future science, technology, engineering and mathematics (STEM) (Peppler et al., 2016) as well as STEAM, which includes the arts. Within their two-volume edited collection, Peppler and colleagues (2016) have provided a wide range of examples of the educational applications of makerspaces. Similarly, Berland (2016) suggests makerspaces can be used to enable children to develop their computational literacy by presenting them with opportunities to engage in what he calls mindful tinkering. Through the process of building, children express themselves and develop their literacy to explain what they have built or how it works. These examples demonstrate the diverse range of uses of makerspaces in pedagogy and curriculum.

The materiality and multimodality: makerspaces and becoming text producers

The data reported in this chapter was collected as part of a larger school reform study, Learning to write in the early years. The project involved two schools across two different state systems. The school involved in this chapter was in a high poverty community, where access to digital technology, both at school and in the home, was limited for many children. This mid-sized school of approximately 500 children was culturally diverse with approximately 10–12% of students identifying as Aboriginal or Torres Strait Island children, and more than 50% of the student cohort having a language other than English as their first language. Outcomes on national standard assessments (NAPLAN) record student achievement in literacy and numeracy as being below that of peers attending other schools. The school leaders, teachers, children and their families and communities were focused on improvement and the provision of an equitable, quality education. As one part of this, the school leaders and teachers actively participated in the research project as a way to support their school improvement agendas.

The larger project involved three phases. We first conducted an audit of current practices at each of our research sites. In phase two, researchers worked with teachers to plan and implement design-based interventions as a means to reform pedagogical practice in the teaching of writing and text production. Finally, in the third phase of the project, we produced case studies focusing on a number of children as they became writers and producers of texts in the early years of their schooling. Here, we draw on data collected as part of phase two of the project at one school, as we document the instructional and technological learning interventions undertaken by one of the researchers and a teacher in a year 1 classroom. Data sources include children’s writing samples; photographs; classroom observations; and teacher, researcher and student reflections. The project draws on Bradley and Reinking’s (2011) framework for conducting design-based experiments as a tool for analysing the goals, processes and outcomes of the three cycles of the instructional and technological intervention.

Teachers at the school were asked to consider an area of their pedagogy or classroom practice that they felt could benefit from review and reform. When asked about the teaching of writing, the classroom teacher featured in this chapter identified that her students had little or no enthusiasm for writing. She wanted this to change but reported feeling unable to provide opportunities that were engaging to the students at the same time as managing the classroom. The children routinely wrote individually at their desks. Writing practice was not a daily occurrence. There was little text production work in modes other than print, nor was there a great deal of collaborative text production with small or whole class groups. Working with the teacher, we collaboratively designed a three-cycle intervention that included various instructional and technological interventions that aimed to (a) encourage children to become enthusiastic about
writing and making meaning through text production across a range of modes; and (b) increase opportunities for children’s multimodal text production. We decided to focus on makerspace activities, drawn from the maker movement (http://makerspacesaustralia.weebly.com/) as a means of inspiring the young children to write. The makerspace activities were identified as a way of encouraging an interest in text production within this group of children who were already quite reluctant writers. The play-based makerspace activities provided the children with the inspiration as well as the time to think about the object they were creating. The objects and the makerspace process became stimulus for individual and collaborative writing. This was followed by the writing of a story.

In all, there were three cycles to this design-based experiment. In the first cycle, the researchers took the lead in designing and delivering the intervention lessons that were planned in collaboration with the teacher. In the second cycle, one researcher provided background support and the teacher took a greater role in the planning and delivery of the lessons, while in the third cycle, the teacher took the lead in planning, teaching and assessing the children. The first cycle was a problem-solving activity called ‘Trap the witch’ (Anderson n.d.); the second focused on ‘Something interesting happened last week’; and the third was ‘Life in a fish tank’ which was linked to the children’s technology assessment. In each cycle, the children made something and then produced a written or multimodal story about their creation and/or the process of making.

**Cycle 1: trap the witch**

The activity was based on the Hansel and Gretel fairy tale. After a shared reading of an abridged version of the story, the children were introduced to the small cardboard boxes resembling matchboxes that represented Hansel, Gretel and the witch. The witch was represented by a larger box, while the children were smaller and thinner boxes. This was followed by a question and answer session with the children to help them identify the differences between the boxes. The children then worked in groups and with their teacher and researchers, to plan a design for a witch trap and identify and list the materials they needed (see Figure 18.1). The cage was
B. An example of a witch trap.

C. Working together during the trap the witch makerspace.

*Figure 18.1* Trap the witch makerspace activities
required to allow the children to escape but to trap the witch. The children then collected their building materials and proceeded to construct witch traps in small groups. Materials provided included cardboard, pipe cleaners, paddle-pop sticks, scissors, string, masking tape, ribbons, bottle caps and straws. After the children constructed the traps, they tested these with their cardboard box characters to see if they were successful in ‘trapping the witch’. As there were additional adults in the room, the teacher was able to work with small groups of children. Her role changed from regulator of behaviour of the whole class, to supporting problem-solving investigations of smaller groups. She asked questions, laughed when she required help from the children to construct particular aspects of the construction and listened to the children’s ideas. Her questions had shifted from rhetorical questions or ones with prescribed answers to questions of inquiry – what if we tried this? She sat on the floor with the children, head down to focus on the developing construction. She and the children vied for staplers, paper and glue as they collaborated to construct the trap – using oral language and their bodies (stretched hands and moving heads) to indicate what they needed from others in the collaboration. We were struck by the shift in roles available to this teacher through the introduction of different materials. Bodies had moved from individual desks to the floor – paper and pens were used for different purposes than how they were usually put to use. One researcher wrote in her field notes the difference that the materials and the shift in pedagogy made to the roles of the children and teacher, and to how the classroom space was used, was very visible.

Following the maker session, the children used iPads and the Book Creator application (https://bookcreator.com/) to write collaboratively with their peers and their teacher and the researchers about the makerspace activity. The use of digital technologies to produce multimodal texts encouraged writing, particularly collaborations between children of various confidence and proficiency levels. As Kalantzis and Cope (2012) suggest, the pedagogy was purposefully selected to meet the teaching and learning goals of young children to write.

The teachers/researchers made a few suggestions about what the eBooks might contain:

- A story cover page with ‘Trap the witch’
- A page with the sentence starter: ‘The members of the group are: . . .’
- A page with the sentence starter: ‘The story was about . . .’
- A page with the sentence starter: ‘The challenge was . . .’
- A page with the sentence starter: ‘I liked . . .’

Figure 18.2 shows the different interpretations of the sentence starters and the story. The eBooks were also converted to video and shown to the class using the interactive whiteboard available in the classroom.

Additionally, the videos were shown to the children’s parents when the class hosted a ‘Literacy Party’ as part of National Literacy and Numeracy week. This enabled the teacher to engage parents in the literacy lives of their children in new ways that extended their range of thinking about literacy to be more than engaging with print. Later the children also used this experience as a stimulus for other writing as part of the reformed individual writing time in the class. Children were asked to consider other aspects of the story including flipping the story, for example, ‘How did the witch feel about the children destroying her house?’

As this was the children’s first introduction to makerspace activities in this classroom, it is understandable that they would be excited about the newness of the experience. However, as the lesson progressed, the potential for sustained literacy learning became apparent. The makerspace activities promoted exploration, collaboration, as well as developing cooperation, creativity
and problem-solving. Here, the assumption is that children become more fully engaged with writing and more efficient and effective thinkers when they experience something first-hand, such as through these play-based approaches (Larson & Rusk, 2011, p. 91).

**Cycle 2: something interesting happened last week**

The second makerspace activity was drawn from the children’s own experiences. The teacher and one of the researchers worked together to plan and deliver the lesson. During this cycle, there was a shift of responsibility to the teacher as leader. A brainstorming session enabled the children to list interesting things that had happened to them the week before. Topics included fishing, a dog having puppies and a party. The children used these topics as a spring-board to think about something they wanted to make and write about. The maker activity was completed individually and the children were photographed with their creations. Additionally, a ‘gallery’ of the children’s work was created by placing the object on their desks, and the class moving around the room to look at other people’s maker creations.

Following the gallery activity, the children were given two sentence starters: ‘I made . . .’ and ‘I like . . .’. These sentence starters were provided for the children who needed prompting to start writing. Many of the children continued to write beyond these two-sentences or used their own ideas (see Figure 18.3).

During this makerspace activity, and the writing task that followed, the children expressed enjoyment with both activities. While their enjoyment was likely to be related to the scope for self-direction and choices about their curriculum, there is little doubt that the play-based nature of the task, and the shift in materials and rules about how to ‘be’ in the classroom, also encouraged engagement. In addition, as with the other two cycles, many of the children demonstrated pride in their writing and wanted to share their stories with other adults and children.

As expected, all children in the class were keen to participate in the makerspace activities. What we also saw was highly engaged children during the writing phases. They demonstrated productive talk and movement during the lessons. They responded to the makerspace sessions with a high degree of responsibility and behaviour management seemed to be less of a focus of
the classroom interactions during these lessons. As such, we found the makerspaces to be inclusive spaces (Wohlwend, 2008) that engaged all learners, including those who were reluctant to write or more disengaged with the teaching and learning in other learning contexts.

**Cycle 3: life in a fish tank**

This activity was planned and taught by the classroom teacher as part of an assessment piece that was linked to the children’s technology lessons. The assessment piece required the children to create a diorama of a fish tank. In the lead up to the makerspace lessons, the teacher spent a number of lessons reading and discussing *The Rainbow Fish* by Marcus Pfister (1992). This was followed by the children watching excerpts from *Finding Nemo* (Disney), which showed the fish
tank and the marine life. These were each attempts by the teacher to bring texts of multiple modes into the core curriculum of her classroom. The teacher designed a worksheet that acted as a planner for the design of the fish tank (see Figure 18.4). This involved the children identifying the items in the fish tank and providing a drawing. It also included a cut and paste activity where sentences relating to the fish tank had to be unjumbled.

A range of materials were provided (see Figure 18.5) to create the various components of the fish tank, including the rocks, seaweed and water. These included paints, crepe paper, cello paper, beads, pipe cleaners, googley eyes, printed marine animals and various sized boxes and bottle caps. The fish tanks were made in shoe boxes, positioned on their side.

![Designing the fish tank](#)

**What you need:**
- Rocks
- Filter
- Water
- Fish
- Seaweed

**What you do:**
1. Put the rocks and decorations into the tank.
2. Stick the filter into the tank.
3. Pour clean water into the tank.
4. Gently put the goldfish into the tank.

*Figure 18.4 Designing the fish tank*
After the children constructed their dioramas, they were photographed with their creations and were able to move around the room to see what other people had created. A few children were called upon to explain various components of their fish tank and any special innovations, for example, one child created a container with ‘fish food’, another child created seaweed by twisting a pipe cleaner around a pencil to create a stand-alone, three-dimensional object that represented the plant matter.
When the children were ready, they started writing. They were given some ideas as to what they could include in their writing. Some focus questions included:

- What are the names of the creatures in the fish tank?
- What type of creature are they?
- Describe the fish tank – what is inside the fish tank?
- Is there anything interesting happening inside the fish tank?
- What are the creatures doing in the fish tank?
- What are the creatures feeling inside the tank and why?

Figure 18.6 provides an example of the writing. This writer, while having grasped many of the functional elements of writing, was usually quite reluctant to write. When asked to write at other times, this child would routinely write only what was mandated by the teacher and no more. Following this makerspace activity, the child wrote a substantial amount about the fish.

Today we made a fish tank. It was so much fun. The names of my fishys are Bader and Mumer fish, and my jalee fish. It is so cool, and I have some bublies and I love my seadweed and the fish. I made a house for my fish.
tank he had created. The comment, ‘I love my seaweed’ references a situation where many of the children around him wanted him to show them how he had made the seaweed, that is, by twisting pipe cleaners and securing them to the base of the ‘tank’. It was obvious to us that he enjoyed having his idea shared with others and being recognised for his imaginative use of the materials. So much so that he wrote about it in his text.

Reflection and conclusions

In drawing this chapter to a close, we reflect on the practices of literacy learning in this class as a part of the design-based experiments conducted with the purpose of reforming writing pedagogy. By focusing on the sociomateriality of the lesson we are able to tease out examples of intra-active and de-territorialised pedagogies (Kuby & Rucker, 2016; Lenz Taguchi, 2010).

As Barad (2007) states, ‘our knowledge-making practices are social-material enactments’ (p. 26). From the makerspace writing, the enactments of the social and the material, the human and the non-human, the technological and the non-technological gave rise to intra-active learning experiences. Ideas flowed, as did creativity and imagination, as materials took on a multitude of forms. These materials become active agents that constructed various realities and discourses (Lenz Taguchi, 2010). Plastic beads simultaneously became air bubbles blown by fish and fish food floating at the surface of the tank (cycle 3) or the eyes of a monster alien that very interestingly had landed on earth the week before (cycle 2). Pipe cleaners imaginatively produced seaweed in a fish tank (cycle 3) as well as the bars of a jail trap (cycle 1), all through the discursive practices of 7-year-old children and the dynamics of intra-active pedagogies (Kuby & Rucker, 2016). The materials were able to ‘speak back to the children in the entanglement of intra-activity’ (Kuby & Rucker, 2016). For example, the pliability of the pipe cleaners made them (un) suitable for constructing a cage to trap the witch. In other examples, limitations were sometimes placed on the agency between the child and the materials, for example, the ruled lines in Figure 18.6, which are meant to restrain children’s writing practices, compared to the blank page in Figure 18.3, which affords greater freedoms. Interestingly, in an example of the messiness of intra-activity, the child (see Figure 18.6) did not (or perhaps could not) adhere to the restrictions of the ruled lines, instead moving beyond the confines of the allocated spaces.

Drawing on the work of Lenz Taguchi (2010), we note that ‘meaning-making and the learning we do is dependent on the material world around us. The material world acts upon our thinking just as much as our thinking acts upon it’ (p. 49). Therefore, by ‘focusing on the intra-active relationship between people and materials’, materials become ‘active agents’ within ‘entangled becomings’ within pedagogy (Kuby et al., 2015, p. 399). The concept of entangled becoming, has allowed us to shift the focus from the teacher or student or material, but rather, to the ‘in-between’ (Kuby et al., 2015, p. 404). In examples of this intra-activity (Kuby & Rucker, 2016) and meaning making, we observed that some children were asked to demonstrate or explain their making techniques and choices, or their use of adjective and noun groups, to the rest of the class or to other children. During the desk gallery displays or when the stories were flipped to create different narratives, the children made meaning of their material world through the objects they created by thinking and seeing others children’s maker-objects, stories, videos or eBooks. One of the observable effects of these intra-actions was the evidence of the pride that swelled as the children were praised for their work or as they were asked by other children to assist them with something they had already accomplished themselves. In the chatter during the sessions, we frequently heard, ‘How did you do that?’; ‘Can you show me?’; ‘Could you read out your sentence to the class’; or ‘I like how you did that’. Consequently, the children were more open to experimenting with writing and different perspectives and seemed inspired.
and motivated to write in traditional forms based on the powerful stimulus of the makerspace experience. This included the children who were more likely to be hesitant to write in other learning contexts. On these occasions, we saw improvements in the quantity and the quality of their print-based writing.

The intra-active entanglements also had the effect of de-territorialising (Kuby & Rucker, 2016) the classroom spaces and identities. During making sessions, adults and children worked together, around desks and not always at them. There was a temporary blurring of the identities of ‘teacher’ who is spatially positioned at the front of the room, and ‘students’ who are seated at their desks. The teacher was sitting on the carpet with groups of children, working on the task. Desks were abandoned by many, and the children had full use of the classroom space. There was movement and sharing, discussion and critique, experimentation and the refinement of designs. New opportunities presented themselves, through the engagement of the human and the non-human, for the best way to build their objects including artefacts and texts. The teacher was lost in the mess of bodies scattered across the room, making their creations. Agentic relationships between adults and children in the room gave rise to increased opportunities for successful literacy learning. Through the de-territorialising of spaces and the de-centring of the teacher, there was a shift in roles and identities. Children had choices about where they worked, who they worked with or the topic of their writing. Ideas were cross-fertilised through discussion and debate, or the casual glance over the shoulder to see what the others were doing.

What has emerged from these reflections of a design-based experiment are new ways of teaching-learning-writing between teacher and student, adults and children, all of which were made possible through a focus on the sociomateriality of classroom practices and pedagogies. As the connections shifted between the humans in the room, and between human, material and spatial resources, tools and texts, new ways of being and of learning writing became possibilities for children. The new possibilities which resulted from the changed pedagogical approach enabled shifts in the social interactions of the class as well as shifts in how children engaged with texts as writers or text producers (Kuby et al., 2015). The focus of pedagogy became children learning to produce texts, rather than children who refuse to write.

Notes

1 The National Assessment Program of Literacy and Numeracy – NAPLAN – was introduced in 2008. In its current form the program involves all Australian children in years 3, 5, 7 and 9 sitting tests in May of each year. There are tests in five domains: Reading, Writing, Spelling, Grammar and Punctuation, and Numeracy.
2 The project is known as the ‘Learning to write in the early years project’ (LWEYs). We would like to acknowledge the support of the Australian Research Council (DP150101240). Our colleagues in this project include Barbara Comber and Lisa Kervin. We thank the schools, school leaders, teachers, students and their parents and communities for their support of this project. Special acknowledgement goes the teacher and children of year 1Purple for their participation and insights during this project. We acknowledge the funding support of the Australian Research Council through the Discovery Program.
3 In this Australian state, children in year 1 are 6 to 7 years old and are in their second mandatory year of schooling.
4 eBooks are electronic books published in digital form. Other terms include ‘digital books’.

References


