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'Evil cats' and 'jelly floods':

Young children's collective constructions of digital art-making in the early years classroom

Abstract

Digital technologies have the potential to offer new opportunities for children's expressive arts practices. While adult expectations surround and shape children's visual art-making on paper in the early years classroom, such expectations are not so established in relation to digital art-making. So how do children make sense of digital art-making when it is newly introduced into the classroom and adult input is minimal? Drawing on a social semiotic ethnographic perspective, this paper explores this question by examining instances of 4-5 year olds' spoken dialogue around the computer during a week in which digital art-making was first introduced into the classroom. Analysis focused on interactions where children proposed, reinforced or challenged conceptions of digital art-making. These interactions demonstrated that children's digital art-making was negotiated and constructed through particular processes. Three such processes are presented here: the use of collective motifs and metaphors; attributing 'expert' status; and polarizing conflicts. Understanding these processes offers a starting point for thinking about how a new activity like digital art-making can be integrated into the early years classroom and supported by practitioners.

Introduction

Previous research has demonstrated that there is uncertainty among teaching professionals in the early years as to how best to integrate digital technologies into the everyday life of the classroom (Lynch & Redpath, 2012; Lindahl & Folkesson, 2012; Plowman, Stephen & McPake, 2010). Furthermore, when technologies are used in early years teaching, it has been noted that they are typically used for game-playing, literacy and numeracy activities, and for information gathering and are not often integrated into young children's creative play or their expressive arts practices (Resnick, 2006; Burnett, 2010; Formby, 2014). As a result, when digital resources are made available to young children for creative practices in an early years setting, the onus is on them, rather than adults in the classroom, to negotiate and establish how these resources should be used and what the outcomes of their use should be (Arnott, 2013). Children are likely to draw on a range of experiences in order to make sense of digital technologies that are newly introduced into the classroom. In the case of digital art-making as it is newly introduced into a class of 4-5 year olds, the practice will unfold according to how different members of the class conceptualise the activity and resources. But how are these different conceptions regarding the practice debated, negotiated and resolved among young children in the classroom?

A social semiotic approach suggests that exploring this question depends on considering how the material resources of the meaning-making practice are made sense of and constructed by those using them (Hodge & Kress, 1988; van Leeuwen, 2005). From this perspective, digital art-making in the early years

classroom represents a distinct set of material properties, but, just as significantly, it comprises a distinct set of social associations. While the prevalence of digital technologies in the lives of young children has been noted (McPake et al., 2013), the presence of digital art-making in the early years classroom is relatively new in comparison to paper art-making. As a result, the social associations of these digital semiotic resources will be 'less fully and finely articulated' (Jewitt & Kress, 2003, p. 2). This suggests that – initially at least - there will be a greater degree of diversity in the expectations and conceptions that children possess and articulate in relation to the purposes and practices of digital art-making. A social semiotic account would suggest that these conceptions of the resources will become narrower and more established over time (Jewitt & Kress, 2003), but there is little research that focuses explicitly on the processes through which this change unfolds.

This paper explores how young children negotiate and construct the purposes and practices of digital art-making when it is introduced as a new activity into an early years classroom and there is minimal adult input. This is done with reference to a series of observations that were conducted over the course of one week in an early years classroom of 30 4-5 year olds in which digital art-making had just been introduced. The paper first provides some background with regards to young children's art-making; the potentials and realities of children's digital art-making; and the integration of digital technologies into the early years classroom. After the study design has been outlined, the findings from the observations are reported according to three processes that were found to be important in how

digital art-making was negotiated and constructed by young children in the class. These were: the use of collective motifs and metaphors to reinforce particular conceptions of digital art-making; the validation of 'expert' conceptions of digital art-making; and polarizing conflicts between children resulting in the validation of one conception of digital art-making and the invalidation of others. In the discussion, [these processes are used to highlight issues that practitioners need to consider when supporting children to engage with new activities in the classroom, and particularly those involving digital technologies.](#)

Digital technologies in early childhood

The current statutory framework for the [Early Years Foundation Stage \(EYFS\) in the United Kingdom](#), updated in March 2012, highlights three principal areas in child development: 'communication and language'; 'physical development'; and 'personal, social and emotional development'. While art-making relates to all three of these general areas, it is also explicitly discussed within one of the document's specific areas of development: 'expressive arts and design', which has the purpose of 'enabling children to explore and play with a wide range of media and materials' (p. 5). Research suggests however, that this 'wide range of media' does not typically extend to include digital resources. When digital technologies are found in early years learning environments, they tend to be associated with literacy and numeracy activities and information-gathering rather than with creative or expressive play and learning (Lankshear & Knobel, 2006; Resnick, 2006; Burnett, 2010; Formby, 2014). In the EYFS framework, learning

about technology is seen as part of the specific learning area entitled 'Understanding the world'. The document suggests that children in the early years should learn to recognize a range of technology and to select particular pieces of technology in order to achieve certain purposes (EYFS, 2012). Thus, while the framework does not prevent a relationship between digital technologies and 'expressive arts and design', there is no explicit link made between them. This might help to explain why digital art-making is not a typical activity in most early years classrooms.

Researchers in early childhood have noted some difficulties and delays experienced in integrating digital technologies more generally into the early years classroom. A report by Aubrey and Dahl (2008) suggested that while teachers in the early years are positive about the opportunities that digital technologies provide for learning, they sometimes lack confidence in deciding how to integrate technologies into different forms of learning that are taking place in the early years classroom. This is supported by other findings made in nurseries and preschool settings, which have focused on practitioners' lack of confidence in facilitating the use of digital resources among young children in the classroom (Lynch & Redpath, 2012; Lindahl & Folkesson, 2012; Plowman, Stephen & McPake, 2010; Chen & Chang, 2006; Plowman & Stephen, 2005). In the observation and interview research conducted by Plowman and Stephen (2005) across seven pre-school settings, practitioners often avoided interacting with children as they used the computer. When they did intervene, it was a form of 'reactive supervision' (p. 145) as a result of problems or difficulties occurring

rather than planned support in using the resources available. [The 2012 position statement of the National Association for the Education of Young Children](#) suggests that further research and guidelines are needed in order to support practitioners as they facilitate children's use of digital technologies (NAEYC, 2012). Formal early years environments are particularly low on technology use when they are compared to estimates of technology use in more informal settings (McPake et al., 2013; McTavish, 2009; Aubrey & Dahl, 2008). Studies have found high levels of technology use by children in the home (Palaiologu, 2014) across a wide range of technologies (McPake et al., 2013). While parents have been found to be generally supportive of children's use of digital technologies (e.g. Marsh et al., 2005), Stephen et al. (2008) found through interviews conducted with adults and children that parents and carers typically underestimate the extent of guided support that children benefit from when they are using digital technologies. Parents/carers most often think about their young children as being competent technology users and are not aware of particular difficulties with specific technologies that the children themselves report. This suggests that children's interactions with and around digital technologies are not as straightforward as adults tend to think. In response, this study seeks a more in-depth and nuanced understanding of children's use of digital resources and how they make sense of these resources together.

Young children's constructions of digital semiotic resources

The research described above suggests that, whether at home or at school, adults are less directive and interventionist in relation to children's use of digital technologies than they would be if they were completing activities with non-digital resources (Plowman & Stephen, 2005). As a result, children have more freedom to determine how digital technologies should be used among themselves. Labbo (1996) conducted a qualitative semiotic analysis of kindergartener's symbol use while on a computer and suggested that the computer offered children an opportunity to work outside of the 'teacher-sanctioned' (p. 377) approach to making pictures. While the teacher in the class likened the computer to a set of non-digital resources for picture-making (e.g. paper and pencils), she was not able to impose this perception of the resources consistently and the children conceptualized the resources in quite radically different ways. Sometimes the children constructed the screen as a 'landscape' that they would inhabit through imaginative play; at other times, the screen was a 'stage' where they would perform to each other; and in other moments, it became a 'playground', where the focus rested on social interaction rather than the picture products that were being created. Labbo's research suggested a range of ways in which children could construct digital art-making, but it did not focus on how these constructions were formed through processes involving negotiation, conflict and resolution.

Since Labbo, other researchers have highlighted the ingenuity that children demonstrate as they make sense of digital resources that have less established purposes and practices associated with them. Mavers (2007) conducted a social

semiotic analysis of an email exchange between a 6 year old girl Kathleen and her uncle. Mavers suggested that Kathleen was less inhibited by formal writing conventions as a result of the medium through which she was composing her correspondence. Using the computer, Mavers argued, Kathleen dedicated less time and concern to the accuracy of her punctuation, spelling and grammar than she would have done had she been using non-digital resources to write a letter to her uncle. Writing on screen was a less constrained, or adult-guided, process than writing on paper. It enabled direct communication between Kathleen and her uncle, rather than being mediated by other adults interested in the 'correctness' of the written text. As with Labbo's research, there is a need in this instance to understand more about how Kathleen constructed the digital resources on offer in the way that she did; how did they acquire the purposes and practices that were enacted through her use?

Since the practices associated with digital technologies are 'less fully and finely articulated' (Jewitt & Kress, 2003, p. 2), their use is likely to lead to new forms of social interaction as individuals explore them together. This was seen in an action research project conducted by Schiller & Tillett (2004), in which 7 year olds created digital images in order to express and communicate their thoughts about school. The researchers found that the unfamiliarity of the medium positioned both the children and the teachers as students in this activity, producing new opportunities for exploratory learning. The study highlighted the extent to which technologies could be powerful tools for learning not simply through their physical properties, but also in their capacity to reconfigure social

relations and modify the practices of those in the learning environment. Schiller and Tillett's research suggests that introducing digital resources for meaning-making will prompt new forms of interaction as the resources are collectively constructed through various social processes. This research however, focused primarily on the relationship between children and teachers; it would be interesting to understand how interactions between children, when adult input is minimal, are influenced by negotiating the purposes and practices of newly introduced digital resources. This is an important line of inquiry given that studies on digital technologies in the early years classroom have highlighted the tendency of adults to avoid interfering with children's use of the technologies, leaving them to negotiate the resources by themselves.

Study Design

A social semiotic approach involves a dual focus on the semiotic resources that are available for meaning-making and the use of these resources in everyday contexts (Vannini, 2007). By focusing on everyday use, the researcher is seeking to understand how the material resources are 'semiotized' i.e. transformed into semiotic resources (Bjorkvall & Engblom, 2010). In the case of digital art-making, a focus on everyday use might take the form of gathering 'talk around text' (Lillis, 2008, p. 355) to see how various social influences are unfolding through semiotic processes that lead to the young child's artwork. This is similar to the contextualized methods advocated by Cox (2005) and Frisch (2006) in making sense of young children's drawings. This research builds on these approaches

by focusing on the interactions that surround semiotic resources, rather than the resources themselves. It should be noted however that this paper focuses quite specifically on the 'talk' produced by children as they engaged in digital art-making, rather than the entire 'multimodal ensemble' (Goodwin, 2000; Kress, 2010; Jewitt, 2013) of their interaction. While analysis of the latter would have produced a richer understanding of the processes involved in the collective construction of digital art-making in the early years classroom, it was not feasible as a result of the potentially obtrusive video equipment recording that this would have required. Future research would benefit from exploring further how various modes of communication, including movement, gaze, gesture, body orientation and speech, are organized in interactions surrounding digital art-making.

A reception class of 30 4-5 year olds was recruited to participate in the study. The class was part of a state foundation stage school that serves a local community in South East England. The school follows the Early Years Foundation Stage (EYFS) statutory framework through a combination of free-flow activity time in which children can choose which activities they would like to participate in, and more structured adult-led input ('carpet time'). The parents and/or carers of children in the class were informed of the study in advance through a letter and information sheet and were invited to raise questions with either the school or the researcher directly. Had any parents/carers preferred that their children did not participate in the study, this could have been communicated to the school or researcher orally or in writing. All data collected involving such children would have been immediately destroyed by the principal researcher.

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However, no parents/carers chose to withdraw their child from the study, and as a result, observations could be made of the class in its entirety.

Over the course of one week, an additional computer was placed in the classroom during four sessions of free-flow activity time, each lasting between 1.30pm and 3pm. The laptop computer and external mouse, which were placed on a small table on the carpet area, had the art-making software *tuxpaint* installed (figure 1), which is targeted at 3-8 year olds according to its designers. The software *tuxpaint* was chosen for both practical and theoretical reasons (Sakr, 2013). Practically, it was readily accessible and freely downloadable, which meant that practitioners and children would have access to the software after the study if they so wished. Theoretically, the features of *tuxpaint* map onto potentially interesting material properties of the digital art-making experience. The software comprises a combination of tools that mimic those available via paper resources (e.g. the 'paintbrush' tool) while simultaneously offering the ready-made images that enable 'digital remix' (Lankshear & Knobel, 2006; Knobel & Lankshear, 2008; Lamb, 2007). During the study, *tuxpaint* was the only software accessible via the desktop icons on the computer. The use of *tuxpaint* on this computer was an activity that children could choose to engage with by themselves or with other children. During the time that the computer was active in the classroom, audio recording equipment was placed beside the computer in order to capture the surrounding talk of the children as they made digital art. At the beginning of the week, the children in the class were briefly introduced to this new activity by the class teacher.

The researchers sought to intervene as little as possible with the children's use of *tuxpaint* for digital art-making. However, it was necessary for the principal researcher to be in the classroom in order to help with any practical difficulties that might arise with the technology. The researcher was therefore a participant in the wider field of study, interacting with the children in the classroom more generally, but did not engage in the interactions that took place around digital art-making any more than in the interactions that took place in relation to other activities available during the free-flow time. The input from practitioners in relation to the children's digital art-making was minimal over the course of the week. Of six hours of recorded interactions, there was only a single conversation, lasting less than five minutes, between an adult practitioner and a child in the class that occurred in this site of activity. The lack of adult interaction is likely to be related to the practitioners' conception of the activity as a 'research activity' that they did not want to interfere with. Although practitioners were told to interact with the children as they typically would, they may have been reluctant to do so given the presence of the recording equipment. Having said this, the lack of practitioner input mirrors what previous literature has suggested about early years teachers' tendency to avoid interacting with children when they are using digital technologies (Chen & Chang, 2006; Plowman & Stephen, 2005).

Figure 1. A screenshot of *tuxpaint* in use [Insert here]

Analysis focused on examples of interaction between children that were recorded around the use of the computer for digital art-making. As these interactions were

captured via audio recording, the first step of the analysis involved the transcription of all that was audible during this time. The transcriptions were talk-focused since they were based on an audio recording in order to capture data. However, where other forms of communication that played a part in the interaction were identifiable and significant, they were also recorded in the transcript. Of these transcripts, a focus was placed on moments involving tensions, concessions and resolutions relating to the practice of digital art-making since these moments would offer an insight into how constructions of the practice were shaped over time through children's social interactions. These moments were identified for further exploration; they were understood as 'key interactions' in the co-construction of discourse in the free-flowing environment (Wang & Carter-Ching, 2003). Twenty such 'key interactions' were identified for a more in-depth analysis, in which transcripts of the interaction were highlighted and then annotated with comments relating to the social processes that these interactions were suggestive of. These annotations were then grouped thematically to produce a set of particular social processes through which the activity of digital art-making seemed to be negotiated and constructed by the children in the classroom. Focusing on the three processes that were created through this analysis (Table 1) offers an insight into how resources that are newly introduced into the early years classroom are constructed through children's verbal interactions with each other. The processes are each presented below through description of the sequence of events they typically involved and illustrative examples that show the process 'in action'.

Table 1. Three processes through which the activity of digital art-making was negotiated and constructed by the children in the classroom [Insert here]

Findings

From the analysis of speech surrounding the computer, three processes were found to be significant in determining how digital art-making was collectively constructed in a class when it was newly introduced and adult input was minimal. These processes were: the use of collective motifs and metaphors; the attribution of 'expert' status; and polarizing conflicts regarding how the resources should be used. In reporting the findings, all participants have been anonymized.

Collective motifs and metaphors

This process refers to children's use of previously used ideas and imagery to make sense of digital art-making and to signal their participation in a particular approach to digital art-making. Through particular terms and references – motifs and metaphors - the children in this study indicated to each other what their conceptions of digital art-making were. In the very first episodes of digital art-making that occurred at the beginning of the week, Levi and Katie used the resources available to construct a narrative involving the motifs of 'evil cats', 'superhero cats' and 'jelly floods':

There's one evil cat... shall I show which is the evil cat?

This one... and he made it flood and all of these cats

are running away... because they turned into the jelly flood so he couldn't find them... he run that way and then he looked there and then he was there...but they cats are really fast, they ran away, and they're really speedy.

The cat 'stamp' that Levi and Katie were using while they created this narrative had a special material quality that facilitated the representation of physical action. When it was stamped across the screen, the position of the cat image changed giving the impression that the cat was running one second and then sitting still the next. This is particular to the digital resources that the children were using and they made sense of it by attributing narrative action to the cat images that were placed onto the screen. Through their introduction of 'evil cats' and 'jelly floods', Levi and Katie constructed the activity of digital art-making as one involving storytelling and imaginative play. In the terms of Labbo (1996), they constructed the digital art-making experience as a 'playground' or 'stage'.

Later in the week, by invoking the motifs of 'evil cats' and 'jelly floods', other children in the class could signpost to each other their participation in this kind of construction of digital art-making. Using these terms was a way of indicating to one another that the activity was being understood as play or performance. Strikingly, the use of these motifs recurred throughout the week and they were used by children that had had no direct contact with Levi and Katie around the computer. This suggests that these terms were being passed around the classroom away from the physical resources involved in the digital art-making,

becoming part of the collective schemata belonging to the class through which children made sense of the resources on offer to them (Thompson, 2003).

As the motif of the 'jelly flood' was used over the course of the week, it developed as a way of describing a particular on-screen visual activity: the motion of colour across the screen via the 'thick paintbrush' tool. The metaphor of 'flooding' was used throughout the week and by various children in the construction of digital art-making. When a bright colour was moved across the screen, it was described as a 'jelly flood'; when occurring in white, it was described as a 'snowy flood'. In this way, children were able to talk about visual events that were not similar to visual events that occurred when they used other resources. This new terminology was in conflict with more traditional ways of describing the visual activity that was unfolding on screen. For example, on Tuesday, one child joined the group of children at the computer and demanded to know why the principal user was scribbling:

Why are you scribbling?

He's not scribbling. He's making... he's making a blue flood go over that...that dark (laughs).

Is it another jelly flood?

It's a white jelly flood.

It's a snowy flood!

Through the invocation of the metaphor of 'flooding', the children established distinctions between their digital art-making and other forms of art-making. In the

context of paper-based art-making, spreading colour across the page in a haphazard way was often labeled 'scribbling' by the children. In digital art-making however, it was constructed in a distinct way through the metaphor of 'flooding'. As well as offering validity to a new practice, the metaphor of 'flooding' helped, along with motifs like 'evil cats' and 'superhero cats', to construct digital art-making as a play or performance activity. It should be noted that storytelling in art-making is not exclusive to digital resources, and it has been observed in the context of children's non-digital art-making in multiple studies (Kolbe, 2005; Anning, 2002, 2003; MacRae, 2011). Previous research has also found however, that early years practitioners tend to value children's art-making when it involves discernible representations (Soundy & Drucker, 2010; Duncum, 1999). Digital resources, as a result of the limited adult guidance and intervention they are typically associated with, may foreground the potential for art-making to manifest as performance and play since there is more space for the 'heterogeneous, dissonant and absurd' (Tam, 2012, p. 251).

Attributing 'expert' status

Another important process in the construction of digital art-making was the perception of particular children in the classroom as more competent than others when using digital technologies. The conceptions of digital art-making that these children possessed and proposed were more likely to be seen as valid than those suggested or enacted by children deemed to be less competent, or even 'incompetent', by others in the class. From the first appearance of the computer

in the classroom, some children positioned themselves as 'experts' in using the digital resources on offer. In introducing the computer and the activity of digital art-making, the class teacher had asked for two volunteers to be the first users. One of these, Levi, who featured in the previous section, put himself forward and explained that he had had lots of experience with similar software on his father's computer. He talked about what worked at home and compared this to what occurred when he was using the laptop in the classroom. During the first day of the computer's presence, Levi engaged in digital art-making on multiple occasions and he also issued instructions for other users. Other children in the class confirmed the 'expert' status that he had proclaimed by actively seeking his help. At its most extreme, other children would ask Levi to act as a 'scribe' in their digital art-making. He would use the mouse and they would issue instructions about the content of the art, becoming frustrated if Levi did not follow these instructions and instead allowed his own plans to take over.

Potentially as a result of his 'expert' status, Levi was a particularly influential character in determining how digital art-making should be enacted by children in the class. As seen in the previous section, he advocated approaching the screen as a type of 'playground' or 'stage' (Labbo, 1996) in which social interaction and narrative were paramount. He would often narrate the activity that he produced on screen and seek reactions and contributions from an audience that he actively sought. Levi's 'expert' status increased the amount of time that he was using the digital resources and thereby increased other children's exposure to his methods and ideas for digital art-making. On the other hand, children who were less

confident in their use of the digital resources, and were not asked to 'scribe' or support others' use, were less influential in shaping how the activity of digital art-making was constructed and enacted in the class. Their patterns of activity and conceptions of digital art-making were likely to be buried under forms of practice put forward by the 'experts'.

As well as reinforcing the 'expert' status of an individual, children had the power to construct other users as 'incompetent' and thereby undermine their digital art-making practices. For example, when Aysha used the computer for the first time and struggled to manipulate the mouse successfully, other children watching the screen urged her on and became visibly and audibly exasperated with the time it took for her to carry out their intentions.

White Aysha! I'll do it. No. You need a white

Aysha...don't we Aysha. Now do it.

Aysha! I'll do it!

Possibly as a result of this experience, when Aysha next sought to use the computer, she did so with only one other child present and when most of the children in the class were playing outside. In this episode of activity, her approach to digital art-making was markedly different to what was becoming increasingly typical among the rest of the class. Rather than narrate or respond to seemingly haphazard visual activity that was unfolding on screen, Aysha invested time and effort in a pictorial representation of her mother (figure 2). She carefully progressed through a human figure schema, as is often seen when children are drawing human figures on paper (Malchiodi, 1998; Cox, 2005).

Through this activity, Aysha engaged in an alternative construction of digital art-making as an opportunity to make discernible representations of everyday life. While this might be a popular conception of art-making among adults working in the early years (Labbo, 1996; Soundy & Drucker, 2010; Duncum, 1999), it was a relatively unpopular approach to take among the children in the class. Had Levi as the class's first 'expert' put forward or enacted this form of digital art-making, it might have been much more popular over the course of the week.

Figure 2. Aysha's mother [Insert here]

Of course, the attribution of 'expert' status to particular children is not specific to digital art-making. Children's concept of themselves and others as more or less competent has been shown to be important in the way various activities in the early years classroom unfold (Wang & Ching, 2003; Shin et al., 2004; Arnott, 2013). However, there may be particular relevance in considering this issue in relation to the introduction of new digital activities in the early years classroom because of the potential for children in the class to have had significantly varied experiences at home with digital technologies (Holloway & Valentine, 2001; Plowman et al., 2008). Influence in constructing activities like digital art-making will therefore not be distributed evenly across members of the class, and practitioners will need to take this into consideration when deciding how to support children in their potentially diverse forms of engagement with digital art-making.

Polarizing conflicts

Sometimes, opposing conceptions of digital art-making came into sharp, unresolvable conflict with one another. In such exchanges, the children involved would seek for one conception of digital art-making to be validated and another to be invalidated. These conflicts were therefore polarizing experiences that prevented a fully 'open' attitude to the diversity that characterized children's use of the digital resources for much of the time. In the week of observations, this type of polarizing conflict generally occurred in relation to the processes of archival, retrieval and overwriting of digital artworks that had been created.

One such conflict arose between Du and Emma. Du created a range of digital artworks over the course of the week. These were similar to each other in the way that they prioritized aesthetic features like spatial arrangement and colour (e.g. figure 3). Du approached digital art-making as a visual design process, bringing together ready-made images that she was visually attracted to in symmetrical arrangements on the screen. Perhaps in keeping with this approach to the process of digital art-making, Du was emotionally attached to the artworks she created. She carefully saved them and would retrieve the art she had previously created in order to look at it, stating on several occasions 'I love it' while looking at her own artwork. On the other hand, Emma did not engage in this form of digital art-making. She engaged more readily in digital art-making that was narrative- or play-based. She did not save the products of her art-making. She did however, show interest in the archives of art that were available in *tuxpaint* and on one occasion she retrieved an artwork that had been created

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by Du while Du was present beside her at the computer screen. What followed was an exchange as to whether Emma would change or add to Du's artwork, with Du adamantly resisting this:

I did that one yesterday... I made that one yesterday,

I made that one yesterday.

Did you put these on?

I did that one and that one and that one...

I'm going to take them off.

No! Don't! No! Don't!

I just don't want them.

Don't. I don't like it. Don't take them off. Don't like it.

Just let me do what I'm doing. Just let me do what I'm doing. And I'm going to put some on...

Don't!

I'm going to put different ones on and they will look nice.

But yesterday... I'm going to cover your picture.

Du was understandably fretful in this situation and came to find the researcher to ask her to intervene. Fortunately, the old saved file had not been overwritten and so Du's picture was intact and she was easily reassured. This would not always be the case (at least with *tuxpaint*), since the individual who has made the

modifications can choose to overwrite the old version with the new version if they wish.

Figure 3. Du's artwork prioritized colour and spatial arrangement [Insert here]

The incident involving Du and Emma illustrates an unresolvable conflict between two different conceptions of how digital art-making should be enacted. On the one hand, Du is constructing digital art in much the same way that children's paper texts have traditionally been perceived – as products belonging to individuals (Malin, 2013; Dyson, 2010). On the other hand, Emma constructs digital art-making as an ongoing, collaborative process of 'remix' (Lankshear & Knobel, 2006), 'mash-up' (Lamb, 2007) and even iconoclasy (Ivashkevich & Shoppell, 2012). Both conceptions are suggested to some extent by the material constraints and properties of the software *tuxpaint*. While the digital files containing the art can be saved, retrieved and shown to others (as is typically encouraged for paper art), the saved art exists unnamed in a communal folder that can easily be explored and tampered with without any realization on the part of other children or the practitioners.

As mentioned, the conflict between Du and Emma ended with the nearest adult being sought (the principal researcher) and reassurance that Du's artwork was still safe. This response however, was based primarily on the potentially negative emotions involved in the situation. The response represented a short-term fix that essentially validated Du's conceptions of digital art-making over Emma's. This would influence the approach that Du and Emma took to digital art-making from then on, and their perceptions of what was 'right' and 'wrong' in relation to the

resources on offer. Conflict as a process therefore greatly shapes and narrows the construction of an activity like digital art-making that is enacted through newly introduced resources (Arnott, 2013; Wang & Ching, 2003). It produces a situation in which, sometimes through adult intervention, one construction of the resources is validated and another invalidated. Through this process, a new activity in the classroom like digital art-making becomes more 'fully and finely articulated' (Jewitt & Kress, 2003, p. 2). Just as this is dependent on the children in the class with 'expert' status, it also relies on the nature of the adult guidance which is given in the case of arising conflicts and, therefore, adult conceptions of what art-making should involve. By considering digital art-making, we must therefore return to questions of what children's art-making is and how it should be supported, regardless of the resources that are used (MacRae, 2011; Knight, 2012).

Discussion

The findings in this paper draw on a series of observations of children collectively constructing the purposes and practices of digital art-making when it was newly introduced into an early years classroom and there was minimal adult input. The findings suggested three processes that were important in how digital art-making was negotiated and enacted by young children in the classroom. These processes were: the use of collective motifs and metaphors; the attribution of 'expert' status; and polarizing conflict between children. Examining these processes highlights issues that practitioners need to consider when supporting

children to engage with new activities in the classroom, particularly when they involve digital technologies. In this discussion, these processes will be considered in terms of what they mean for practitioners and how they engage with children's digital art-making.

The collective motifs and metaphors that the children in the class used to make sense of digital art-making were imaginative and innovative. Their terms of reference, like 'evil cats' and 'jelly floods', helped to establish digital art-making as a new practice involving distinct rules and concepts. This is important given the tendency of adults to make sense of digital learning resources through a framework developed initially in relation to paper learning resources (Labbo, 1996; Lankshear & Knobel, 2006; Burnett, 2010). Adults in the classroom hoping to support digital art-making and its new potentials for meaning-making could benefit from actively engaging in children's collective motifs and metaphors, which move away from terminologies associated with paper. This would facilitate an imaginative approach to digital resources and facilitate links between digital technologies and playfulness (Edwards, 2013).

Another finding from the study was that conceptions of digital art-making were more likely to be validated if they were presented or demonstrated by members of the class that had been attributed 'expert' status. Certain children acquired 'expert' status as a result of their confidence with the digital technologies and subsequent reinforcement from adults and children in the class. At the other extreme, other children were labeled 'incompetent' and their conceptions of digital art-making were likely to be less popular as a result. Practitioners need to

be aware of the potential for children in the class to be labeled as either 'expert' or 'incompetent' in relation to the use of digital technologies. As home exposure to digital technologies is likely to be diverse (Benett & Maton, 2010; Plowman et al., 2008), and adult guidance in the classroom with regards to digital technologies is often less than for other activities (Arnott, 2013; Plowman & Stephen, 2005), some children will inevitably have more experience and confidence when interacting with digital technologies than others. When these resources are introduced into free-flow activity time, and children are organizing their own use among each other, children identified as 'experts' may dominate in using the technologies while those labeled 'incompetent' may shy away from opportunities to use the technologies or may even be actively discouraged by other children. Previous research has suggested that the presence of digital resources in the early years classroom can facilitate the leveling of competence between adults and children (e.g. Schiller & Tillet, 2004), but the observations presented here suggest that digital resources can also exacerbate differences in experience among members of the class. Practitioners' awareness of this possibility is essential in developing practices surrounding digital technologies that include all children and their ideas about what digital art-making should be

Children sought adult input when there was a conflict in their conceptions of digital art-making that they did not think they could resolve between themselves. The primary example of this was in relation to the processes of archival, retrieval and overwriting in digital art-making. The difference between physical and digital environments mean that the rules of ownership and archiving that are typically

applied to paper art are not necessarily adopted for digital information. Although many of the metaphors that guide digital storage design are based on our understanding of the storage of paper (e.g. keeping 'files' in 'folders' on the 'desktop'), digital environments also offer an opportunity for individuals to move away from these practices and towards 'remix' (Lankshear & Knobel, 2006; Lamb, 2007; Ivashkevich & Shoppell, 2012). Practitioners need to be aware of the various 'child agendas' (Dyson, 2010) at work in an activity like digital art-making and have clear ideas about what is acceptable practice in the context of digital art-making based on a rationale that stems from their pedagogical approach to early learning. While practitioners approach their interactions with digital art-making in the same way they approach non-digital art-making, it would be fruitful to engage in discussions regarding what new opportunities for art-making are foregrounded by digital resources.

Conclusion

This paper offers insights into how children construct and negotiate digital art-making when it is newly introduced into the classroom. . An analysis of children's interactions around digital art-making when it was first introduced as an activity into the classroom demonstrates that certain processes are key in how children make sense of digital art-making together with minimal adult input. These processes highlight the imaginative ways that children approach digital resources, but they also suggest issues that practitioners need to be aware of when supporting children in using digital technologies. These include the

possibility that children negotiate how to use digital resources on the basis of attributing 'expert' status to particular children, and that this could lead to the resources being dominated by some individuals. Furthermore, careful planning is required to decide how children's different conceptions of an activity like digital art-making can be valued while at the same time establishing guidelines for use that ensure that conflicts between children are resolved thoughtfully.

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