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“It’s Not For Real”: The Tablet as Palette in Early Childhood Education

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Abstract

This qualitative study investigated how a group of three-year-old preschool children use the drawing application *Doodlecast* on iPads. The smoothness, rapid response, and distinctive digital visual expressions of the tablet provided visual feedback that influenced the children’s preferences for colors. *Doodlecast* seemed to encourage the children to explore colors and superimpose and fill-in the iPad’s screen. In addition, they painted very precise shapes and lines, which seemed to facilitate pattern making and discovery of signs and relations. The children used the eraser tool to correct, reveal, remove, and create shapes. Irrespective of the method –erasing, superimposing, or filling-in the screen – the clear and professional result seemed to provide a visual confirmation that the children were able to master formulas.

Introduction

“It’s not for real”: these are the words of a preschool child explaining why he found it easier and more fun to paint digitally on an iPad than paint with crayons on paper. This comment aroused my interest in a new and relatively unexplored area. A preschool teacher told the story to me during a course in digital art-making, which I arranged some years ago in a former role as an art lecturer. She also mentioned that this child seemed a bit reluctant to use crayons on paper, seemingly afraid to fail. There is undoubtedly something irrevocable about crayons on paper. The quotation seems to indicate that drawing and painting on a tablet can be perceived as ‘something else’. In its elements and expressions, an iPad painting is reminiscent of what a ‘real’ drawing or painting usually looks like, but with other conditions and possibilities.

Matthews and Jessel (1993) note that children spontaneously produce forms and signs in traditional art-making when they are introduced to digital painting. Similarly, this study assumes that performing a similar task using a different technique results in a different experience: that a child converses or interacts with a new material/medium (in this case, the iPad) in ways that differ from their traditional experience of making art (e.g., paper and paint). This interaction enables a child to see their art-making from a different perspective beyond their previous experiences and expectations (e.g., Matthews, 2003; Selander & Kress, 2010¹; Änggård, 2005).

Introduced in 2010 as the first commercially available tablet device, the iPad is praised for its ease of use as it employs few menus and offers a touch screen that quickly provides feedback and responses, characteristics that enable its use by very young children (Nacher et al., 2015). Although there is no current data on how many Swedish preschools use tablets, a number of studies about the tablet as a tool for play and learning (e.g., Kjällander & Moinian, 2014; Nilsen, 2014; Petersen, 2015) show that it is gaining ground.² However, this is a small qualitative study about the iPad as a platform for a simple drawing application³: *Sago Mini Doodlecast*. The focus is entirely on the tablet as a tool for art-making⁴, or more precisely, a tool for plain digital drawing and painting with the chosen application. My overall question is how five three-year-old⁵ preschoolers using *Doodlecast* take advantage of an iPad’s touch

¹ This phenomenon is referred to by Selander and Kress as *transformation*, as a part of multimodal learning.

² The Swedish Media Council states that in 2016 78% of Swedish children in the age group 2 to 4 had access to or owned a tablet (2017).

³ There is a wide range of drawing applications for children, often with functions like sound, moving images, the ability to take photos, using ready-mades, etc. I would like to stress that what can be defined as a drawing application is debatable as the boundaries are blurred.

⁴ Bendroth (1996) contrasts art-making activities with projects where art is involved but primarily have other purposes.

⁵ They were between 39 and 49 months old.

screen's hardness, smoothness, and speed, in combination with visual cues and feedback. The characteristics of the screen and the quality of the digital image, its stepless transformations and sharpness – here in form of bright and opaque local color – create conditions for and contribute to the exploration of color, form, and signs, including the possibility to erase. This study contributes to the knowledge of how the tablet can be used to explore and make meaning of visual traces made by the hand. The fingerprint technique – painting directly with fingers – is the main technique used although traditional material (i.e., liquid paint) is replaced with light. Matthews and Seow (2007) note that if analogue painting is based on reflecting light, digital painting is the light itself.

I mainly use the term paint – the children usually termed the activity as “do” or “paint” – and I use both “picture” and “film”⁶ to refer to the works (the creations are saved and shown as an animation).

Digital Art-Making and Children: Literature Review

Although many studies have examined how children interact with traditional drawing and painting, few have examined how children interact with digital technology and art-making. Research on digital tools has tended instead to focus on “literacy, numeracy and information gathering”⁷ (Sakr, Connelly & Wild, 2016: 289). Sakr et al. call for more input and concentrate on art-making from a narrative point of view, stressing how access to the ready-made benefits new and different kinds of stories. Similarly, Klerfelt (2007) examines how special software and design become co-agents in children's storytelling. Knight (2018) investigates how the iPad's intangibility and multidimensionality in preschool create conditions for exploring and questioning aesthetics, ideas, and concepts. Several studies also assess how the multimodal tool, with pictures and visual elements as integrated parts, greatly favors interaction, communication, and social learning (e.g., Beschorner & Hutchison, 2013; Heydon, McKee & Daly, 2017; Kjällander & Moinian, 2014; Nilsen, 2014; Petersen, 2015; Sakr & Kucirkova, 2017).

Within the drawing/painting field, Matthews and Seow (2007) compare media forms, emphasizing the role of the stylus in children's understanding and use of color, form, and representation. In addition, Couse and Chen (2010) show that using a stylus provided similar

⁶ The children never referred to the activity as “making movies,” but referred to it as “seeing the movies” after it occurred. Sometimes they said they were “drawing,” but no one mentioned the word picture.

⁷ There are multiple research studies that focus on fine motor skills and gestures (e.g., Nacher et al., 2015; Vatavu, Cramariuc & Schipor, 2015).

positive results in terms of commitment and skills.⁸ Crescenzi, Price, and Jewitt focus on drawing/painting with an iPad, where human-machine interaction is central. Using the concept of affordances, the authors investigate the media's potential for mark-making activities and touch forms by comparing young children's finger-painting activities with a corresponding digital task, finding simpler compositions and stronger emphasis on movements with fewer fingers (Crescenzi, Price & Jewitt, 2014; Price, Jewitt & Crescenzi, 2015). Picard, Martin, and Tsao (2014), comparing drawing on tablets with paper and pencil (drawing skills based on specific criteria), come to a similar result regarding simplified digital pictures; however, the simplified and reduced digital result contradicts other research where children use a stylus, including the above mentioned study by Matthews and Seow where it is argued that the difference can be interpreted on the basis of fine motor conditions.

Theoretical Perspective: Movements and the Exploration of Form and Signs

The tablet resembles a small sheet of paper and the tracks are bound to arm gestures, just as in analogue painting, where the young child keeps discovering that different movements give different results. For example, by repeating, contrasting, and combining, the child develops and refines forms and meanings where the temporary and random develop into the more systematic and planned (e.g., Arnheim, 1976; Gibson, 1979; Matthews, 2003; Wolf and Perry, 1988b). Children acquire and use different drawing repertoires that lead to ideas of ongoing actions and its effects: something depicted or represented can be detected in a pattern, the work being transformed, and given various explanations and significance depending on the context in which it is being used (e.g., Matthews, 2003; Wolf & Perry, 1988b; Änggård, 2005). Rudolf Arnheim stresses that the motoric is present in the line as an expressive element, while movements and gestures have a descriptive function (performing conditions as large and small, round and angular, and so on), the seeds of more concrete representations (1976). Price et al. (2015) show that shapes like lines and circles are used more frequently on the tablet and seem easier to accomplish; lack of resistance and speed in the medium facilitate the continuity of operations and thus can accelerate those kinds of skills.

In addition to discovering the connection between making gestures and making traces, I would like to stress the impact of erasing as well. Torre (2015) defines erasing as a tool used in a process, a tool that is sometimes visible as well as part of the end product in the same manner as a line or color. Paradoxically, this seemingly backward step is a part of the forward direction as in all changes and in all processes in nature; that is, the removal of a trace creates

⁸ The latter two studies, which do not deal with tablets like iPads, also highlight the importance of teachers as instructors.

new traces (Torres, 2015).

Visual Response and Color

The visual response is a form of reward, a confirmation of an accomplished gesture or movement. J.J. Gibson claims that the trace of the pen or chalk, as a recording and concretizing of a movement, is a foundation for the child's conquest of drawing as well as writing. For example, children completely lose interest in using a piece of chalk that does not result in marks, where only the movement remains. The registered movement – inherently bound to time with a forward movement, a “progressive record” – involves both the look and the feeling of the hand that moves across the surface, but it is only the sight of it that remains (1978, p. 229).

Parson (1987), stressing the importance of color in children's assessment and valuation of art, argues that younger children's aesthetic preferences are largely based on color. Color has an intrinsic value and many uncomplicated clear colors are considered better than a few with fine, subtle nuances, which can even interfere with the experience.⁹ The preference for clear, pure colors can be linked with the importance of pronounced visual feedback in children's own drawing and painting activities. Dunst and Gorman's (2009) comprehensive research survey shows that crayons or pencils that provide visually significant and striking results¹⁰ stimulate (pre-)drawing in young children, and that finger painting generates more interest when the color leaves clear traces. The impact of visual feedback is supported by Price et al. (2015) and both Matthews and Seow (2007) and Couse and Chen (2010) emphasize the intensity of digital colors as something that encourages activity. Several studies show that pre-made templates also have a positive effect as these provide children a form to capture (e.g., Dunst & Gorman, 2009; Gibson, 1978; Goodnow, 1977; Wilson & Wilson, 1977; Änggård, 2005).

The Role of Material

Burkitt and Barrett (2011) argue that some material seems to facilitate certain expressions and forms and familiar effects may also influence how children respond; less familiar material may require more attention, which could lessen focus from existing beliefs about how, for example, a feeling is best represented. Similarly, Löfstedt (2001) and Änggård (2005) found that some techniques encouraged testing of colors, shapes, and composition rather than

⁹ Matthews and Nacher (2007) show that even small infants, under supervision of teachers, can quite easily learn to identify and use a variety of tones and nuances in a digital painting program. However, being able to and preferring to are not the same.

representation *per se*. Änggård believes that painting activities should be sorted according to genre, characterized by an “aesthetic exploration of colors and effects” [author’s translation] (Änggård, 2005, p. 66), noting that an entire paper is often filled with color.

According to Matthews and Seow (2007), the digital image is characterized by its intangibility, while simultaneously competing with the physical world through the sensuality of the smooth display and access to unfading and brilliant colors. Other studies stress that digital painting compensates for the lack of traditional pictorial sensory qualities through the hardness of the surface and the speed of production, allowing colors to continue to flow as long as the finger touches the screen, creating an extension of the activity: an expansion of the coloring process (Crescenzi et al., 2014; Price et al., 2015). In summary, the use of a tablet results in more and longer touches (Crescenzi et al., 2014; Price et al., 2015), fewer details and simpler compositions, with a greater focus on continuity and speed of movements, engendering compositions that “comprised many overlapping and overwritten circles and lines, resulting in a ‘more coloured in’ area” (Price et al., 2015: 138).

Method: the Group and Doodlecast

This study is based on the experience of three preschool boys and two preschool girls. Despite individual differences, this age group was chosen because this age is characterized by a more systematic exploration of colors and shapes (e.g., Matthews, 2003; Wolf & Perry, 1988b). These children had previously worked with art-making in some sense both digitally and traditionally (especially with watercolor and crayons) in preschool. However, these art activities were voluntary and none of the boys in the group were described as particularly interested in paper and crayons, rarely or never spending time on such activities. The girls were reported to have better motoric skills. One of the girls, Moa, was noted as the most committed to artistic activities in various forms, even being described as “dedicated”. Lina was also described as engaged in such activities, but with a tendency to quickly move on to other things. However, this study does not focus on gender differences.

Doodlecast is advertised as suitable for children ages two to six. Users can paint free hand on a blank “sheet” or use one of 38 templates¹¹, which vary in size, theme, etc. The templates are presented one-by-one or scrolled as thumbnails. Once chosen, the user is asked a question (e.g., “Who lives in the house?”) and the application records the painting process (including sound), which can be played afterwards as a sort of animated film. Along the bottom of the

¹¹ They are actually more like visual cues or pictograms meant to help develop and complete the theme, but I stick to the term. The children seemed to spontaneously interpret the templates as the equivalent of a coloring book.

screen, the user can choose from nine dots/circles in bright local colors (red, pink, orange, yellow, green, blue, purple, light brown, and dark brown) as well as three crayons/pencils with different thicknesses. Red, marked with a dot at the tip, and the middle pencil are preselected. In addition, users can choose a pink "eraser" icon, which in practice also serves as the color white (the tool has no impact on the template, however). The icons disappear when the screen is touched and reappear when no pressure is sensed. There is also a pause/stop button at the top of the screen that appear when no pressure is sensed.

The children – Lina, Moa, Per, Valle and Jens (the latter two are twins)¹² – participated voluntarily and were free to work in whatever manner they chose. They had access to two tablets: one that belonged to me and was used mainly when I was present and one that belonged to the preschool used mostly between my visits. After an initial visit, I was present on three occasions spread over two months (about three hours per visit). The school director served as an informant, answering questions about the children and everyday activities.

When I was at the preschool, I was there as an active participant observer, sometimes intervening. Initially, I instructed the group on how to handle the application and repeated these instructions often. I continuously asked questions to uncover the children's thoughts and views of what was taking place, which of course at the same time affected the usage and explanations (e.g., Bendroth, 1996). I tried to make sure that all the children had access to the tablet at some point and to allocate time fairly when several children were gathered. This meant that to some extent I influenced the activity and how it was designed. Sometimes I only worked with one child so that child had more opportunities to test the tablet and I had more opportunities to ask questions.

As the application was recorded, it was possible to follow the actual appearance of the painting process in audio and video. Therefore, I confined the study to the existing video, although there are many other important contextual aspects that were not considered such as facial expressions, (non-registered) gestures and movements, painting as a part of interaction, activities in the surroundings, and pauses (e.g., Löfstedt, 2001; Matthews, 2003; Änggård, 2005). The iPad's versatility was not considered (for example, that the children often asked to use other applications). In addition, the study does not consider the selection of a template or the possibility to view and comment on the finished film. (Lina, in particular, tended to hurry the painting process, explaining that she wanted to see the film). I viewed all films (41 in total), placed them in individual folders, and transcribed comments. Comments are important

¹² The names are fictitious. Per and Lina were born in February, Moa in September, and the twins (Valle and Jens) in July 2012, so at the time they were between 39 and 49 months old.

because to understand or interpret concrete, visible expressions in drawings of young children requires studying verbal explanations (e.g., Änggård, 2005). I took some notes in connection to my visits, and my knowledge about those situations of course influenced my interpretation, although my actual source is the recorded material. The child's tone of voice determined, for example, whether the child's experience was described as "happy". This inductive approach was guided by the actual recorded material. Parents or guardians were informed about the project and provided their approval. I introduced myself to the children as a teacher from another sort of school who was interested in seeing what they were doing with *Doodlecast* and if they liked the application. It seemed like they regarded me as one of the staff.

Results: Visual Feedback, Discoveries, and Control

The easy handling as well as stringent colors, shapes, and contours were crucial when Jens at one point accidentally tapped the surface with his fingertip (working with the theme "What happens in the water?", symbolized by a wavy line). The touch resulted in a nearly perfect green dot, or circular shape, with a roundness and sharpness that would have been difficult, if not impossible, to accomplish for a three-year-old with brush, chalk, or traditional finger paint. Jens continues to explore his discovery; he decorates color fields, creating patterns with dots/circles in different colors. Jens announces something as he turns to the teacher beside him who is busy in another conversation, but he does not get a response. Jens returns to the technique during the session, mixed with more conventional lines and shapes: "Can you tell me what you are doing?" the teacher asks as she turns her attention to Jens's work "I'm doing sharks" Jens responds, repeating what he initially stated (he returns often to "sharks"). When Jens makes a blue dot on a brown oval shape and then a purple small dot on the blue one, he exclaims "Oh, eyes". A dark brown dot placed under the alleged form is directly identified as a "black eye" [Figure 1].

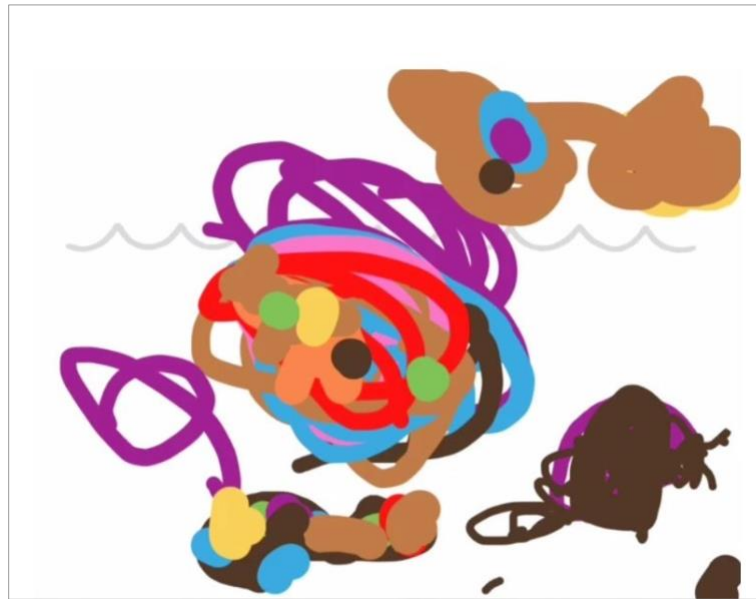


Figure 1. Shark with eye(s) by Jens. (Shark in the upper right.)

Jens seems to have found a formula. He continues by making a yellow shape and decorates it with dots, which he describes as “many.” (This way of making patterns by taps does not appear systematically later; it pops up as an occasional phenomenon in a number of pictures produced by the children.) Jens appears almost surprised. The unexpected is a part of painting, and the random and unplanned might render graphic discoveries in patterns and traces, revealing the role of possible representations and meanings (Wolf & Perry, 1988b). Once again, Jens’s discovery is not in itself remarkable, but through his tap technique he accomplished a resemblance of a professional graphical expression (reminiscent of ready-mades) in the almost perfectly round, which may have contributed to and facilitated his enthusiastic recognition and identification of an “eye”. Sakr et al. (2016) argue that the speed of digital technology makes it easier to let the visually manufactured precede meaning: i.e., expression creates content.

Distinctness in shape and color as well as speed in patterning might also be seen as something that facilitates incipient exploration of the surface and spatial relationships. Adding layer upon layer is something that recurs in the group, but Jens systematically experimented with circular and oval-like shapes of different colors, almost concentrically overlapping, without losing color and exactness, a repetitive testing and manifesting of size and spatial relationships (in front/behind, under/over, big/smaller/smallest, etc.) [Figure 2].

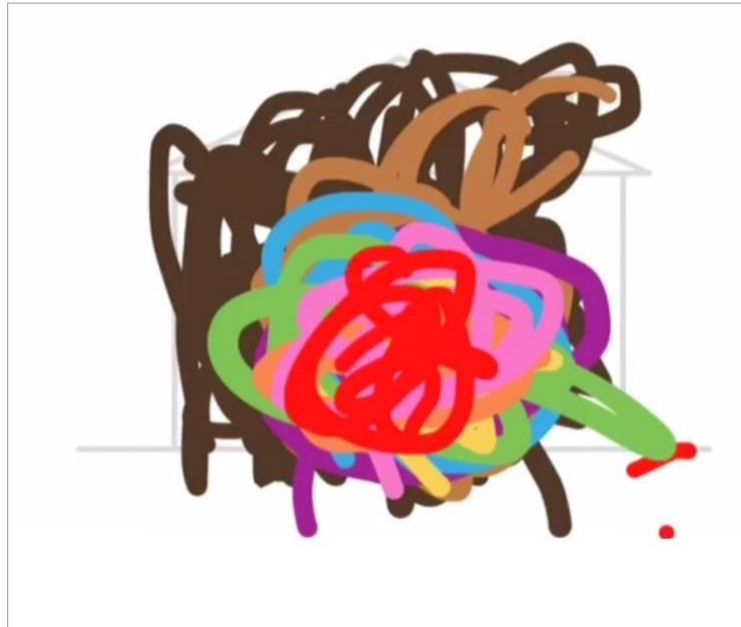


Figure 2. A repetitive testing and manifesting of size and spatial relationship.

As mentioned above, research shows results with fewer details and simpler compositions when using fingers on a tablet. Picard et al. (2014) suggest blunt conditions for fine motoric skills, while Price et al. (2015) raise speed as a possible contributing factor for decreasing attention and concentration and hence the lower level of detail. These studies are based on the depiction of given motifs that might have affected the outcome. That is, established representations could have taken a step back for the sake of discovery (Burkitt & Barrett, 2011). Some patterns and details that emerged here would hardly have been achievable with smeared paint on a blunt finger. The smoothness and cleanness of the tool, as the discernible result, were prerequisites for Jens' consistent approach and exploration of the surface and the revelation of "an eye". The recurring work of Lina and Moa (who are described as having more advanced motoric development) to fill in the template's forms, sometimes very small such as pennants and raindrops, becomes a controlled drawing where the girls seem to try to see how small a form the finger can (re)create, a technique that also required more precision and therefore more time.

The children preferred templates almost without exception (a common strategy was to use it as a starting point), but Moa was especially attached to them. The template as an incentive for encouraging drawing activities follows previous research in traditional techniques (e.g., Dunst & Gorman, 2009), so the presence of the phenomenon is not surprising. However, the ability to continuously follow a line without resistance or color loss may contribute to both a motoric and a visual reward. The children here received a very pronounced visual proof of the hand's ability to manage the formulas (Goodnow, 1977; Änggård, 2005) and were able to create

similarities between patterns (Gibson, 1978). The fact that the templates are ignored and hidden to a great extent after a while, as the children begin to use their own motifs and color activities, could be related to the quality of completely opaque and flowing colors.

Color and Movement

There is a repertoire of movements and shapes that recur: circles, ovals, spirals, straight and zigzag-like lines, and spots. In a quick, unresisting, and smooth way, colors are activated on the screen and provide an opportunity for the children to revise or to repeat what they have done. Although the vivid colors dominated their paintings, the children also used the two brown tones (albeit in a more limited way, especially the dark brown). Although more or less totally monochrome films are present, they changed colors frequently. For example, Jens changed color 32 times (he mostly put on spots) in 4.10 minutes, whereas Lina managed to change colors 17 times in 4.40 minutes, mixed with long flourishing strokes. Per filled the entire surface area in about 35 seconds in what appears to be a continuous motion. In comparison, it is much less tempting to shift a pen, as what is more important is not the step of change, but the most obvious result (and, of course, appealing and conspicuous icons). A tablet makes it easy and quick to change colors, letting a colorful line run for a while, resulting in contrasting effects. All the children seemed to want to fill the screen with colors, preferably superimposing new and different colors. This desire was most apparent for Per (who also is the one who used the thick pen, at my suggestion, more systematically). At one session, he recurrently painted layers from left to right; different colors appear to sweep like waves across the surface one after another [Figure 3].

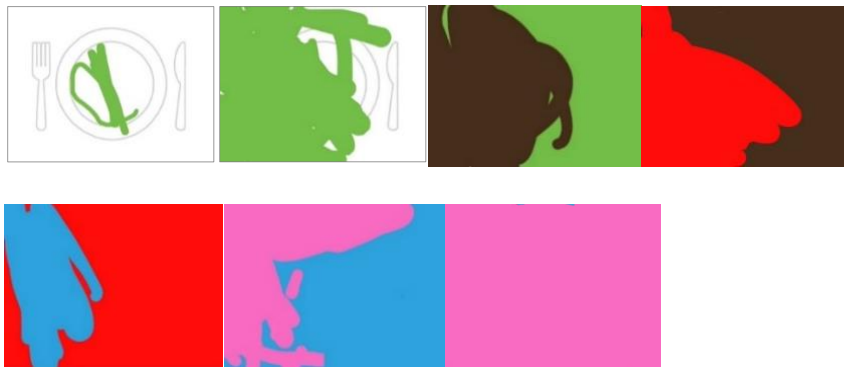


Figure 3. Per initially started by following the template, but soon let colors flow in one direction.

Jens says – after he initially chose a template representing a house – that he “is just painting pink” (which eventually turns out to be a pink wall, but it is more a concession to me as I previously have mentioned the pink wall). The important thing here appears to be that the

children could fill-in the screen. Jens noted that “there should be a lot [of color] here” and he continued to cover the surface with pink. When Jens misses one white spot, Per assists by instructing him to fill-in the area “over there”. Valle stands out on some occasions by carefully decorating the white surface with color stains, resembling confetti, avoiding superimposing layers of paint and spots from touching each other, instead allowing the white background to be glimpsed in contrast.

The color is given great intrinsic value as reflected in statements such as, “I take lots of colors”, and, “here there should be a lot [of color]”. Lina, choosing a template with some flies surrounded by a couple of odor streaks, answers the question, “What smells bad?” coming from the tablet: “Pink smells bad”¹³. This response seems to legitimize the use of a certain color. Pink is Lina’s favorite color. When she paints a sun pink, she adds, after a moment of reflection, “a pink sun”. Similarly, when she paints a tree pink, she proclaims “a pink tree”. Despite leading questions about what something represents, the children most often insist that it is “nothing,” responding with a “no” to my suggestions. The boys often put it like this: “Now I’m going to make blue [. . .] make red [. . .]”. On another occasion, when I ask Per if “everything should be red” (he had been preoccupied with the color), he replies resolutely, “all red”. When I then ask if it might be a sparkling fire, he answers, “no, red” and finishes covering the entire surface. The expression that one just does “red” or “yellow” reappears. When I remind Jens, who is just painting yellow, that there are more colors, he says, “I just want to have yellow,” painting both inside and outside the template (a house), suddenly changing to red, doing circular shapes over the yellow. When I ask what he is doing, he answers happily, “a red”. I persist with the questioning: “Is it a still a house?”. Without responding, he just continues to paint, now in green, confirming the color, “green”. The building seems to become less and less important and is replaced by more and more circles in vivid colors.

This focus on color is a recurring motif for all the children. “Green, green, green”, says Lina and paints green over blue, “Red, red, red [. . .] purple, purple, purple”¹⁴. The children’s desire to name the colors as they paint indicates their attention paid to color, almost regarding color as an object with an intrinsic value. Children appreciate color on its own right, preferably bold and abundant when they judge art, where simplicity is a key (Parson, 1988). This color-in-itself orientation is re-enforced by the technology’s ease and aesthetics: the result is “perfect”

¹³ Most often the children seemed to totally ignore the spoken initial question, perhaps because it is too abstract for a three-year-old.

¹⁴ Interestingly, although a little bit outside my subject, Per repeatedly uses English terms for colors, which sometimes are echoed by the others. The staff surmise this tendency is the result of English language television programs or programs that use some English or something from a game or the Internet.

with brilliant and equally strong colors, which encourages further generous coloring. The color palette is an eye-catching tool, emphasizing local color as a quality and object. Price et al. (2015) note that the opaque, immiscible character allows one color at a time to dominate the surface, which is also a tendency here: the individual color plays the lead role for shorter and longer periods. The transformations in color and shape sometimes get an animated character¹⁵ or an emerging line/movement materializes. There is always a discrepancy between the sequential production of a picture and the static result (Arnheim, 1974; Gibson, 1978), and the extended painting process delays that gap.

Eraser as a Tool

As with the eraser tool, the superimposing technique allows a user to delete something. For example, a new color can totally erase the traces of the previous color. The eraser icon also creates the color white (Per even refers to the tool as “white”) and can be used to add layers. The eraser functions not only as a tool that paints over (thus ‘deleting’ something), but also as a restorer of the blank surface – meaning possibilities – like in traditional drawing. The eraser is traditionally a tool linked with the use of pencil or charcoal, materials more appropriate for older children, and it is also perhaps associated with wrinkled and soiled paper. Erasing also potentially carries the meaning ‘not good enough’, far from the once very influential Herbert Read (1943) and his idea of free creation and the importance of self-expression, a process that challenges prevailing norms about what something is supposed to look like.

Moa more systematically explored the eraser’s functions. Although generally very accurate, Moa accidentally makes some purple spots outside the template’s peaked cap. Once she notices this ‘mistake’, she exclaims, “Oh, no, I drop”. As she continues with the cap, I remind her of the possibility of removing “errors” and show her how to erase. As Moa continues to erase, I remind her to switch to a color icon before filling in the cap. Ignoring my comment, she continues to delete, declaring, “It’s not so good” and takes away all color. “I’ll take brown” Moa exclaims before filling in the cap again, but she also makes a stroke far beyond the contours of the peak. As she continues to fill in the template, I comment that it is a nice cap with a big peak. After a short while, she removes the stroke/peak, repeats “erase”, exclaiming, “but no” when she obviously thinks too much has been removed. [Illustration 4].

Then she picks brown again, but once again paints a bit outside the contour lines, seems to paint ‘wrong’ on purpose before quickly switching to the eraser and carefully removing a bit of the color outside the cap in preparation to completely filling-in the cap. That is, erasing has

¹⁵ This impression is reinforced by the fact that the creation reappears as a film.

the function of correction: there is a representational form as a reference point – what something ‘should look like’ and how it should be represented. Moa demonstrates that she is capable of detecting and correcting errors and mistakes.

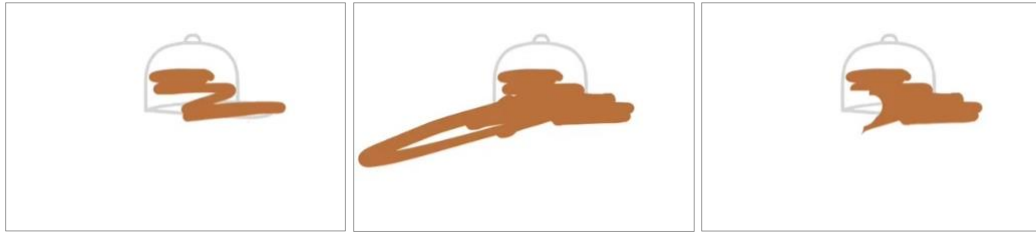


Figure 4. Moa makes a stroke far beyond the contours of the peak and erases.

Moa continues to explore the function and capabilities of erasing. After carefully filling-in forms (the template is, “What does your bedroom look like?”, “pillow”, “bed”...), Moa suddenly begins to act bolder (for once also using the thicker pencil), not restrained by the template’s lines (although she holds on to some kind of basic form). When I ask if it is still a bed, she says “yes”. Suddenly she stops and mumbles, “Now you can’t see” and begins to remove color so that the outline of a headboard is revealed. Initially, Moa seems reckless, so she can undo her mistakes. After I remark that we now can see the bed, she ponders and erases some more; “Now you can see”, Moa laughs delightedly and says when spotting more objects, “Oops, the pillow!” [Illustration 5]. Despite my question whether she now would like to shift to color, she continues to erase (“Don’t want color”) and erases every bit. The main issue this time appears to be to remove some underlying object (template), like a palimpsest technique that reveals something previously hidden.



Figure 5. Picture 3: “Now you can see!”; Picture 4: “Oops, the pillow”.

When Moa was drawing/painting a green house (also a bit reckless for being Moa) on a blank sheet, she suddenly says, “Oops, I need to erase” and removes some spots from another part of the screen. She starts to paint the house again, but she interrupts and begins to erase color in the building, making circular motions that create a gap (i.e., a white field that contrasts with the green house). “Check it out, it’s lightning”, Moa says happily and surprised [Illustration 6]. When I ask if it might be a window, she refuses to answer and instead continues to erase

until it is completely white and finally announces, "I erase everything, I don't want to have the colors". Now it seems like the purpose is to fade out colors because they can be removed, not to correct forms in order to create a suitable representation/symbol or to uncover an underlying template. As a bonus, Moa noticed the contrast between light and dark (in a reverse way somehow – light covering the dark and at the same time creating shapes).

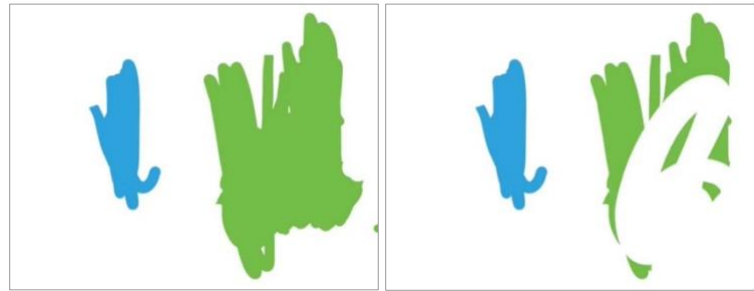


Figure 6. "Check it out, it's lightning!"

While Per, as a sidekick to Lina, glimpses some template droplets behind cascades of color, he says, "Oh no, it's raining on me". Lina continues to paint some thin orange strokes and confirms her initial announcement, "It's raining" (She started by filling-in some droplets with pink). More colors and shapes develop in a seemingly random way. Suddenly, Lina erases with several fingers and says, "Now to remove the rain [. . .] I'll do something new", eliminating the weather by simply deleting any signs of it (i.e., previously filled-in droplets and fields of color) [Illustration 7]. Characteristic movements, along with explanatory words, might yield a representation of an event or situation, where the tracks become significant (Wolf & Perry, 1988b). Here, the rainfall can best be terminated by letting droplets disappear, cease to fall. Here, erasing becomes a very concrete motion that represents the declining rain fall.

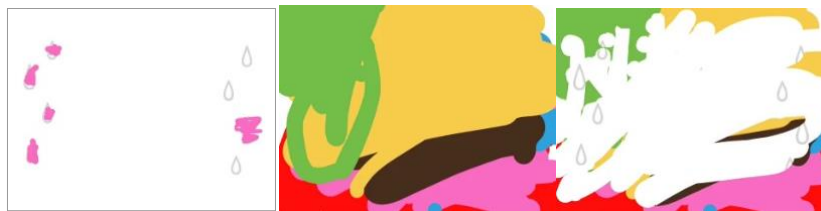


Figure 7. From starting point to "Now to remove the rain"

The eraser function is a convenient tool in the process, part of the expanding process. The trace is equally opaque and sharp in its contour as the color field; the eraser/white is, like the other colors, a quick and clinical tool in the palette, a tool, as Torres says, which constitutes an element in the composition (2015) and at the same time is a way to go back, fix, restore, and

uncover. And not to forget, the surface remains flat...

Reflections

I initially asked how the tablet as a platform for a simple drawing application invited children to explore color, form, and signs through its visual sharp images and touch sensitivity, much like an ordinary coloring book and palette. As this is a limited study, no generalizing conclusions should be drawn, but there are some tendencies that are of note. The *Doodlecast* application (inseparable from the tablet) constitutes something of a hybrid between controlled drawing and the flowing effects of painting. Furthermore, in sharp contrast to traditional art-making, art created with *Doodlecast* remains clean and tidy. Patterns and compositions, based on layer upon layer but still clearly defined and distinct in shape and color, might prompt associations and interpretations such as Jens' "eye" and spatial discoveries; mastering the surface becomes a potential exploration of relationships between shapes.

Color is seen as an object rather than merely as a quality an object possesses. Although *Doodlecast* was a new application for these preschoolers, they easily mastered the techniques, so the orientation towards colors and shapes were not hindered by mastering unfamiliar and difficult techniques, as is the case with traditional painting material (Löfstedt, 2001; Änggård, 2005). Still, there is something new and unknown about the drawing application: it is not clearly associated with what something should look like, which can be liberating (Burkitt & Barrett, 2011). The distinctness of colors – its contours and its shapes – invited the preschoolers to perceive and use them as a kind of ready-mades: quick and easy applications that allowed them to paint over, remove, and restore. Immediate and articulated feedback makes the surface an area for trial and negotiation of compositions, combinations, and contrasts. The color, here separated from physical nuances and blends (and often an unavoidable turbidity), becomes an object or phenomenon to explore and use (reinforced by the naming). The expanding painting process as described by Price et al. (2015) is relevant for this result as well. At the same time, Moa especially was concentrating on filling-in (small) forms or carefully deleting to create a more precise and exact representation.

Price et al. (2015) argue that digital painting can be a gateway for children who for various reasons have difficulties with pen and paper and for children who show less interest in drawing. Regardless of whether the child is more or less accustomed to traditional techniques or is more or less developed in fine motor skills, the child can achieve a clear and 'professional' result, providing visual confirmation that the child has mastered formulas. Children such as Moa can go a step further than most children. She was able to examine new tools like the eraser, which offers control of color and composition, to produce shapes and forms by using the eraser to "remove" colors or to add or "paint white." A tool may have several features and benefits, creating many significances.

A transfer from one platform to another always involves some kind of change such as other requirements of the physical elements, resulting in unexpected uses of the tool (e.g., Matthews, 2003; Matthews and Seow, 2007; Selander & Kress, 2010; Änggård, 2005). Modifying a technique contributes to an additional experience for the child, creating broader references and different perspectives. This exploration leads back to the initial story about how a preschool boy declared that it was better to paint on the iPad because it was not "for real". *Doodlecast* is reminiscent of, but still is not the same as, analogue painting. Resistant traces are replaced with modifiable light that invites examination of movements, colors, shapes, and possible meanings in different combinations in a playful way. The movements, gestures, and touches are enhanced by the distinct visual feedback while creating a sort of clean but colorful and changeable world beneath the surface.

Finally, I would like to highlight the extended painting process and its quality of animation. Smoothly emerging lines and the many transformations in shape and color almost seems intended to be recorded as well as presented as moving images in animation. The part of "seeing the film" was excluded from this study but was obviously important for the children (as was the initial scrolling and choosing of templates). In the film the process is repeated but also reminds you of previous decisions and actions, and at the same time is a creation of its own, offering new meanings and perspectives. How children talk about, understand and experience their art-making when it's being manifested and transformed into animation is a relevant field for further research. A related question is whether art-making displayed as animation could influence children's digital drawing and painting, for example being aware that certain movements of the hand create certain cinematic effects.

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