Learning through art:
Decision-making in a complex domain

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A thesis submitted to the Faculty of Humanities, University of the Witwatersrand, Johannesburg, in fulfilment of the requirements of the degree of Doctor of Philosophy

Johannesburg, 2020.

Declaration

I declare that this study is my own original work. Where use is made of the work of others, it is indicated and acknowledged through complete references. It is submitted for the degree of Doctor of Philosophy at the University of the Witwatersrand, Johannesburg, South Africa. It has not been submitted before for any other degree or examination in any other university.

Renée Lesley Koch
November 2020

Dedication:

To Robert, Abigail, and Kira, for their love, patience, support, and endless conversations.

Thank You:

To David Andrew and Ruth Sacks, my supervisors at the University of the Witwatersrand, for their insight, thoughtful encouragement and patience.

To the Visual Arts learners who generously participated in my research project, for sharing their stories of art-making.

To my former colleagues in Visual Arts, for distributing letters of invitation to participate in the research, to learners in their schools; to the school principals and the CEO of the IEB, Ann Oberholzer, for granting permission for the SenseMaker study.

To Dave Snowden and Sonja Blignaut for generously giving me access to the SenseMaker app and support.

And to the many Visual Arts learners, over many years, who helped me become a teacher.

Renée Lesley Koch
November 2020

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Figure 1: From the Projection series. Charcoal on paper.

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Abstract

In its most generative form, arts education aims to provide opportunities for learners to develop self-efficacy in cultural practices. While the curriculum espouses values such as creative and critical thinking, it imposes a fixed model of 'art', derived from European culture, on all learners. This is both unjust and inadequate. Such a model fails to account for the diverse ways people make meaning of experience and neglects the emergent nature of creative processes. Consequently, learners and teachers need better ways of collaborating to create and recognise value in practices, *across boundaries established by culture and convention*.

Against this background, I set out to 1) construct a model of decision-making in contexts where there are no right answers; 2) gauge Visual Arts learners' awareness of the range of decision-making strategies and resources available to them, as becoming artists; 3) identify institutional constraints acting on learners' decision-making within the process of making art; and 4) recommend strategies that learners and teachers can apply, as they work together to create and recognise value in unfamiliar and emergent cultural processes.

To achieve these aims, I drew on trans-disciplinary research into agent-centred decision-making which I read through my teaching and creative practices. I developed a conceptual model of decision-making in the process of making art and used this to design a study into learners' arts-based decisions. For this study, I used a complexity theory-informed methodology and SenseMaker, a narrative-based sense-making tool (app), to gather learners' self-indexed narratives about decisions they made in the process of making art. I read the findings of this study and those arising from my own practice-based decision-making, through each other.

While the model of agent-centred decision-making I developed foregrounds social learning systems, collaboration, elaboration on prior mental models, and the integration of body-brain processes, I found that participants' self-indexed narratives revealed their decision-making processes to be individualistic, based on a fixed view of knowledge and lacking in awareness of embodied knowledge. These patterns can be linked to systemic constraints in arts education and education, generally, such as the marketisation of learning, graded assessment, and the erasure of the body from learning contexts, through discipline.

Drawing on complex adaptive systems theory, I propose approaches to intervention with practical small-scale and safe-to-fail examples.

Key Words:

arts education; decision-making; creative practice; complex adaptive systems; constraint

Introduction

As a Visual Arts teacher in secondary schools in South Africa, I have been part of and privy to discussions between teachers and learners (and in some cases, parents, and administrators) about the grading of learners' artworks. While learners and parents insisted that grading was subjective (and therefore, unfair), teachers and administrators took the official line that assessment was standardised across the schools within the assessment body. They pointed to the rubric as the document that clarified what those standards were.

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In a studio 'crit' of Master of Arts (MAFA) students' work at the University of the Witwatersrand, one of the students asked the lecturers what it was they were looking for in a Master's portfolio. Colin Richards answered that there was no consensus between the lecturers who were present at that time, nor was there any consensus between their past and present selves. In response to this, Penny Siopis answered that lecturers would recognise what it was when they saw it.

These narratives have a common thread, related to the notion of knowledge in the arts. They point to claims made (and contested) for an ability to recognise when something is 'art' and when it has value. These claims, in turn, give rise to ontological and epistemological questions with serious implications for the arts in education. Three main problems emerge. The first is the notional category, 'art', the second is the location of evaluative expertise, and the third is the nature of a course or curriculum that will allow learners to become knowledgeable. These questions might be rephrased, by asking what it is we learn (to do) when we learn to make 'art'.

There is uncertainty[1] both about the *category*, 'art', and about how to determine its *value.* Both of these impact on the curriculum. In the first case, categorising certain practices as art (and excluding others) delimits the content of the curriculum. In the second case, knowing how to make evaluative judgements

[1] Ironically, this uncertainty lies outside of arts education, and more particularly from my experience, outside the subject, Visual Arts. While debates about the nature of art are not new, and might even be said to be intrinsic to the nature of the thing (Schwab, 2020), Visual Arts as a subject has stabilised the nature of the art that is taught.

about art informs assessment processes. Together, these dynamics structure the ways learners, teachers and matter(s) (Barad, 2014)[2] interact to produce a curriculum.

To some extent, the reception of something *as* art, by an audience, also automatically bestows on it[3] particular forms of cultural *value*. However, the *way* value is conferred, is far from clear. When I had to grade learners' artworks, in my capacity as a Visual Arts teacher, there were times when I found it difficult to *give an account for* the way I valued certain artworks and not others. This may have been (at least partly) because I was blind to the assumptions I made about certain objects, events, and practices *as* art.

While the reception of art by an audience is an inseparable part of defining an object or experience *as* art (Duchamp, 1961), the identity of the audience is important, too. Artists may seek out relationships with different audiences, but secondary-school learners are locked into particular systems for recognising and giving value to their artworks. While my role (and my art school education) conferred on me the position of subject 'expert', I argue that my 'expertise' was a matter of personal and professional judgement. There are no 'right' or 'wrong' decisions in the arts, just decisions that are either useful or otherwise, in context.

The issue of evaluative judgement in domains of practice is a thorny one. My position in this doctoral study is not that all objects are 'art' or that all artworks have the same value. My argument is that in Visual Arts as a discipline (and other arts disciplines may have the same challenges) no set of objective standards exists against which artworks, complete or in-progress, can be measured. There are many examples of rubrics for assessing art, which include standards, but their claim to objectivity is unfounded. I argue this on three grounds. The first of these is contextual, the second is based on an understanding of complex adaptive systems, and the third derives from neuroscience.

The contextual argument against *objective* standards in the arts takes the position that different experts, from different communities of practice, find different artworks valuable. This has huge implications for cultural meaning-making, especially when we consider the fluid nature of cultural boundaries. Some readers might suggest that a particular art-making practice should be evaluated within the community of practice it relates to. In this argument, a European-style painting could be evaluated, appropriately, by a teacher with a background in European painting. Practically, this would require every educator in a Visual Arts classroom to be an expert in many arts practices, especially those of the cultures represented by her

[2] Barad (2014) argues that matters of physics, matters of politics and power, and matters of care or ethics are not separate.
[3] The adage is that experts with artistic communities of practice can recognise value in the arts.

students. However, even if this were possible, there would still be the issue of artworks made at the boundaries of cultural practices. Culture is fluid and learners may identify with more than one culture, in ways that are unique and for which there is no ready community of practice. It is in the nature of meaning-making practices that practitioners will toy with found elements and contexts and seek out the potential meanings that these interactions produce. A community of practice argument for evaluative judgement does not account for the ways value is created and recognised in emergent processes.

My second argument against the claimed objectivity of evaluations in the arts is based on complex adaptive systems theory. The claim for objective standards for evaluating art reveals a metaphysical stance in which reality is seen to be objective and representation an accurate reflection of that reality (Barad, 2013). By contrast, a stance emanating from complex adaptive systems theory argues that components of a system are relationally connected to one another *in such a way* that they allow for new, surprising effects of signification. In this view, an artwork does not consist of a number of discrete 'elements of art', arranged according to 'principles of design',[4] which unfailingly produce the effects that learners are taught to analyse. Rather, an artwork is the result of dynamic relationships between components, *such that* they produce new meanings. The same components could be 'added' to another artwork, in a parallel process, and achieve very different meanings and value.

My third argument against objectivity in the evaluation of art derives from the work of neuroscientist, Joseph LeDoux. In his book, *The Emotional Brain*, LeDoux (1998) provocatively claims that people do not know their own minds. Despite the illusion that people can reflect on their actions and thinking to understand what they did and why, LeDoux (1998, p. 32) argues that some of the mental processes that produce our thoughts and actions are unconscious and, therefore, hidden from our introspection. Moreover, there is no reliably rational link between the things people think and do and the explanations that are available for these actions.

People may find plausible-sounding reasons for their actions, but these are drawn from social scripts or contextually-available explanations and not through privileged access to the workings of the mind. In particular, LeDoux (1998, p. p. 61-67) makes us aware that people have emotional associations with objects and experiences, based on events in their personal histories. While these histories include formal

[4] Visual Literacy practices currently require learners to analyse artworks in terms of the elements of art and principles of design. These are taught in ways that create the impression they are atomistic units that can be added to an artwork or, principles that govern artworks in unambiguous ways. This is an oversimplification.

(conscious) learning, they are also made up of complex or many-layered experiences. In some of these non-formal learning experiences, especially highly-charged emotional experiences, individuals come to associate particular elements of the context with specific emotions or feelings. LeDoux (1998, p. 59, 167) points out that the particular object or quality of experience that becomes a trigger for later associations can be *anything* that was present at the time and is not necessarily logically related to the emotion it triggers.

When an expert points to an element of an artwork (for example, colour) and describes its contribution to the overall composition or significance, they cannot be aware of the way their personal histories intersect with their professional learning. The knowledge they produce in reviewing the artwork is only available in the particular context of *that* critic relating to *that* artwork, on *that* occasion.[5] It is not equally available to all viewers of the artwork, nor is it available to the critic in advance of the viewing experience. In other words, the critic would not able to advise an artist trying to produce an artwork, with the same degree of specificity that they bring to the critique of a finished artwork. This problem is not helped by turning to artists, themselves, since, as LeDoux (1998, p. 61-67, 280) explains, they (like all people) do not know their own minds.

The unconscious nature of evaluation (LeDoux, 1998, p. 32, 33, 50, 52) makes it difficult, if not impossible to translate evaluative processes into language. Learners I taught sometimes felt that evaluations of their artworks were arbitrary, a point with which some psychologists and neuroscientists would agree (see, for example, Goldberg, Funk & Podell, 2012; LeDoux, 1998). This meant that, while I was confident my evaluations were in line with institutional standards,[6] learners were not sure how to recognise value in their own artworks-in-progress. Consequently, learners would seek my approval for process-decisions, to

[5] The tacit nature of this knowledge does not invalidate it. However, the unconscious and potentially irrational (LeDoux, 1998) connections the critic makes between the perceptible artwork and their interpretation of it gain their credibility from the particular context. Since the classroom is a context that must accommodate all learners' ways of making meaning, a singular explanation for an artwork has limited validity.

[6] In standardisation processes, examiners spend a good length of time (two to four days) calibrating their grading of artworks, as a group. This process is revealing. Examiners do not necessarily bring the same grade levels to their evaluations of artworks. They need to calibrate against one another. Also, the levels that emerge from the process are not objective, but specific to this particular group or community of practice. When I argued that my grading practices were in line with institutional practices, I meant that they were similar to those the group of examiners would give. This did not mean they were universal or objective.

ensure that their artworks would, later, be considered successful. This lack of decision-making agency flies in the face of many of the claims we make for the arts in education[7].

Since the notional category of art and value in art are inseparable, the question of how we evaluate something *as* art is at the root of learning in this domain. However, decision making is not taught intentionally, in Visual Arts. Also, policy-makers in the subject work to create stability and certainty around what it is they teach (what art is), despite debates that rage outside of secondary-school contexts.[8] The subjective and contextual nature of evaluation is elided to make way for knowledge understood as fixed or what William E. Doll (1989) refers to as the measured curriculum.

An epistemology that derives from Newtonian physics and Protestantism (Doll, 2008) regards reality as objective with representational knowledge as attainable. In this view, the teacher, like a priest or a scientist, has an 'objective' view of knowledge and knows what the learners should learn. For Doll, this translates into a measured curriculum (1989; 1993, unnumbered page) where efficiency takes precedence over complexity. He encourages us to consider that, while the curriculum is often seen as a course to be run, we should also consider the *action of running*. This leads to the conception of a curriculum as something that co-evolves with the runner *as they run*. In arts education, this would means that art is enacted by the intra-action (Barad, 2014b) of the artist, audience and symbolic material (Gaztambide-Fernández, 2013b: 227). Therefore, in arts education, the three concepts, 'art', value in art, and a curriculum for the arts, are intertwined.

A curriculum for the arts must establish some idea of what 'art' is. This is because the category 'art', acts as a space within which cultural practices have meaning. In many ways, conventions, such as notions of art, work with variations to produce generative tensions. However, when the category 'art', is too narrowly defined and too inflexible, it loses its generative potential and begins to constrain learners' practices in unhelpful ways. Equating the 'art' in 'arts education' with a European model of art produces unhelpful constraints[9] on learners' creative and critical thinking and has implications for social justice.

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[7] Creative and critical thinking, which many claim to be associated with learning in the arts, are worthless, if the learner never develops decision-making agency.

[8] As an example, the call to decolonise the curriculum, emanating from the student movement #FeesMustFall in South Africa, had little effect on what was taught in Visual Arts, within the IEB. Successive attempts to open the debate within the Visual Arts teachers' conferences met with resistance from examiners and also from teachers who maintained that the knowledge and skills they taught were foundational, for all arts practices.

[9] Constraints are limiting concepts, objects or events that operate within a complex adaptive system. Constraints can have positive or negative effects on the system. Constraints are part of the system and we should not aim to

The substitution of a very particular cultural practice for the practices of all cultures, in the curriculum, is a form of epistemic violence. This approach draws boundaries around value in creative and cultural practice, along cultural or racial lines (Gaztambide-Fernández, Kraehe & Carpenter, 2018). Such an approach does not belong in a curriculum that styles itself as liberatory (Gaztambide-Fernández, 2013a).

While tradition in a particular community of practice gives learners some certainty about what it is they should aim to do, this certainty too easily leads to representationalism (Barad, 2013). Moreover, such a system expunges the blind variation (MacLennan, 2007: 6-8) that systems require to reinvigorate themselves. While the balance between convention and innovation is itself contextual, a too-heavy reliance on convention extinguishes the potential for *emergence* that, arguably, distinguishes some cultural objects, practices, and processes as noteworthy.[10] In other words, a curriculum that offers convention without the requisite amount of uncertainty (Doll, 1993a: 216) loses its richness and rigour.

While this doctoral study is situated in the context of South African schools, it speaks to the limitations a fixed model of art imposes on all learners everywhere. I would argue that a fixed view of art in the curriculum unhelpfully constrains the arts-based decisions learners in Europe can make, as much as it does this for learners, elsewhere. The call to reimagine the art in arts education (Gaztambide-Fernández, 2013a) is made primarily to advocate for educational justice for non-hegemonic learners. For educators who adhere to a fixed view of knowledge this call is experienced as overwhelming. Their view of knowledge requires them to be experts in all forms of cultural practice, an ideal that is clearly not feasible. However, I argue it is not necessary.

Complexity theory offers us a way of thinking about value in art as the emergent quality of a complex adaptive system. Within such a view, art arises from processes that are emotional, embodied, and reflective. Further, cultural, and creative practices are influenced by the nested systems within which practice-based decisions are made. While many influences can be identified, some are undiscoverable. It, therefore, makes little sense to try to establish markers of value in order to apply them, top-down, to learners' processes, without acknowledging context. It makes more sense to try to understand how artists and audiences collaborate to create and recognise value, across contexts.

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remove them, specifically, but to work with or around them. Top-down constraints limit the behaviour of components in a system. Bottom-up constraints relate components in a system to each other in particular ways.

[10] Colin Richards once described art as *a special form of noticing*, in a conversation at Wits.

Rather than taking an educational approach that tries to control what learners will learn and produce, I argue for an approach in which the decisions made by learners in the process of making art are understood to reflect the interface between their complex lives and the curriculum. Learners' decision-making constitutes their attribution of value in cultural production, and the sense they make of their experiences. While, in veridical contexts, decision-making might be seen as the *application* of learning, in creative practice, decision-making *creates* learners' understanding of what art *is* and *might be*. Educators cannot be expected to be experts in all forms of art or cultural practice, but they could be attuned to the ways learners create and recognise value.

Research Focus

This doctoral study focuses on the ways artists make decisions in the contexts of their creative practices. In particular, I am interested in the ways artists create and recognise value in the moves they make with material. Since practice-based decision-making is a process and not a single event, I ask how artists evaluate their moves with material before, during, or after they have made the move. Within this broad inquiry, the current PhD has four objectives. They are to:

1. Construct a model of decision-making in contexts where there are no right answers.
2. Gauge Visual Arts learners' awareness of the range of decision-making strategies and resources available to them, as becoming artists.
3. Identify institutional constraints acting on learners' decision-making within the process of making art.
4. Develop tools and strategies to support learners and teachers as they work together to create and recognise value in unfamiliar and emergent cultural processes.

Rationale

This doctoral study was undertaken as a response to two knowledge gaps I identified in arts education. The first is the lack of knowledge about the ways artists make evaluative decisions in the process of making art. The second is a lack of a methodology and method for observing *emergent* learning in the context of arts education. In other words, while Dewey (in Doll, 2008) argues learning is the by-product of educational experiences and Doll (1989; 1993b: unnumbered page) urges us to consider the *runner* who runs the educational course, we have had no way of knowing what kinds of learning emerge from the co-evolution of the runner and the course. I discuss each of these gaps, in what follows.

From my experience of arts education, no useful or workable model currently explains how artists make and recognise value in the context of their creative practices. Generally, the approach is that 'experts' in communities of practice recognise value in artworks once they have been completed. Learners are introduced to the finished works that have been 'ratified' by art world experts and not to the evaluative processes by which they were received.

There is, further, no certainty about what kinds of life or educational experiences allow particular people to become 'experts'. While learners are introduced to the media and techniques artists used in the past, they are not engaged in conversations about how artists select and evaluate particular moves with material, without knowing what the end product will look like. Learners and teachers do not have access to shared tools (model or language) that help them discuss the ways artists make decisions while working with unpredictable processes.

The lack of a working model for decision-making in the arts leaves learners guessing or basing their decisions on those made by others. This is compounded by the fact that arts education around the world continues to use European art as a model for learners. Moreover, in this approach, learners and teachers focus on the *appearance* of completed European artworks to guide their conceptual and material *processes*. This leads to learners conceiving of their artworks as *products* and working backwards with material processes, to achieve those pre-set goals.

One reason for the lack of research into artists' decision-making could be that it is difficult to study decisions in non-veridical contexts since there are no right answers that act as standards (Goldberg et al.,2012). Another reason is the inability of language to account for unconscious processes involved in agent-centred decision-making (LeDoux, 1998: 65-67). While it is intuitively obvious that individual embodiment, personal histories, cognitive biases, and cultural ideologies all play a part in agent-centred decision-making, these can be hard to identify and acknowledge in particular artists' processes.

The difficulties in researching agent-centred decision-making, notwithstanding, an appeal to vague notions of 'expertise' elides structural dynamics that can be damaging to learners. While Visual Arts learners try to develop domain-specific knowledge and expertise, they are held at bay, both, by the opacity of expertise and by educational constraints that locate value in the appearance of artworks based on the European model. The irony is that, while deviating from the European model is discouraged in Visual Arts, copying the model too closely results in work that is uncreative and derivative. This double-

bind (Bateson, Jackson, Haley, & Weakland, 1956) produces deep-seated confusion for many learners in the arts. It results in a lack of decision-making agency and over-reliance on the teacher as expert.

This doctoral study advances knowledge by offering a model of decision-making in the process of making art. This helps learners and educators create and recognise value in practices for which the education system has no models. It helps learners and teachers collaborate in all kinds of meaning-making practices, processes, and products, even if they are unfamiliar (see Rancière, 1991) or emergent. The model and the language it introduces offer dialogic tools with which to address the epistemic violence wreaked on learners' diverse ways of knowing by dominant cultural forms.

Imposing a European model of art on the curriculum, in arts classrooms around the world, is oppressive and unjust. At the same time, this practice undermines the values espoused by arts education and education more generally. While many people associate the arts with creative and critical thinking skills, it has not been possible to demonstrate that exposure to arts education promotes these capabilities, more than any other subject (Winner & Hetland, 2001:2).

To date, we have had no reliable or ethical way of studying learners' application of arts-based thinking outside of the narrow confines of the school-based assessment. Since internal assessments measure learners' performance against pre-set, known goals, they do not provide any information about learners' abilities to work with unfamiliar or emergent processes. In other words, learners' grades in Visual Arts do not reflect how well they would perform in cultural and creative practices outside of school. Consequently, it is not clear whether learners' achievements in Visual Arts represent creative and critical capabilities, as is claimed, or conformity to a predetermined model of 'art'. This reveals a significant blind spot within arts education.

This doctoral study contributes to knowledge about the system within which Visual Arts learners make their decisions. It uses a pre-hypothesis research methodology and app, called SenseMaker, to map learners' decision-making in the process of making art. The resultant probability landscape reveals the presence of systemic constraints acting on learners' creativity and critical thinking. In this way, the PhD provides contextual information or 'warm data' (Bateson, 2015:7) through which to interpret the claims made about arts education and the decision-making capabilities it develops. In addition to revealing patterns caused by systemic constraints, the SenseMaker study points to outlier participant narratives that identify positive deviance within the system.

I argue the knowledge gaps, discussed above, undermine learners' abilities to develop decision-making agency, creativity, and critical thinking. These issues are of fundamental importance to arts education, and to education, broadly conceived. By gauging the nature of emergent learning (as opposed to programmatic learning) in Visual Arts, this doctoral study sheds light on structural dynamics in arts education and tests a methodology for studying the systems within which learners' arts-based decisions make sense.

Theorists

I have drawn on the work of several theorists for this doctoral study. While I discuss these writers' work, in Chapter One, I wish to introduce the most significant theorists, for my research, here. Their disciplines range from education, through neuroscience and psychology, to complexity theory.

Rubén Gaztambide-Fernández is an arts education and curriculum specialist. He was born and educated in Puerto Rico and is currently affiliated with the University of Toronto. Gaztambide-Fernández's critique of the European model of art, in arts education, added impetus to my own curiosity about the way artists make decisions. In his 2013 article, *Why the Arts Don't Do Anything*, Gaztambide-Fernández challenges the boundaries drawn around art, on social justice grounds. His provocation leaves European-trained arts educators, like me, at a loss for how to guide learners in their arts-based decisions. Gaztambide-Fernández's critique of the racism underlying the continued imposition of the European model, outside of Europe, motivates my search for a more equitable way of working with meaning. It has led me to seek meta-principles (Dehaene, 2020:35-37) which learners and teachers can use to navigate cultural boundaries and collaborate to create and recognise value in unfamiliar creative and cultural territory.

The idea of introducing multiplicity into the curriculum may seem foreign to educators who, like me, have been educated in a system that viewed reality as fixed and knowable. William E. Doll (1931-2017) was an educationalist and curriculum specialist who opposed the measured curriculum because it failed to account for the complex nature of reality. Doll drew on developments in science, such as chaos theory and complexity theory, to argue for a curriculum that more appropriately imagines knowledge as the by-product of a process in which learners are positioned in relation to a changing world. In writing for a time 'post' Modernism, Doll made recommendations for a curriculum that accounted for complexity. However, the field of education has been slow to embrace complexity as a way of understanding (aspects of) reality and has failed to take advantage of this author's insights. I argue that Doll's work offers educators very useful ways of thinking about how to work with knowledge as it unfolds.

The Italian-American neuroscientist, Antonio Damasio (b. 1944), addresses the elision of the body from our conception of rationality, in his 2006 book, *Descartes's Error*. His work provides a biological base for affect theory and underscores the importance of somatic systems in all decision-making processes. In a later book, published in 2019 and called, *The Strange Culture of Things*, Damasio argues that somatic states precede thinking, rather than follow it. Organisms act to stabilise homeostatic disequilibrium brought about by the interaction of the organism and its environment. Consequently, no account of cognition or decision-making that discounts the body is complete. I draw on Damasio's work to underwrite the model of agent-centred decision-making presented in this thesis. In particular, I argue, with Damasio, that agent-centred decision-making is impossible without the contribution of somatic brain systems. This means that, if learners are taught to suppress their bodies in learning, they are not able to take full advantage of their decision-making apparatus. At best, they will account for their decisions in ways that overlook the role of the body; at worst, they will model their decisions on those made by others.

Another neuroscientist whose work offers a perspective on evaluative decision-making is Joseph Le Doux (b. 1949). Focusing on the study of emotion and anger, in particular, LeDoux (1998) explains that emotions are evaluations of perceived objects or experiences that take the individual's personal history into account. The neural systems that process evaluations are automatic and unconscious. In other words, while the outcomes of these processes come to awareness, people do not have access to the processes themselves. This means that people cannot give a reliable account of the causality of their evaluative reactions to things. They may offer explanations that seem plausible, but that does not mean that they accurately account for the reaction. The implications of this research for evaluative judgements in art are significant. It means that when an examiner or critic gives an explanation for the way they evaluate an artwork, the explanation is likely to be inaccurate, no matter how plausible it sounds. This undermines the authority of the examiner's *explanation*, if not the *evaluation*, and requires us to re-examine the processes of assessment and grading.

Cognitive scientist, Sian Beilock (b. 1976), focuses on the body-brain connection. Her work is important for this doctoral study as it helps establish the idea that people infer embodied action from other people's language (e.g. conative words). I use Beilock's (2015) work to argue that material artefacts, especially those with traces of human action, cause similar forms of mirroring. Viewers with experience in particular types of processes with material can infer the embodiment that produced the artefact they observe. This makes it possible to argue that mirroring occurs intra-personally, between two brain systems within an individual. One of the systems concerned mirrors the behaviour of an observed actor, while another

system structures the information so produced, to make meaning. This can be taken further to suggest that, when viewing an artefact that has evidence of embodied actions used in its making, a viewer infers and mirrors the embodied processes used to produce the artefact, especially when the viewer has experience of the processes inferred in this way.

Stanislas Dehaene (b. 1965) is a cognitive neuroscientist interested in learning. In his 2020 book, *How We Learn*, Dehaene describes human learning by comparing it to machine learning. He notes the ways human learning is superior to machine learning, *for now*. A key feature of human learning is the way it allows people to anticipate how situations will play out, based on models derived from the integration of previous experiences with similar situations. There are several systems that contribute to the formation of these anticipatory models, but I draw on Dehaene's (2020) description of the actor-critic brain system in which one part of the brain proposes a mental model, and another, critiques it. This critical intra-personal collaboration helps the individual improve their ability to anticipate by elaborating on their mental models, as they have new experiences. Dehaene also argues that the brain repurposes biologically old systems for new learning needs. This has implications for the model of agent-centred decision-making in the process of making art.

Ellen Dissanayake (b. 1950) is an etiologist. She draws on her work in anthropology (1979; 2001; 2009; 2018) to propose ritualised behaviour[11] as 'aesthetic incunabula' or protoaesthetics.[12] The author observed that, across cultures, adult-infant interaction is governed by principles that have a lot in common with those governing aesthetic behaviour. While there may be some problems with trying to create rules for cross-cultural aesthetics, since aesthetics are neither stable nor universal, Dissanakaye's work points to the possibility of a higher-level meta-rule governing creative, cultural, and aesthetic practices. I infer

[11] Dissanayake (1979) uses this term to describe the communication games played by adults and infants across cultures. While the term, ritualised behaviour, usually associated with animal courtship behaviour, is seen as a display of adaptive qualities in the species, human adult-infant interaction displays the preferences of the infant brain for certain types of interaction. Adults are 'trained' by the infants' pleasure to respond in certain ways. This suggests that there are certain biological elements to the functioning of attentional systems, although they are likely to have individual and cultural modifiers, as well.

[12] From the observation of ritualised behaviour in human adult-infant interaction across cultures, Dissanayake observed five principles that functioned in all of the contexts. While culture appeared to dictate the modality of interaction, biology seems to dictate the principles by which these gain attention. These are, in Dissanayake's words: simplification, repetition, exaggeration, the development of expectancy, and elaboration. Dissanayake believed there was something in these principles that had a relationship to aesthetic behaviour and that they might form the incunabula of mature aesthetics.

from Dissanayake's work that the principles governing ritualised behaviour, and which seem to have something in common with some forms of aesthetics, more likely structure human attentional systems in generative ways. I link Dissanayake's work to that of Michael Tomasello (1986; 1995; 1999; 2007; 2010), and Stanislas Dehaene (2020) to argue that adult-infant interaction in the early childhood years develops social learning systems in the brain that can be repurposed for creative and cultural practices, throughout life.

Michael Tomasello (b. 1950) is a comparative and developmental psychologist. His work in joint attention[13](1995) and the origins of cultural thought (1999) makes it possible to link ritualised behaviour, the creation of cultural artefacts and joint attention. Thinking with Tomasello, I argue that artworks are perceived as having value when they achieve joint attention between two or more minds. In other words, value in art derives from inter- and intra-personal joint attention.

Karen Barad (b. 1956) is a Post-Humanist Feminist scholar with a background in Physics. She argues that the discursive turn has given too much power to language. While she acknowledges the role of discourse in shaping reality, she writes that materiality 'makes itself felt' (Barad, 2014b) in the intra-actions that construct an onto-epistemology. I draw on Barad's work in new materialism (2007; 2013; 2014; 2016; 2018) to think about the way material processes contribute to the emergent properties of artworks. When artists attend to the way material *acts on them* in their perspectives as-artists and as-viewers, they can work to achieve the synchrony that signals joint attention or connection with another 'mind'.

Alicia Juarrero is a philosopher, currently living and working in North America. Juarrero (1998; 1999; 2000; 2010) uses complex dynamical systems theory to account for intentional behaviour. She concurs with Damasio (2006; 2019) that the human brain is a complex adaptive system and, consequently, sees a decision as a temporary complex adaptive system, in the brain. Juarrero uses the notion of constraints to explain the structural dynamics at work in emergence. This allows me to theorise artworks (as mental objects produced by perception) and the decisions that artists make to produce artworks, as complex adaptive systems. Further, these entities can be seen as part of a multi-level complex adaptive system,

[13]Joint attention is a state of mind shared by two or more people in which they attend to the same thing and are aware of the mutuality of their attending. This phenomenon is considered the state in which adult carers (most often mothers) bond with children and are able to pass on family, cultural, and social values, and norms. Research (Schachter, 1979) suggests that parents who *respond* to the attentional interests of their children are more readily able to achieve joint attention than parents who initiate joint attention by trying to get the child to attend to the adult's interest.

with the reception context, the institution, and circulating ideologies as examples of additional levels. Complex adaptive systems theory makes it possible for me to position learners' decisions within the arts educational environment and consider how this context produces constraints that act on learners as they make their decisions.

Local-global relationships in this doctoral study

Gaztambide-Fernández currently lives and works in Canada, but was born and educated in Puerto Rico. Alicia Juarrero was born in Cuba and now lives and works in North America. Apart from these two writers whose global identities are more fluid than situated, the principal theorists chosen for this doctoral study are all situated in the global North. I use their work to make sense of my creative and teaching practices, which are situated in South Africa, part of the global South. This north-south relationship is part of the dynamic that was produced by education as a colonising project. It constructed knowledge that emanated from the North as universal and relegated indigenous knowledge as pertinent only to the local context. This dynamic is very robust and resists change, particularly in independent schools. It means that local critique of imported practices is ignored[14] by those who perpetuate the European model of art in South African arts education.

Consequently, I have argued for change on two accounts. The first is the social justice motivation behind Gaztambide-Fernández's writing, and the second addresses the dynamics that maintain Northern dominance in global education. The second argument, which is that overly top-down processes limit the development of creative and critical thinking in *all* learners, speaks more directly to policy-makers and educators who would otherwise be content to continue teaching a European model of art in South African schools. Since a fixed view of knowledge can be shown to constrain decision-making agency and, I argue, sensitivity[15] (Perkins, Tishman, Ritchhart, Donis & Andrad, 2000), in a time when international organisations, such as the World Economic Forum (WEF, 2018) is calling for greater attention to complex

[14] In conversations I have had with Visual Arts teachers in the IEB, the justification for maintaining the emphasis on European arts practices, such as representational drawing or the focus on European and American art history, is based on a persistent belief that these practices are superior and therefore foundational knowledge for all learners. Teachers do not mind adding some local content to the Visual Culture Studies syllabus, but they are not willing to give up the position that representational art is the foundation of cultural thought or of their practices as arts educators.

[15] David Perkins and his team (2000) at Harvard University coined the term, sensitivity, for the propensity an individual has for recognising that a situation requires a particular application of a cognitive resource or strategy. One might say that sensitivity is the disposition that causes transfer within individual intelligent behaviour.

problem solving,[16] decision-making, and creative and critical thinking, I hope this approach will find purchase where the other does not. It is also worth noting the primary importance Juarrero's thinking has for reimagining creative practice, arts education, and other contextual realities as (levels in) heterarchical multi-level complex *dynamical* systems. Her work speaks back to Newtonian conceptions of cause that have dominated the episteme imposed on education by the global North.

Positionality

In writing this thesis, I recognise that it is important to note my positionality, as a researcher, and to acknowledge that I am positioned within the system I attempt to describe, here, in particular ways. There is no objective reality outside of particular material-discursive intra-actions (Barad, 2014), which is to say that this doctoral study acts as an apparatus (Barad, 2013) that generates a particular (view of) reality. Implicated in the formation of the apparatus are my identities, the questions I ask, and the material nature of my inquiry. This includes my embodied presence (and the particular privilege it affords me) in Visual Arts classrooms and the sense I make of learners' narratives.

I am a White South African woman, an artist, teacher, mother, and researcher. All of these roles and identities position me in particular ways relative to the research. I grew up in apartheid South Africa and was educated in a Whites-only government school. My family and community were conservative Christians and most of the adults in my extended family were farmers. This is important for two very different reasons. On the one hand, my exposure to the natural environment made me who I am, in many ways. The land is not a backdrop to my life; it is *part of* my life. Trees, grass, water, and sky are not elements as much as characters in my narrative. Moreover, despite the lateness of my introduction to serious painting, I consider my childhood play with stones, clay, and water as experience with 'paint.'

On the other hand, growing up in a family that had title to land in South Africa exposed me to exploitative farm owner-worker relationships that followed racial lines. I also acknowledge that while White ownership of the vast majority of land in South Africa may be legal, it is largely unjust. White landowners

[16] Ironically, this formulation indicates a poor understanding of complexity. Problem solving is possible in complicated domains, but not in complex domains, since indeterminacy and unpredictability define such contexts. Learners would be well served with skills such as working with and making decisions in complex contexts, but to construct this as 'problem-solving' is to project a modernist view onto reality. It misses the point about complexity.

benefitted from the historical dispossession and impoverishment of Black citizens who were forced to work the land for wages.

I had very little exposure to Visual Arts at school, although I had private lessons in music and ballet. My introduction to modernist painting,[17] during my Bachelor's degree in fine art, offered me a profoundly different way of thinking than anything my education up to that point had allowed. To some extent, my decision to become an art teacher was motivated by wanting to create the conditions for learners to have experiences in arts education that I did not have at secondary school. While my secondary education taught me to discipline my body and deny my feelings, painting required me to draw on embodiment and the agency of material.

The private schools I worked in were all affiliated to the Independent Examinations Board (IEB) in South Africa. These schools levied high fees to offer competitive facilities and a wide range of cultural extra-mural activities. While there was no race bar at any of these schools, their fee structure drew mainly middle and upper-class families and due to the economic realities in South Africa, this meant that the White learners made up the largest racial group in these schools. The majority of the teaching staff were White. This resulted in the privileging of White knowledge and cultural norms, including the ways learners were expected to conduct themselves.

My interpretation of classroom dynamics, of the curriculum, and learners' narratives must all be seen through this positionality. Moreover, the auto-ethnographic nature of my creative practice-based research is limited by its particularity. However, despite my privileged position within the system I researched, I discovered important inconsistencies between my interpretation of the Visual Arts curriculum and my own practice. While learners will have their own preferential ways of working, this doctoral study is about the conditions that make it possible for learners to bring their diverse perspectives into arts education and find support as they learn to create artworks that display rigorous forms of creative and critical thinking.

[17] In this period of European art, the previously-polished surface of the painting was disrupted. Paint asserted its material nature. Colour was unmoored from representational reality and form dissolved before reassembling itself in new ways.

Clarification of terms

The transdisciplinary nature of this doctoral study necessitates using terms that may not be familiar to readers from arts education. I will provide clarifications for non-arts terms, as they are introduced in this text. However, three important terms require explanation and clarification at the outset. They are 'art', 'model', and 'complexity'.

Art

In this thesis, I will use the term, 'art,' for its brevity and because it connects this paper to a wider discussion around 'the arts' in education. However, I align myself with Gaztambide-Fernández's (2013a) rhetoric of art-as-cultural-production, which contests the privileging of European cultural knowledge and norms in universalised ideas of 'the arts' in education. While some may argue that the cultural production of non-hegemonic people is not and does not aim to be 'art' and is, therefore, best seen as 'material culture', this view fails to acknowledge that people from outside of Europe may choose to identify as artists and wish to think of their cultural work as *art*. It also fails to take accountability for the valorisation of European art as the cultural practice that all learners must learn.[18]

I acknowledge that people from different cultures make symbolic objects and engage in cultural experiences in vastly different ways. I appreciate that it would be unhelpful to subject all practices to an 'ideal' in which artefacts are produced for gallery viewing or to be staged, in formal ways. However, by inserting 'art' into education, without also making room for other forms of cultural practice, arts education has made European art a substitute for all the ways people, everywhere, make meaning of their experiences.

Art is, here, seen as a behaviour that benefits humans, in ways that are both instrumental and non-instrumental. The arts contribute to technological advances, through innovation. Just as important are the fundamental changes art introduces into societal behaviour. Since art co-evolves with the humans who participate in it, the explanations that can be given for art are as diverse as the people who participate

[18] Even though Arts and Culture, in Grades seven to nine, technically make room for different kinds of cultural practices, the fact that these subjects articulate to Visual Arts, Music, Dramatic Arts or Dance Arts, means that they are understood as preparation for the senior phase subjects. Since the senior phase subjects, mentioned here, showcase European-style art as the culmination of learners' achievements they constrain how learners and teachers think about their work in Arts and Culture. Even if some schools allow for culturally-specific practices (and here I mean non-European practices), these have no future for learners in the education system.

in it. However, the purposes of art we can make reasonable claims for, have implications for learning and teaching within the arts, and education, more generally.

In exploring the ways learners make decisions in the process of making art, I, therefore, acknowledge art-as-cultural production to be the various ways people 'constantly and creatively [arrange] and [rearrange] the materials available through symbolic work' (Gaztambide-Fernández, 2013a:226). For the 'art' in arts education to be generative and inclusive, it must accommodate approaches to meaning-making that derive from all cultures, and not the culture of Europe, only. It is for this reason that Gaztambide-Fernández calls for a rhetoric of art-as-cultural production. However, I am concerned that adopting a new term for creative and cultural practice in education will merely relegate these practices and allow European-style art to resurface as an *exceptional* practice. I have elected, rather, to find a meta-rule that accounts for all kinds of cultural practices and allows learners and teachers to collaborate in understanding and producing rigour, within their practices. I offer that an understanding of the way value is created and recognised will make it easier for learners and teachers to collaborate in the production of work that has value, whatever material and symbolic processes it draws on.

I consider that art and other forms of cultural practice facilitate joint attention (Tomasello, 2010: 62, 92-93) between the artist and one or more viewers, even if the artist is also the viewer. I use this as a meta-rule for the ways people make and attribute value within their practices. This makes it possible for collaborators to attend to *value* in creative practices, rather than the specificities (techniques, products) of particular (dominant) cultural practices.

While my experience and specialisation lie in Visual Arts, I believe that many of the points made in this thesis apply to various modalities and disciplines, including Dance Arts, Musical Arts and Dramatic Arts. By using the plural form, *arts*, I signal the inclusion of these modalities in the discussion on decision-making. I also argue that many points made here apply to *the arts in education*, where arts-based pedagogies may be applied in other subject areas.

Model

The word, model, is sometimes understood as a rigid conceptual structure that is imposed on contexts in unwavering ways. However, I use the word to refer to conceptual structures that people create to help them navigate the complex nature of experience. Following Damasio (2006:173-201), Dehaene (2020:19), and Bleilock (2015:126), human thinking and learning progress by structuring experience. In this thesis, the term, model, includes, among other concepts, the formation of categories, the creation of rules to

govern the formation of categories (Tversky, 2011a; Dehaene, 2020:29) and theory of mind (Boyd, 2009:116).

Mental models help us structure our experience of the world. A related neural strategy is known as a forward model. This helps us 'predict the outcome of our actions (and the actions of others) before they have happened' (Beilock, 2015:126). Where mental models can be applied to concepts and the ordering of abstract ideas, forward models seem to be related to embodied actions on or with material. Beilock explains:

> *When we decide on an action and our brain signals the muscles to perform it, a copy of this command is created that estimates the end result of the movement. It gives us feedback from our senses before we have actually completed the action* (2015:126).

Forward models allow people to anticipate how objects in the environment and other people are likely to behave so that they can prepare to act appropriately, in response (Tversky, 2011a:,503). They also help individuals anticipate how their actions with embodied and material processes are likely to play out.

While models are often inaccurate, they help conserve mental energy by focusing attention on prediction errors (Dehaene, 2020:199). In other words, models help people know what details they can risk ignoring. By habituating[19] attention to details that stay the same, individuals can free up attentional space for the ways particular experiences *differ* from their anticipatory models. While some models do become rigid, the notion of a mental model does not rely on rigidity but incorporates fluidity and flux. What causes people to either maintain inflexible models or update[20] their models, progressively, may have something to do with context. In highly-conventional contexts, a model can prevent further inquiry, through a form

[19] When processes are repeated often enough for the cortex to correctly predict its structure, the system stops rewarding the prediction and only rewards predictions related to earlier or associated objects and ideas (Rescorla & Wagner in Schultz, 2006). The end result of this early-detection system is an automatic response which does not even pass through consciousness. Skills become habituated after much practice. While we can describe our actions as we learn a skill, once it has habituated the knowledge becomes tacit. This has implications for the application of skill or knowledge in complex domains. While these are helpful in complicated domains, in complexity, we need to be able to revisit the physical or elemental qualities of concepts and objects so that we are able to make new connections between them. It explains why mature artists often move into new territory or 'deliberately regress' so that they become more attentive to the feedback they get from their sensorimotor systems.

[20] Updating is an important executive function skill (Miyake et al., 2000) as this allows new information to be fed back to the cortex, so that improved and elaborated predictions can be made. Updating might be thought of as the habit of attending to feedback. This is more important than skill or starting knowledge in a complex system. As we make small changes to a system, sensitivity to feedback allows us to respond rapidly to either dampen or support the pattern that emerges.

of confirmation bias. In uncertain and ambiguous contexts, the brain's learning systems (Massi, Donahue and Lee, 2018) seek out feedback that helps to refine or elaborate on the model. Therefore, while some people use models to impose structure on experience in top-down ways, models are not necessarily fixed. They can be adapted. However, it is not possible to navigate the complexity of life without mental models.

Complexity

The words, complex, and complexity, are used freely in ordinary conversation and are generally taken to imply that something is difficult. More particularly, this difficulty is attributed to the fact that the problem in question has many inter-related parts. I have also heard people use the term, systems thinking, in ways that suggest it accounts for thinking in and about complex systems. However, many systems are not complex, but linear, even if they are made up of multiple parts. For example, the engine of an aeroplane is made up of multiple inter-related parts and is difficult to understand. This does not make it complex, however. The parts of the engine do not self-organise. Even when these systems fail, the failure can be explained in mechanistic terms. Understanding such systems requires expertise, but these are not complex domains.

In contrast to the closed systems of engineering, biological systems can produce new levels of order with surprising potential for freedom. The human brain is a startling example of the freedom that higher levels of organisation in biological systems can attain. Similarly, human systems produce new levels of organisation that are capable of much more than individuals can achieve on their own. Further, meaning-making systems, such as language, produce complex meanings from the inter-relationship of symbols.

While there are many theories within complexity science, I focus my thinking through the lens of complex adaptive systems theory. In addition to being composed of many interrelated parts, a system that is complex-adaptive has two main features: 'fractalness and self-organization' (Doll, 2008:196). Complex adaptive systems 'cause themselves' (Juarrero, 1998:242). Further, their fractal or isomorphic nature create a particular kind of order that is unlike linear notions of cause and effect.

Since it is difficult to determine whether the system one is dealing with is complex or merely complicated, people can mistake the one for the other. This can lead to educators believing that knowledge in the arts can be stabilised, in language, and transmitted to learners, when in fact, knowledge in the arts arises from learners and teachers interacting with material as equal partners.

The Cynefin[21] Framework (Snowden & Boone, 2007) is an ontological framework for distinguishing between domains based on the kind of order these contexts exhibit. The framework denotes five domains: obvious (recently renamed 'clear'), complicated, complex, chaos, and disorder (renamed 'confusion'). The domains to the right of the framework have predictable order, while the domains on the left are unpredictable. The central domain, confusion, represents the state of affairs when decision-makers do not know what kind of order they are dealing with. In keeping with the material-discursive (Barad, 2013) nature of reality, Dave Snowden (2020) says decision-makers can identify a system as complex when there are multiple competing hypotheses and insufficient time to decide between them.

Using the Cynefin Framework, I offer examples of ontological domains from cultural practice. In the clear or obvious domain, I offer the exercise of creating a colour wheel, showing the primary, secondary, and tertiary colours. In the complicated domain, I suggest the process of drawing a portrait using formulae that help determine the position of facial features, in relation to one another. In the complex domain, artists engage with material and other minds to create meanings in ways that the artist(s) have not encountered before. Chaos is the domain in which exploratory processes push material-symbolic coherences too far so that they fall over into meaninglessness. Artists may discard these objects, but they often seed innovative processes in future artworks. Thinking with the Cynefin framework, educators and learners who treat complex processes as if they are complicated (for example) are in the disordered (confused) domain.

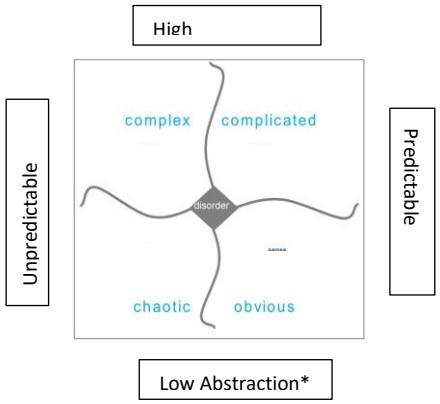

Figure 2: Cynefin Framework (Adapted from French, 2013). In later versions of this framework, the 'obvious' domain has been renamed the 'clear' domain, while 'disorder' (in the centre) has been renamed, 'confusion'. The addition of low and high abstraction *as tendencies are derived from a very early version of the Cynefin.*

[21] *Cynefin* means 'multiple places of belonging' in Welsh.

To the extent that complexity theory undermines the idea of a single meta-narrative, it has been associated with Postmodernism. This theory has come under criticism, in part because Postmodernism had no alternative meta-narrative with which to replace the various pre-modernist and modernist narratives (religion and Newtonian conceptions of science). Consequently, it created a vacuum which was filled with the individual customer/consumer as the arbiter of value and ushered in a neoliberal capitalist ideology that has since infiltrated many parts of our socio-cultural world. This, in turn, has been responsible for the marketisation of every part of life (Björkman, 2020).

The reader may wonder whether complexity is being used as a new meta-narrative, in this thesis. Since the broad theory claims to be able to accommodate the interconnectedness of multiple, unpredictable (and to some extent, unknowable) components and related systems, it seems to offer a perverse kind of certainty in a decidedly indeterminate context. Seen another way, it offers comfort in the face of uncertainty. It replaces the fear that chaos and complexity represent the absence of order with the assurance that order emerges from these systems, even if this is only visible in retrospect. In this form of order, we humans share agency with the non-human (Barad, 2014).

Therefore, while complexity theory (and complex adaptive systems theory, in particular) allows me to view ideology, politics, social dynamics, educational institutions, and learners as decision-makers in the process of making art as an interrelated multi-level system, I do not use complexity to flatten these dynamics to linear versions of causality. I specifically use complex adaptive systems theory to allow the perspectives of disparate groups and discourses to be seen to contribute to collective understanding. If there is a meta-narrative in this doctoral study, it is that apparently opposing forces (for example individualism and collectivism, or innovation and convention) produce reality as paradox. Being aware of the dynamics, describing them, and noting our relationships to them, are some of the ways we can make sense of situated experience.

Complexity theory does not view reality as objective, nor does it see inquiry as a way of piecing a representation of reality together. Rather, complex adaptive systems theory explains how primary forces, such as emergence and entropy, co-create a constantly-changing reality. When applied to the systems I am focusing on in this doctoral study, learners' decision-making within arts education, complex adaptive systems theory allows me to identify constraints that act in bottom-up and top-down ways to produce the system these decisions are embedded in. This provides 'warm data' (Bateson, 2015:9) that clarifies what those decisions mean, in context.

Chapter outline

In addition to this *introductory* section, which contains the conventional background, aim, and rationale of the PhD, this thesis contains four chapters and an epilogue, titled, (In)conclusion.

Chapter One weaves together a conventional literature review and the theoretical background of the PhD. It culminates with a description of the model of decision-making in uncertain contexts I derive from the theories discussed.

Chapter Two documents and discusses the SenseMaker study into learners' decisions in the process of making art. It offers an interpretation of the results, along with implications for arts education and suggestions for arts learners and teachers.

Chapter Three documents, describes, and discusses the creative practice-based research component of this doctoral study. It creates a space for reflection on the way my practice took the doctoral research project further.

Chapter Four offers a discussion of the key learnings, through the whole PhD process. It makes an argument for the way these findings contribute to knowledge. In particular, it argues that this thesis offers those of us involved in learning and teaching in the arts or in creative practices ways in which we can collaborate in creating and recognising value in cultural processes, even when these are unfamiliar and emergent.

Finally, this thesis offers an epilogue, *(In)conclusion*, in which I foreground an artwork made by a learner I taught some years ago. For me, this particular artwork demonstrates many of the ideas this thesis has been engaged with and simultaneously challenges assessment regulations, which meant that this artwork would not have obtained a passing grade, as an examination piece.

A note about the visual objects

This thesis includes reproductions of drawings and paintings made by me, as research for this doctoral study. I have also inserted *actual* drawings. I have done this because reproductions do not do justice to the materiality of the objects, nor do they allow for the embodied response that is so central to my theorising about art. I do not think of these objects as art, but as thought experiments or objects to think with. Consequently, I invite the reader/viewer to consider how these objects make themselves felt, as matterings (Barad, 2014) that permeate the gaps between words and meanings. A more complete documentation of the body of work made for the PhD can be found here or by scanning the QR code, below:

Chapter One

In this chapter, I combine some of the conventional roles of the selective literature review and the construction of a theoretical framework. Since many of the theories arise from outside of the arts or education, the discussion offers examples and analyses that situate these theories in the domain of the arts in education. I will also use this chapter to propose a model of decision-making in the process of making art.

To cover the range of concepts I introduce, I have divided this chapter into five sections. The first section deals with the arts education context and draws on literature from within the field that initiated this doctoral study. The second section turns to research from other fields that offer useful perspectives on decision-making, viewed as an *interior* process. In the third section, I consider theories that construct decision-making in the process of making art as a *social* process. The fourth section discusses the idea that ritualised behaviours *model role-switching* in adult-infant interactions and proposes that this practice produces the neural systems that make perspective-taking possible. Finally, the fifth section offers complexity theory, and complex adaptive systems theory, in particular, as frameworks that bring the various ideas and theories together.

> *If you did any art in primary school, you probably did a few rubbings or frottage as it is called in art history books. This was where you placed paper over the textured surface of a wall or floor and rubbed on it with a crayon. It's an almost magical experience seeing an image come to light. A particularly strange aspect of this exercise is that the image is produced by the architectural material, but it looks quite different. It also makes one more aware of the presence of forms we may have learned to ignore. Architectural forms in schools have a particular way of not appearing. It's not possible to focus on the generally ugly buildings that house school students, for long. Everything about them speaks to the discipline that education visits on tender bodies.*
>
> *When I taught architectural form and sculpture (I thought of them as the same thing, really, just different scales) I would point to the walls and windows of the classroom and to our bodies to make the relationship between 'volume' and 'being inside' apparent. Windows and doors are openings for the body while apertures entice the eye. We measure space with our bodies. In school, the bodies we use to make sense of the world must all be standardised.*

Bodies and buildings are what a school consists of, materially, yet both are elided so that we pretend they are not there. We focus on the activities of the mind; the intellect rules. Teachers' authority lies in their 'knowledge' and in the institution, both of which are invisible. Yet the designers of schools as-institutions considered, or seemed to, the way bodies should be schooled. There can surely be no coincidence to the way corridors channel the flow of students from one classroom to the next. Doorways create a kind of bottleneck. They slow down the movement of people but seem to increase anxiety as students and teachers negotiate rank, passing through.

Bodies bring buildings into being, just as architectural forms act on us. Buildings allow us to behave in certain ways and prevent other ways of being. Nobody likes the idea that schools are factory-style buildings, but you just need to drive past them to know this is true. Blocks of classrooms, laid out in parallel, are surrounded by dirt, paving, or grass, depending on the geography and the wealth of the community. Inside the building, students are processed like products-in-the making. The timed bell moves children along in groups. They all get the same treatment; no exceptions. No deviance is allowed. Neither are bathroom visits, out of turn; eating in lesson time; sitting when you are meant to stand; or standing when you are meant to sit. Bodies are understood as machines for sports and sites of disease (sick notes are required to confirm this.)

Discipline erases the body's particularities through uniformity. Classrooms, desks, chairs, corridors, and windows all have to be the same. When a body in uniform walks into a school building, the particularities of that form of embodiment align with the others. Sameness erases difference. No part of the body must escape the limits of the uniform. No wisps of hair, flesh, nor nails should overflow the boundaries drawn by the code of conduct. This is how to be a 'true-blue' child.

If a house in a dream can be a symbol of psychic space, what does a school building represent? What are its doors and windows? Clarissa Pinkola Estes (2008) writes that questions are keys and that if you have been given keys you are obliged to find the doors that they unlock. However, there are also elements in the psyche that do not want to uncover what these doors hide. (Personal notes)

Section 1: Arts education

Making art requires a multitude of micro-decisions that make up the creative process. Many of these decisions are so quick, subtle, and fluid that the artist may not even be aware of them as decisions. Some people may even argue that artists work with non-decisions, in the sense that chance events and the physicality of material can make surprising contributions to the process and the final product (if there is one.) However, I argue that making art involves making decisions in one way or another. One possible way artists make decisions is by using a forward model (Beilock, 2015:126) to consider and select options for action. Another way that artists make decisions is through retrospectively vetting and/or editing the effects of past actions and chance occurrences. Together, these form an actor-critic network that predicts[22] or proposes, self-evaluates, and self-corrects (Dehaene, 2020:19).

In the field of arts education, some writers touch on the topic of decision-making, albeit indirectly. Donald Schön's (1987) writing about the reflective practitioner describes various aspects of a self-critical mode of working. The author distinguishes between reflection-on-action (a retrospective view), reflection-in-action (an explanatory accompaniment to action, in the present), and reflection on reflection-in-action, which has a meta-cognitive component (Schön, 1987: 22 – 40).

One of the concepts I draw from Schön's writing is the *repertoire* of strategies a practitioner brings to a decision point. Although Schön (1987) notes that, in comparison with the student, a studio master (in architectural design) has a particularly rich repertoire of resources to draw on; I argue with Gaztambide-Fernández (2013a:226) that, in Visual Arts, learners also bring rich repertoires of experience and associative meaning to their material processes. While architectural design can, conceivably, involve consequential 'errors', I would argue that these relate to the functional aspect of design, including safety and fitness for purpose, or regulatory requirements. The aesthetic and significatory dimensions of architecture and Visual Arts are subject to evaluation, but there is no such thing as a 'wrong' decision or design.

While Schön (1987) writes about the education of reflective practitioners, he stops short of describing how agent-centred decisions are made. He quotes a conversation with a dean of an engineering school who said, "We know how to teach people how to build ships but not how to figure out what ships to build"

[22] In this view, the prediction is a forward model that anticipates what kinds of actions would succeed in the particular context. Prediction error (Dehaene, 2020:199) occurs when the prediction does not match the feedback that arises from perceptual systems. The prediction error causes the individual to estimate (predict) what actions are necessary to close the prediction gap. This leads to self-correction, over time.

(Schön, 1987:11). The view that agent-centred decisions are beyond understanding or research (Goldberg et al., 2012) hampers learners' and teachers' ability to collaborate in decision- making and creates a vacuum that is easily filled by convention. The danger of this is that learners adopt convention in the place of creative inquiry.

In a higher education context, Ajjawi, Bearman and Boud (2019:1) argue similarly for caution in adopting a standards-based approach to assessment. They write that 'the dominant perspective [on the use of standards in assessment] prompts educators to make standards "transparent" for students, inferring stability through a written explication'. In their critique, they ask readers to consider that fixed written standards belie the complexity, contextual embeddedness, and tacit nature of expertise. Their concern is that a 'representational epistemology holds that knowledge is something that is separate from the knower and untainted by culture, values or power; knowledge can thus be "reconstituted" at a later time, in a different place or by a different group of individuals' (Ajjawi et al., 2019:4-5).

Ajjawi and others (2019) continue by offering a socio-material approach in which standards are enactments, not artefacts. They make space for tinkering by educators and learners, through collaborative judgment and micro-adjustments that turn the enactment of standards into a performance (Ajjawi et al., 2019: 9. In this view, the materiality of standards 'participate' with humans 'in the production of reality, often in unpredictable ways' (Ajjawi et al., 2019: 11). These views help to disentangle value from a fixed, written standard and position it in practice. I also find it necessary to separate value in art from the artwork seen as an independent outcome, the product of a creative process. I use the notion of practice in ways that are similar to Ajjawi et al's (2019) 'performance' or Barad's (2013) 'performativity'. Applying their writing to the context of art, I find that value does not exist outside of its making. Also, the act of making includes judging the artefact-in-progress and selecting and adjusting material resources (including any written or documented 'standards' as material).

In my experience, arts education has focused attention on the artwork as artefact, rather than on the practice-based *thinking and acting* that learners need to engage. The official IEB Visual Arts curriculum attempts to recognise the importance of process, by assigning points to the documentation of process in a 'Visual Journal'. Learners must provide evidence of their processes and these must be seen to have contributed to the artwork as product. Receiving a good score for the Visual Journal hinges on learners' abilities to identify what kinds of evidence stand in for processes that are often hidden from the learners themselves (see LeDoux, 1998). As a result, the Visual Journal becomes another *product*.

The institutionalisation of practice, whether it is the practice of making or of assessing, can be self-defeating. In Visual Arts, a deliberate attempt to introduce more emphasis on process turned the Visual Journal into a product. Dina Belluigi (2009: 708) found that certain Higher Education studio arts programs that espoused values of 'creativity' and 'criticality' were undermined by assessment practices, and inadvertently encouraged a 'strong reproductive ethos' with 'surface or strategic approaches to learning' If students lacked an understanding of 'the rules of the game', they tended to follow the suggestions of assessors rather than develop their own voices (Belluigi, 2009:708). The author warns that when compliance replaces autonomy (Belluigi, 2009:707), it renders individuals 'bereft of the capacity for creativity (Belluigi, 2015:9).

The imperative of assessment places pressures on curriculum designers, examiners, and teachers to identify and describe the qualities of desirable arts processes and products, *in advance*[23], and in ways that support claims for objectivity. I argue that the very act of describing the 'ideal' artwork, in the context of school-based programs (as analytical rubrics attempt to do), introduces rigidity in a subject that claims to value inquiry, exploration, creativity, and criticality. I am particularly concerned that it *disciplines* creative processes to make them conform to conventional ways of thinking. In this context, 'creativity' becomes a vague term used to ratify examples of learners' work that meet predetermined criteria.

While guideline documents promote notions such as creativity, formative and summative assessment practices communicate to learners that they should rather make artworks based on received models, such as the representational art of Europe. This kind of communicative contradiction is confusing to learners. While they expect to be able to explore their own meaning-making processes, they find that *certain kinds* of artworks regularly receive good grades.[24]

Assessment criteria such as 'creativity' and 'originality' position learners in a *double bind.* Bateson and others (1956) came up with the term, *double bind*, to describe the disempowering state of individuals, caught between conflicting messages. In family dynamics, a parent may say they love a child while presenting body language that indicates they do not. In Visual Arts, learners are encouraged to be 'creative' but censured for working outside of conventional boundaries. These conflicts are even more

[23] Accepted practice in education involves creating Intended Learning Outcomes and assessment criteria, in advance of learning activities. These are meant to create transparency around what it is that is valued and how learners will be assessed.

[24] At the IEB annual User Group Conference, examiners show case examples of learners' artworks that they consider exemplary. This has the effect of replicating the styles and processes of those artworks throughout IEB schools.

damaging because they cannot be discussed, without being perceived as a challenge to authority. Bateson and colleagues (1956) related the concept of a double bind to the development of schizophrenia in individuals. In the context of Visual Arts, the double bind diminishes learners' decision-making agency and makes them dependent on teachers' judgments regarding their artworks-in-progress. This has implications for learners' ability to identify as artists since the mental model of 'art' is fixed by people other than the 'artist'.

In school-based arts education, a fixed model of art has perpetuated a *historical* and *context-specific* view of art, and imposed this on *all* learners, *everywhere*. In the context of South Africa[25], historically fixed knowledge is also colonial knowledge. In arts education, ideas and practices that educators might think of as having 'stood the test of time'[26] correspond to the body of knowledge that was exported from Europe as part of the colonial project (Gaztambide-Fernández et al., 2018:2). If Visual Arts learners do not approach the process of making art as inquiry, they become passive recipients of ideological and historically fixed notions of knowledge in the arts and miss the opportunity to develop contextually-sensitive ways of thinking through creative and cultural practices.

[25] South Africa was subject to Dutch colonisation from 1652, and British control from 1795 until 1961. The education system in South Africa was based on the British system and implemented in order to 'anglicise' the Cape (*South African History Online*, no date).

[26] In conversations with colleagues, it was clear that they regard realistic drawing skills as foundational to art-making, irrespective of the student's context.

Figure 3: from the veiled series. Monoprint.

Gaztambide-Fernández (2013a:226) argues that, by acting as a classificatory term, the 'art' in arts education excludes the knowledge and cultures of Black and Indigenous people from that which is valued. This attitude is born out of racism and perpetuates race-based grounds for attributing value (Gaztambide-Fernández et al., 2018). While many advocates for the arts in education claim that arts experiences have beneficial effects on learners (e.g. Ashbury & Rich, 2004), Gaztambide-Fernández (2013a:218) is critical of this generalisation. In his article, *Why the arts don't do anything*, Gaztambide-Fernández (2013a) argues that for arts education to be shown to produce certain desirable effects, it must be understood narrowly. We cannot make objective, scientific claims for the way art promotes learning in other fields (for example) without clarifying what 'art' is. Since claims about art's effects are made to support arts advocacy, they also entrench narrow conceptions of cultural meaning-making as a universal good.[27]

To clarify, claims for the value of the arts are usually made about hegemonic forms of art, which are based on European models of culture and thought (Gaztambide-Fernández et al., 2018). This makes a fixed view of 'art' a social justice issue. While many well-intentioned people see education as 'the great leveller', Gert Biesta (2010:39) argues, following Rancière (1991), that equality must be seen as a *starting point* and not the *goal* of education. Otherwise, arts education would be guilty of normalising anti-Black racism and calling it culture. Since this doctoral study is concerned with what it is we value in the arts, it is also concerned with how those values construct makers and receivers of art as valuable.

To address, this, Gaztambide-Fernández (2013a) calls for a *rhetoric of art-as-cultural production* to replace the *rhetoric of effects*. I find this call valid, both because of the way 'art' excludes non-hegemonic people and because the mental models we have of 'art' constrain the intentions we can have when making. At the same time, the term that Gaztambide-Fernández (2013a) recommends, *cultural production*, has undesirable connotations, in some parts of the world. Artists in Africa have complex relationships to international notions of 'art' and 'culture' and many African cultural workers choose to think of the work they do as 'art'. I also use the term, art, in my writing because it connects my research to the context of Visual Arts in schools, and also to wider conversations about 'art'. My response to Gaztambide-Fernández's call is to change my mental model of the art in arts education, such that it accommodates the ways people, everywhere, arrange the symbolic and material contents of their lives (Gaztambide-Fernández, 2013a). I do this by trying to find a logical rule (Dehaene, 2020, p. 11, 31) that accounts for the

[27] The Dana Foundation's 2008 publication, *Learning, Arts and the Brain*, showcased a number of studies, which pointed to correlations between arts educational experiences and other desirable effects, such as increased executive function.

ways people, across cultures, decide when a cultural artefact has value of a particular kind. As a result, the nature and identification of socio-cultural value are central to the inquiry of this doctoral study.

In asking how artists make decisions in the process of making art, I also ask how they recognise socio-cultural value when they see it. The question is pertinent for several reasons. In making these decisions, artists must engage in generative processes as well as classificatory and evaluative processes. Decisions must be made *such that* the result of actions contributes to perceptions of particular kinds of cultural value. Artists' decision-making processes critically engage cultural values as notions and as evaluative perceptions. To the extent that they inquire into the location of these boundaries, they participate in (re)drawing the lines. While this description of creative practice positions 'art' as a non-stable domain, educational theory and practice encourage the projection of clear goals and learning outcomes.

Goldberg, Funk and Podell (2012) refer to these as agent-centred decisions, because they are evaluated from the perspective of their usefulness to the agent who makes the decisions. The authors[28] (2012) reveal that researchers in psychology avoided researching agent-centred decision-making because the disciplinary methodology was dependent on having a standard against which to compare participants' responses. Therefore, it can be argued that the non-veridical, non-linear, unpredictable, and complex nature of agent-centred decision-making has left it under-researched.

I have heard arguments that stabilising the curriculum increases access, and therefore social justice. I have also heard colleagues argue that predictability in the assessment of learners' artworks helps them support learners to achieve success. While I will argue against these perspectives in this thesis, these positions explain why decision-making in the process of making art has not received a lot of attention. Rather than support learners' ability to navigate uncertainty in the context of art, educators focus on certainty.

To my knowledge, the only formal occasion for focusing on decision-making in the IEB Visual Arts curriculum is when studying the work of Marcel Duchamp (1887 – 1968). Grade twelve learners, in the IEB, would be expected to be familiar with Duchamp's (1961) argument that a found object (such as a urinal, in the case of the work known as *Fountain*), *became* art when the artist *selected* it to be considered *as art.* While learners encounter the artist's decision, through Duchamp's work, they may not be familiar with statements made later in his life, in which Duchamp acknowledged the role of the audience in

[28] Their own work begins to address that gap by looking at strategies participants use to come up with as many examples of a particular category, as possible. None of the strategies that produce examples is wrong; nor is there a preferred set or order in which strategies should be applied.

receiving the object as art and giving it posterity. In this doctoral study, I am concerned with both aspects of evaluative decision-making processes, one in which artists put something forward and another, in which audiences receive those notional objects, as art.

Consequently, for something to qualify as art, it must be the product of a collaborative relationship between the artist and the audience (even if the artist is also the audience of their work.) Consequently, Visual Arts learners must be able to 'accurately and responsibly diagnose the strengths and weaknesses in their own forms of cognition and work' (Cunliffe, 2007:10). In this approach, Leslie Cunliffe (2007:10) shifts the emphasis from teachers making judgements to students developing 'capacities to responsibly diagnose the strengths and weaknesses of their own knowledge-rich performance' and 'accurately form judgements about their own learning' . However, Cunliffe does not address *how* students make these judgements, apart from suggesting it involves an alignment between an agent's motives and actions. This doctoral study aims to address this knowledge gap.

In trying to account for expertise, Schön (1987) offers that a studio master has a rich(er) repertoire of resources to draw on, (than students do). However, Perkins and others (2000) argue that *access* to such a repertoire is insufficient to explain performance. In educational psychology, the problem of transfer[29] (National Research Council, 2000: 51- 78) concerns the observation that while learners may be able to demonstrate knowledge in one context, they do not always apply the knowledge in another. However, Perkins and others (2000) did not find that the problem was related to changes in context.

In their study, participants were presented with two kinds of tasks in the same context/test. The first task required them to identify their own strategies and resources for solving a problem. The second task-directed them to particular resources and strategies they could be expected to have access to, and then to solve the problem. Close to 80% of participants were not able to solve the problem in the first instance but were able to do so in the second. The authors identify *sensitivity* as the capacity to recognise that a particular context offered an opportunity to apply resources participants have access to. Perkins and his team (2000: 5) argue that, since tests give very specific instructions to learners about the cognitive

[29] When learning that is acquired in one context is applied in a different context, it is said to have transferred. Transfer of learning may be its true measure. However, the ethics of surveilling students in their lives outside of the classroom makes this kind of assessment impossible. Near transfer occurs when the context is very similar to the original context of learning. Far transfer is rare, since the learning is applied in very different circumstances. It is thought that near transfer is all we can really hope for in education (Perkins & Salomon, 1992) but the more abstract concepts are, the more easily they transfer (Dehaene, 2020:31-33).

resources and strategies they should draw on in completing a task, these assessments only tell us what students can do, not what they *would* do, independently. This suggests that a focus on content and technical skill in arts education may not develop learners' sensitivity to decision contexts or their ability to select suitable resources and strategies.

If education aims to prepare learners for life outside the classroom, our assessments fail to measure this readiness. This is, partly, because tests remove ambiguity and uncertainty by directing learners to the strategies and resources they should draw on (Perkins et al., 2000), whereas life outside the classroom lacks this support. If we have ambitions for learners to become agentic decision-makers, we should pay more attention to the development of sensitivity. Understanding how people make decisions in uncertain contexts will contribute to this knowledge and support the development of learners' decision-making agency.

The capacity to *appropriately select* from a repertoire of resources and strategies can be described in different ways. Perkins and his team (2000:3) recognise that *decision-making* is one of the ways people do this. The uncertainty of real-life (outside of the lab or classroom) decision contexts activates learning centres in the brain (Massi et al., 2018). This suggests that agent-centred decision-making can be thought of *as learning*. Decision-making in the process of making art is not the application or transfer of prior learning, but a process that requires artists to make sense of a decision context, with prior knowledge, experience, and real-time feedback.

Section 2: Decision-making as an internal process

There are many fields with an interest in decision-making, broadly conceived. Some of these are the Psychology of Judgement and Decision-Making; Economics; Behavioural Economics; the education of professionals (lawyers, doctors, architects); entrepreneurship; and organisational leadership. All of these are, to some extent, driven by the cost of 'error' in practice. Since the subject is under-researched in the arts and education, I draw on a wide range of fields to piece together a model of decision-making in uncertain contexts. I use ideas taken from these sources to design the study into learners' decision-making in the process of making art. While I do not have a background in these fields, I draw on William E. Doll's (1989:251) thinking that patterns recognised in transdisciplinary studies offer us heuristics for curriculum design.

Susan Gantt and Yvonne Agazarian (2010) explain that complex human systems are *isomorphic*. This means that the pattern or dynamics of one level in a system can help us interpret the dynamics of the

system overall. They argue that human groups form a 'mind', 'an embodied and relational process that regulates the flow of energy and information'… characteristic of every living human system' (Gantt & Agazarian, 2010:522). The authors explain that, in group psychotherapy, '[U]understanding something about how the subgroups in a group are discriminating and integrating information informs us about both the individual members and the group-as-a-whole' (2010:521).

I use this idea and the more general concept that complex systems are best understood as patterns or patterns of patterns to look for synchrony across the whole system. Consequently, when research findings from disparate research domains resonate with each other, I see this as researchers viewing the same phenomena through different lenses. While research from the biological sciences helps us verify some of our reflective narratives, artists' accounts of the ways they navigate uncertainty may indicate where biological research can be of use to a practice-based field. Alternately, if biological research demonstrates that traditional practices in education are unhelpful as ways of supporting learning, the field of education ought to reconsider its practices.

To illustrate the patterns identified in the research on agent-centred decision-making, I find that the narratives of surgeons who must choose between a laparoscopic procedure or an open operation (Dominguez et al., 2004) resonate with Antonio Damasio's (2006; 2019) work in neuroscience and also with affect theory (e.g. Barad, 2007). Similarly, I find that artists' narratives resonate with Barbara Tversky's (2009; 2011a; 2011b; 2014; 2019) work in psychology and Stanilas Dehaene's (2020) work in neuroscience. Ellen Dissanayake's (1979; 2001; 2009) research in anthropology identifies patterns in human behaviour that can be accounted for by the concept of joint attention (e.g., Tomasello & Farrar, 1986), in psychology). Finally, Complex Adaptive Systems theory (e.g., Juarreo, 1998; 1999; 2000; 2010) makes it possible to view all of these self-structuring systems as different levels of a larger, material-discursive (Barad, 2013) system. In the section that follows, I will draw on work in various disciplines that are traditionally outside of 'arts education'[30] to build a more coherent model of decision-making in uncertain contexts, such as the process of making art.

[30] I have never considered any field or topic 'outside' of the concern of education or art. However, there seems to be a need to explain why I do not draw primarily on the work of arts education researchers, for this doctoral study.

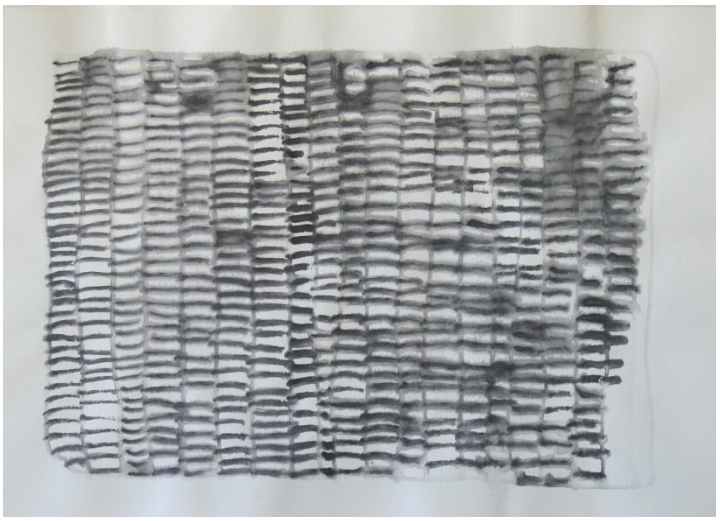

Figure 4: isomorphic patterns. soluble graphite on paper

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One view of agent-centred decision-making is that it is an internal process that occurs within an individual, while other perspectives position it as socially situated and constructed. I will argue that, in the manner of complex human systems, it is, paradoxically, both. Since the individual is situated within social systems, the larger systems constrain individual processes. In turn, individual biological affordances can be seen as components of group-wide systems for attributing value in social and cultural contexts. In this section, I focus on research that constructs decision-making as an internal process. I will turn to theories concerning the social nature of decisions, in the section that follows this one.

Perkins and others (2000) see sensitivity as the bottleneck that prevents learners from accessing their abilities, in a given problem situation. This locates the 'problem' with the learner. In a very different context, the neurosurgeon, Antonio Damasio (2006: 34-51) became curious about a particular patient's inability to apply demonstrated knowledge in the context of his work and relationships. The results of this failure were painful and costly to the individual and so were not likely to be a matter of mere disinterest. What made the case particularly curious, was the fact that the patient scored very well on standard intelligence tests but did not behave in what might be considered an intelligent manner. His intellect was, therefore, intact, but not functional in the context of his work and family life. This narrative is important because it links Damasio's work in neuroscience to the problem of learner performance versus learner ability.

Damasio (2006) stresses the importance of viewing the brain as a system, rather than as a collection of discreet parts. The case mentioned above led the neuroscientist to understand that parts of the brain associated with intellectual processes function in tandem with other parts that process emotions and feelings.[31] These affective components of experience are processed by systems that incorporate the body and the brain. Even when people have fully functional[32] intellectual systems, as in the patient mentioned, above, these do not function well in the complex contexts of lived experience without the co-operation

[31] Damasio sees emotions as biological drivers that prepare the organism to respond, automatically, to particular stimuli. The urge to approach, withdraw or explore is a body-brain positioned by emotions in response to stimuli that is either attractive, repulsive/dangerous, or interesting. Following these automatic responses and the movements within the body that they trigger, the updated state of the body is represented in the brain and comes into awareness as feelings. Feelings occur after the emotions have set the body-brain and its systems *in motion*. They are the conscious component of the changes in chemical and neurological states the body has triggered in the brain. Emotions and feelings are an essential and integrated part of decision-making, because they filter all the options for response in line with the past experiences of the individual and with the individual's best interests in mind. They deliver a judgement, to the cortex, of the range of options available, with both valence and degree (Brown & Dissanayake, 2009).

[32] As demonstrated in IQ tests, for instance.

of emotions and feelings. This has implications for the ways that learners live out their knowledge or make decisions in uncertain contexts.

In Damasio's (2006:173-201) theory, decisions are made through a collaborative process involving the emotional system; embodied *feelings* triggered by the emotional system; and the structuring role of the cortex. The emotional system and the body's updated feelings bias the decision-maker in favour of or against particular options so that the reflective brain system is left with a shortlist. Rational processes can then be applied to this more manageable set of options. If we consider how impractical it is to, rationally, work through all the possibilities that may exist in a given situation, we can appreciate that the affective system simplifies and improves our ability to function in our daily lives. Damasio (2006:34-51, 78) argued that the failure of one of his patient's three main brain systems had caused the whole decision-making system to fail.

Decision-makers use rational processes, but they also draw on emotional associations to any or all of the elements in the decision context (LeDoux, 1998:59, 167). They also make use of embodied states arising from their automatic emotional reactions (Damasio, 2006; Norman, 2004. While school-based curricula regard cognition as something that happens in the brain; Damasio (2006) makes us aware that the learner's emotions and embodied responses are just as important in producing what we consider to be intelligent behaviour. In his view, the mind is the emergent property of the body-brain.

The term, *affect*, which is in common use in arts education, can be considered the combined effects of emotions and the body as a single system. Alternatively, Donald Norman (2005), groups the emotions and the body into a single *behavioural* system. However, the importance of Damasio's (2006) theory is the way it helps us see the separate, yet connected, roles played by the three main systems: emotions, the body, and the reflective system. It has particular significance when religious and educational ideologies[33] denigrate the body as sinful, in need of discipline and of no importance. While a failure to progress through the school system is often regarded as a deficit of intellectual knowledge, from Damasio's (2006) work, we can see that emotional or somatic impairment, *or under-development*, could equally be to blame. Moreover, just as emotional impairment can affect decision-making, excluding the somatic system from our conception of knowledge may produce a form of *cognitive* dysfunction.

[33] I argue that Christian National Education, the apartheid educational system, excluded the body from its concept of knowing and that this exclusion is closely related to the race-based discrimination that plagues our country, to this day.

Education has focused attention on and institutionalised the acquisition of intellectual knowledge. However, to understand decision-making in the process of making art, we need to gain some understanding of the two systems that education has neglected. From Damasio's (2006) account, the emotional system is an automatic and unconscious system that primes the organism for survival. It produces immediate reactions to perceptual events, which prepare the body to fight, flee, or freeze. The result of such an emotional response is a body with changed neurochemical and hormonal levels; muscles in a particular state of tension; and the brain in a new state of alertness. These changes happen automatically (Damasio, 2006; LeDoux, 1998). We do not interpret a scene as dangerous and then get ready to respond; the body responds and once it has done so, we become aware that we feel threatened (Beilock, 2015; Damasio, 2006; LeDoux, 1998:43-45).

As a neuroscientist, Joseph LeDoux (1998) is interested in researching emotion. He explains that emotional associations are both unconscious and irrational. This is partly because many of the associations we have with objects, ideas, events, or experiences are formed in brain systems that are not accessible to language. LeDoux (1998:59, 167) adds that, since the association can be made with any aspect of the context in which it was encoded, it may have an irrational causal-relationship to its trigger. For example, a particular wallpaper pattern may have been in the background when we had an emotionally charged social encounter. If the encounter was positive, we might unconsciously come to like patterns of that kind, without knowing why. For this reason, the emotions and somatic systems become repositories of a person's particular history and affect the decisions they make in highly personal ways (LeDoux, 1998).

Since emotions are easily read in another person's body language, they play a role in the social construction of value (Norman, 2004). In his book, *Educating the Reflective Practitioner*, Schön (1987) narrates student accounts of learning to evaluate design. In this story, a student claimed that they attended to the studio master's *body language and tone of voice*, rather than the content of the master's explanations (Schön, 1987:82, 83). In my teaching practice, I found it helpful to attend closely to learners' body language when they discussed their work with me This helped me understand how deeply they were committed to particular ideas and, consequently, which to prioritise in the feedback I gave them. Similarly, my daughter explained that, while she could tell I wished to give all her ideas value (and let her make her own decisions) she could always tell which one I preferred, by the expression on my face.

Value in design or art may be absorbed by attending to the non-verbal communication of others in a community of practice. What escapes exploration in Schön's (1987) work, is how the studio master associates particular aesthetic qualities with value, in the first place. We do not know why the studio

master, in Schön's (1987) account, encoded these designs, in particularly valued ways. From LeDoux's (1998:32) research, *the studio master does not know*, either. Even though the master uses design principles to explain the changes he makes to a student's drawings (Schön, 1987:56), we cannot be sure that there is any causal link between the principle he expounds, and the move the master makes. More particularly, even if the move he made has a *plausible* link to the explanation given, LeDoux (1998:32) challenges the idea that the move was made *based on* the principle. Following the neuroscientist's reasoning, the evaluative decision was made in an unconscious, automatic, and intuitive way; the rational explanation came afterwards.

A number of my colleagues in arts education attribute their sense of value in the arts to their art school education, but LeDoux (1998) argues that people's preferences are not always produced in rational ways. Since preferences, and the associations they are based on, are often unconscious, the ways people assign value may differ from the explanations they give for these evaluations. The associations people have with perceptions may well stem from experiences in their personal histories that are unrelated to art. In this way, the Visual Arts teacher's personal life sets the bar for her evaluations of cultural practice. Consequently, in a country with the repressive history South Africa has, we should not expect value judgements in the field of the arts to be free of race- or class-based bias.

Sian Beilock (2015:23) writes about the mind-body connection; in her book, *How the Body Knows its Mind*, she explains that action precedes awareness. For example, we become aware of certain interpretations of events, because we reacted to them in particular ways. Embodied knowledge allows people to adjust actions, *mid-execution, without a conscious decision*. An artist can intend to make a mark in a particular place, reach out to make the mark and then, change the action, mid-gesture, as they realise that the result would not be beneficial. To make this correction, their behavioural systems create a 'forward model' (Beilock, 2015:126) of the painting *as if they had made the mark*; they evaluate the (imagined) result, and they adjust their proposal before (without) executing it.

Since contingency governs the decisions made in the process of making art, the brain systems involved are more likely to be those associated with learning (Massi et al., 2018) than with providing correct answers in a test situation. It, therefore, makes sense to draw on the work of Timothy Buschman and Earl Miller. Buschman and Miller (2013) studied the brain systems involved in learning a new manual skill. Using EEG (electroencephalogram) technology, the neuroscientists observed two general brain regions collaborating on the acquisition of the new skill. The first region to become active (in very small increments of time) was the sensorimotor region, which is responsible for controlling the hand and for the visual

feedback about the hand's position in space. This region's activity was perceptible as a distinct high-frequency brainwave pattern. Soon after, the cortex[34] responded with a much lower-frequency brainwave pattern. Over time, as learning progressed, the cortical pattern changed until it became synchronous with feedback from the lower brain region. Buschman and Miller (2013) concluded that synchrony[35] represents the entrainment[36] of the two systems, which produces the newly acquired manual skill. In other words, while the two brain regions are still working at getting the task right, there is no synchrony, but this increases and resolves as feedback from the sensorimotor regions allows the cortex to make adjustments.

To draw out Buschman and Miller's (2013) explanation, the cortex responds to the first set of brainwaves by *proposing* a structure (represented by the lower range frequency). One might think of this structure as a generalisation of the micro-data arising from the hand and eye. Since the first proposal is inaccurate, the lower brain regions continue to provide disconfirming feedback. As a result, the cortex responds by adjusting its proposal, until it achieves synchrony. While it is relatively well-known that long-established skills lead to the development of physical neural networks in the brain, Buschman and Miller (2013) argue this research indicates that the first effective collaboration or entrainment can be recognised[37] as synchrony, or the two systems 'humming together' (Buschman & Miller, 2013: 3).

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[34] I have chosen to generalise the specific regions of the brain, since this thesis is not located in biology. I also prefer to use terms that help a lay reader connect the brain system to the kinds of functions it is generally associated with. For example, Damasio (2006) writes about the cortex as having a structuring function. Sensorimotor systems can be understood as those which mediate movement and sensory feedback.

[35] Following Buschman and Miller(2007), the cortex structures thought and learning through a system of brainwave synchrony. Lower level systems involved in learning are the first to be activated. These systems feed forward information from the environment and the behavioural system. In EEG scans, the brain activity can be observed as high frequency waves. The next system to respond is the cortex. It proposes or predicts a lower-frequency pattern that attempts to synchronise with the feed forward. If synchrony is not achieved or if changes in the environment produce new information, the lower level systems feedback the updated information and the cortex responds with an elaboration on its original proposal. This process continues until the prediction and feedback are synchronous. The humming that occurs is the entrainment of the various subsystems into a new complex adaptive system, capable of more than the lower level systems on their own. A single thought or decision may be such a temporary complex adaptive system (CAS), while a repeated process, such as that involved in learning a new skill will lead to physical changes in the neural structure and produce a permanent system. (Neurons that fire together wire together.)

[36] Discrete systems begin to work together or *entrain*, spontaneously, under certain conditions. Entrainment is not the same as adding components, like ingredients in a cake mix, it involves the separate systems creating a new complex adaptive system that is more than the sum of its parts. Entrained systems are no longer discrete, but they, nevertheless, carry their histories 'on their backs' (Prigogine in Juarrero, 2000:37).

[37] This research does not make claims about what the brainwaves produce; merely that they signal something that is happening in the brain.

Synchrony between brain systems has also been observed across two individuals. Suzanne Dikker and Matthias Oostrijk (2014) created an art and neuroscience collaboration, called, the *mutual wave machine*, in which they demonstrated that two people engaged in mutual gaze produce synchronous brainwave patterns. When participants' brainwaves synchronised, they were able to power a chariot that the collaborators had wired to respond to the brain-wave signals. A later project, called *Neuro-Tango* (Dikker & Oostrijk, 2014) applied a similar process to the cooperation between couples dancing the tango. By changing the modality of the participants' connection from visual to movement, the study's focus shifts from *mutual gaze* to *joint attention,* or what Dikker, Silbert, Hassan and Levin (2014) call brain-brain synchrony. In videos of this project created by Dikker and Oostrijk (2014), we see two couples dancing the tango and two screens showing the information coming from the EEG machines. For the benefit of viewers, the signals are translated as two brain-like icons, which move closer together or further apart, depending on the level of synchronisation. It is clear that synchrony in brainwave patterns corresponds to smoother dancing moves. Presumably, the partners were more 'in tune' with each other in those moments.

Dikker et al (2014) note that when we speak of being 'on the same wavelength' as someone else, we mean that we have a connection or understanding. In the chapter section that addresses theories of art as social connection, below, I draw on Beilock's (2015) work, to suggest that synchrony, which signals joint attention, is produced by *mirroring*. Beilock (2015:126, 50) demonstrates that mirroring can occur across time and space, and through conative language[38] . I propose that mirroring is also produced through the mediation of an object, which we perceive as having been *acted on by a person*. For example, when we see an object that has been carved in wood, we sense the embodiment of the carver, who carried out those actions.

[38] Reading words like *kick*, *pick* and *lick* activates motor areas of the brain (Beilock, 2015:50).

Figure 5: Dikker & Oostrijk (2014) Neurotango from The mutual Wave Projects. Available from http://www.suzannedikker.net/art-science-education

Figure 6: Dikker & Oostrijk (2014) Neurotango, from The Mutual Wave Projects. Available from http://www.suzannedikker.net/art-science-education

Before continuing with the next section, however, I would like to summarise two main ideas I have been working with, so far. The first concerns the *entrainment* of both conscious and unconscious systems in mental operations. Decision-making, seen from the perspective of the individual and observed as an internal process, is already a complex system. It involves the collaboration or entrainment of three basic biological systems, which represent the individual's perception; and learned responses to the object of perception, acquired through their particular experiences, over time. Biological systems encode the individual's personal history into the feedback that arises from perceptual systems. These associations are often unconscious and automatic, which means that the decision-maker cannot know all the reasons for her preferences, even if she can offer an explanation that sounds plausible.

The second, related, idea concerns *synchrony*. When the systems involved in making a decision achieve synchrony, we might say that a new decision has emerged. Synchrony may be the communicative mechanism that allows otherwise separate brain regions to cooperate; more conservatively, it signals that they do (Buschman & Miller, 2013). Synchrony is a sign of entrainment between the various subsystems and a sign of neural emergence. Synchrony can also be achieved across two different brains, in mutual gaze or joint attention, and when this happens it is accompanied by affiliative affect (Brown & Dissanayake, 2009) or what Suzanne Dikker and Lauren Silbert describe as the 'feeling of clicking with someone' (MAI & Blumenson-Cook, 2020). Hasson, Ghazanfar, Galantucci, Garrod, and Keysers (20122 demonstrate that brain-brain coupling accompanies the social construction of learning. The link between entrainment, synchrony, and affect may be probed as a way of helping learners develop decision-making capacities.

These theories have obvious implications for arts education. Not only should we be helping learners become more aware of the feedback provided by emotional and embodied responses to their developing artworks; we should also acknowledge that, as educators, our evaluations of learners' artworks are not based as firmly on espoused theories[39] (Belluigi, 2015), as we claim they are.

[39] By theories, here, I mean that educators will use some form of arts theory to back up their suggestions about how to improve an artwork. For example, the rule of thirds, in composition or the idea that one should not use more than two primary colours in a painting. Belluigi's work goes further. She finds that theories about innovation and exploration are espoused in curricular documents, but that lecturers sometimes override students' experimental choices by pointing them to the work of established artists.

In agent-centred decision-making, decisions hinge on *what matters* to the decision-maker (Goldberg, et al., 2012). However, since we are always situated in social, cultural, political, and other environmental contexts (and these matter to us), our feedback systems loop the environments (Juarrero, 2000:20, 27) through our decision-making apparatus. There are, thus, two parts to the *mattering*; the personal and the situated. To accommodate the first part, the self-as-artist needs to pay attention to their feedback systems, in making decisions. To be aware of the second part, artists need to consider the possible reception of the artwork by an audience or audiences to which the artwork connect(s) them as artist. Since the awareness of a potential audience's reception must be internalised by the learner, they must assume the perspective of the audience, to be able to generate feedback about the way an artwork will be received. In this mental operation, the artist identifies as audience.

The research discussed in this section gives some indication of internal systems and processes that bring an artist's personal histories into the decision-making process. In the next section, *Section 3: Art as Social Connection*, I will consider research that helps us understand how artists might consider the reception of their work, in the process of making their decisions.

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Figure 7: from the material disobedience series. Ink on paper.

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I believed I did not care about bodies, but rather, about (mental) attitudes. One day, I took a student aside to give him a piece of my mind. He was making absolutely no effort to bring sketchbooks to class and every time I gave him a new sheet of paper to begin a drawing, he lost it. I was angry. I'm not sure if I was peeved because he was 'wasting' my efforts or whether I was afraid I'd be judged for his failure, but I let him know that his projected trajectory did not look good. I saw his body collapse inward, just a little, as the inner energy that kept it up and held things together was extinguished. I was mortified to discover that I had read depression and a lack of confidence as defiance. He did not defend himself, but his body let me know how wrong I had been.

There is a difference between pouring paint over an image, in frustration, and finding that ink or watercolour sometimes bleeds past carefully-drawn lines. In the first instance, I am 'in control'; in the second, I am not. This was particularly vexing, since, in these drawings, I had carefully demarcated the 'between' space of inter-personal relationships. These were not objects I knew or expected someone to recognise. I was seeing the negative space between bodies as a 'thing'. Now, bleeding paint disrupted that in ways I had not anticipated.

The accidental nature of such a moment only becomes significant when we decide to keep its effects. Many errors occur in the process of making art. Some highly skilled people might consider their task in painting or drawing one of controlling the medium to a particularly fine degree. Mistakes are not welcome in such processes. Either they are corrected or the work is discarded. What made it easier to keep this chance event in my series was the way it challenged my understanding of the concept I was exploring. What had made me think that the charged space of relationship between two people could be contained between their bodies? Surely, the paint was drawing my attention to the fluid nature of relationships and the lack of control we have over the ways we are affected by each other.

Leaking and bleeding are such bodily associations. None of these processes is considered presentable. Public displays of emotion must always be contained within boundaries of control, even if the show verges on excess. Losing control can be humiliating.

Then, suddenly, I could almost do what Morandi had done. I let forms flow into one another. It may have been easier for me because I was using one colour, only. Still, I felt as though I could think the way he had thought. I could look at objects; see what was not there and refuse to see what was (Personal notes).

Section 3: Art as social connection

While this paper is not concerned, only, with artworks that have been accepted into a particular canon or canons, the reception of something *as art* is necessary for 'art' to be a category. This reception can take the form of an agreement between the identities of artist and viewer within a single individual, or it may play out more publicly. An evolutionary[40] view of art does not deny the huge cultural variety in content and modality. It does claim, however, that some aspects of the way we structure artworks are carried out *in response* (Damasio, 2019) to the way our biological systems perceive[41] something, *as-art*. In other words, people structure those things they wish to be considered as special, with the reception of an audience, in mind. Even when the art is made for the personal viewing of the artist, the decisions involved in making art are shaped by the effect the artwork will have on the individual *engaged in viewing*.

Ellen Dissanayake (1979) has approached art from an ethological perspective. Her anthropological research into practices that broadly align with the notion, art, crosses many cultures. An ethological approach to art is concerned with understanding the advantage(s) that art may have held for people and which caused it to be retained as a broadly practised human behaviour. Dissanayake's (1979) theory is that arts practices help to make life special. She relates this special quality to meanings that are engendered at crisis points in a community's social life. Examples are births, deaths, and the approach of war.

Dissanayake (1979) surmised that the ability of art to gather a community in the production of new shared meanings mitigated the stress of the serious life-threatening challenges they faced. More recent research, from neuroscience, has confirmed her suspicion. When people move together in unison, as is often the case in community arts practices that include singing and dancing, oxytocin is released in the brain (Brown & Dissanayake, 2009:53; Goldstein, Weissman-Fogel, Dumas & Shamay-Tsoory, 2018:2529). Known as the bonding neurotransmitter, oxytocin reduces or counters the effects of stress (Brown & Dissanayake,

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[40] In the thesis, an evolutionary view, as in Universal Darwinism (Blackmore, 2000:52-53), states that variety, heredity, and selection pressure contribute to the evolution of a system. In this view, complex systems pass on traits if these prove beneficial to the organism, in some way. While some traits are adaptations, like the long necks of giraffes, which adapted to browse the tops of trees, others are exaptations. Feathers probably developed to keep dinosaurs warm, but may have proved beneficial for those that accidentally fell out of trees. The surviving members of the species would have passed on their feather-producing genes to offspring. Applied to art, an evolutionary theory suggests that art would not continue to be practised if it had no value for people, that it, outside of art-for-art's-sake. This does not diminish the richness or sensitivity of art's function in our lives, but motivates us to understand what those functions are.

[41] This term must be understood to include interpretation, along with the mere excitation of sensory systems such as seeing, hearing, feeling, sensing, etc.

2009:53). Physical mutuality produces oxytocin, but so do the many social bonding behaviours people engage in (Brown & Dissanayake, 2009:53). A particular form of this is infant-carer interaction that enculturates new members into a family.

Dissanayake (1979) uses the term, ritualised behaviour, to refer to the exaggerated forms of social communication that adults adopt with newborn babies. These performances are based on the particular cultural and social norms of the community[42] and employ different modalities (sound, touch, movement, and visual - face). No matter the modality, five principles governed these interactions, across cultures. These were simplification, exaggeration, repetition, the development of expectancy, and elaboration.

Dissanayake (2009) noticed a striking similarity between these principles and those that govern aesthetic behaviour, broadly speaking. Consequently, she named these 'proto-aesthetic principles' (Dissanayake, 2009) and described them as 'aesthetic incunabula' (Dissanayake, 2001). By this, she suggests that they introduce the young in any culture to the particular aesthetics of their group.

The author notes that the five principles she observed are not cultural, but biological. Even newborn infants pay attention when these principles are employed and adults adjust their behaviour in response to the infants' pleasure. It is, therefore, conceivable that these principles are heuristics for gaining the attention (Boyd, 2009) of an audience in social and cultural exchanges.

This thinking links aesthetics and attentional systems in important ways (and offers another evolutionary advantage art has had for people.) However, to denote its extraordinary quality, I argue the attention-focusing object or practice must first act as a pointing gesture (Tomasello & Carpenter, 2007) and then produce some form of mutuality, whether with the mind of the artist (when this is someone else) or between the two identities of the self-as-artist and the self-as-audience[43].

The noticing involved in making and receiving art is, therefore, a *social* event. In arts-based events[44], at least two minds share an awareness of mutuality and attendant affective experiences (Brown & Dissanayake, 2009). This idea overlaps significantly with a description of a particular psychological state, called, joint attention. In this state, which is usually fairly short-lived, two people both attend to the same

[42] As such, they privilege particular modalities, which may be understood as the first 'content' of the conversational exchange.
[43] William Kentridge refers to the conversation he has between his self-as-artist and self-as-critic, in making art. (2014)
[44] Here, viewing an arts object is also an event.

thing. In addition to being aware that they attend to the same thing, they are also aware of the *mutuality* of their attending (Dikker et al., 2014); and of 'shared'[45] emotional and somatic experiences (Beilock, 2015: 126). Joint attention is most often studied in the contexts of infant-carer bonding and the development of social learning systems, which it promotes.

Traditionally, joint attention was studied concerning two people whose proximity makes it possible for them to attend to shared targets and also to each other. However, Tomasello (2010:62, 92-93) argues that cultural artefacts achieve joint attention across time and space. According to Tomasello (2010:41), cultural artefacts focus community attention on shared values across time and space. This allows younger members of a community to connect with the minds of elders from their historical past; and facilitates in maintaining the continuity of culture.

In some of the first forms of joint attention that children learn, physical pointing directs the gaze of the collaborative partner to the target object (Tomasello, 2010:89). We also use gaze-tracking as a way of inferring what another person is looking at and this can be quite accurate at identifying the object of another person's attention (Tomasello, 2010:62-67). Further, our behavioural systems interpret the body language and other non-verbal cues of a collaborator, so that we can read their emotional state with reasonable accuracy (Norman, 2004).

The functioning of our behavioural systems most likely produces the state of joint attention, with its attendant affective experience. While psychologists agree that joint attention develops social learning systems and carer-infant bonding (Wolf, Launay & Dunbar, 2015), neuroscientists have some insight into the mechanisms that make us believe we can connect.

In an earlier section, I referred to Dissanayake's (1979) explanation that the affiliative emotions (Brown & Dissanayake, 2009) produced by art were linked to oxytocin-mediated movement, in unison. I also proposed that the affective experience was linked to brain-wave synchrony. Work by Dikker and Oostrijk (2014); Beilock (2015); Wolf et al (2015), and Buschman and Miller (2007) helps build the argument that *paying attention to* the same thing may produce brainwave synchrony similar to that produced by physical movement in unison. In the section that follows, I will explore the idea that a viewer projects embodied

[45] This paper argues that the shared nature of experience can never be proven but is judged to be mutual on the basis of synchrony. This topic will be discussed in more detail in a later section.

physicality into their perception of an *object* and, through this, achieves synchrony between two systems within their brain.

The art historian, Michael Baxandall (1985), foreshadowed this idea when he suggested that a critic describes an artist's style by imagining the embodied gestures and movements the artist made in the process of making the artwork. While Baxandall (1985) applied this to the description of style in painting, we can see it clearly in other art forms, as well. For example, a gestural mark left on the surface of a sculpture can suggest the trace left by the artist's hand or thumb. This trace of another human body seems to transcend time, geography, and cultural boundaries. It leads us to believe that we connect with the artist and may produce a form of intra-personal synchrony. (However, this is not the same as saying we know what meanings the artist was working with.)

Of course, some artworks show no direct trace of the human body. Material that has no trace of the artist's hand may conjure the illusion that it formed that way through chance. Like the Surrealists in the early twentieth century, Penny Siopis (Koch, 2012) sets up conditions for material to take on the appearance of making marks by chance. Donald Judd's (1928-1994) sculptures are made by factories, according to the artist's instructions. When we view these works, there is no trace of the artist's body, but its absence may equally contribute to the embodied response that is (part of) the content of a minimalist artwork.

Beilock (2015:126) gives us a view of this phenomenon by focusing on the body-brain connection. The neuroscientist explains that the motor centres of the brain are active even when the body appears to be still. Since motor centres help us understand the actions of others and the conative meanings of language, we activate the motor centres as part of our interpretation of another's movement, whether actual or implied. (This has interesting implications for the use of metaphoric language, a point that will be developed at a later stage.) Beilock (2015:50, 118) writes that conative language activates the motor centres, through the example of the word, 'give'. If someone speaks of *giving* an object, such as a gift, the brain activates the section normally involved in reaching out the hand, in a giving gesture. What is surprising, however, is that, when we use the word in a metaphoric sense, as in 'giving an idea', the brain does the same thing. Our motor centres help us interpret the metaphoric quality of the word, to give, by activating movement systems, even though our bodies appear still (Beilock, 2015:125, 126).

Beilock (2015:125-127) goes on to explain that when we watch another person perform a physical skill, such as sport, we also unconsciously mirror the movements involved. If we have some experience in the

skill, we can go even further: we anticipate the sportsperson's movements before they happen. This tells us that the brain uses embodied memory to create a forward model (Beilock, 2015:126) of reality. Following this logic, I argue that a painter and a photographer[46] do not look at a painting in the same way. They may look at the same object, but their embodied responses would differ markedly. As a result, they would have different ways of attributing meanings to the gestural marks in the painting's surface and making inferences based on this. Different audiences *complete* (Duchamp, 1961) the artwork in different ways.

The viewer intuits the artist's actions and mirrors those. This creates a proxy for the artist in the viewer's mind. In viewing the artwork, Baxandall's (1985) critic adopts a second identity: that of artist. While Boyd (2009) writes that artworks allow us to see into the mind of the artist, and Tomasello (2010: 41) claims that artefacts share 'mind' across time and space, following Baxandall (1985) and Beilock (2015), any mutuality achieved is likely to be between *two intra-personal* identities or subjectivities within a single viewer. The same is valid for the artist who must take on the identity of the viewer to imagine the work's possible reception. If the two brain systems involved synchronise, the person is likely to experience neurotransmitter rewards and positive affect. This would confer a positive valence on the perceptual experience.

Our *embodied* response to art is a complicated issue, for a few reasons. First, the viewer's internal mirroring of the artist's imagined gestures is often unconscious (Beilock, 2015) (and therefore uncritical); second, the ability to mirror the embodiment of the artist is dependent on some experience in the same kinds of procedures (Beilock, 2015:214 - 216); third, artists sometimes produce work via third persons or machines; and, fourth, arts objects may be removed from the contexts of their use in multi-modal performances, and therefore subject to misinterpretation[47]. However, despite the problems this poses for 'truthful' interpretation, neuroscientists tell us that perception is *automatically* accompanied by an affective interpretation. The confidence people have in their interpretations are based on internal synchrony and not on truly knowing another's 'mind' (Boyd, 2009).

[46] Assuming the photographer is not also a painter. However, experience with 'paint' need not be arts-related, but may be experienced with other substances, like food or mud, that have material properties similar to paint.
[47] This is the case with many African cultural objects, which were part of costume worn in particular ways by specific individuals, in multi-disciplinary events. Removing the masks or headdresses from their performative context makes it impossible to understand their meanings.

Section 4: Switching roles and perspectives

In the section above, I have argued that the attribution of value in the perception of art is dependent on synchrony between two internal body-brain systems of an individual. These systems represent the primary role (the individual as-artist, or as-viewer, as the case may be) and the secondary role, which is a proxy for the other collaborative perspective (the individual's *projected* self-as-viewer or self-as-artist). It does not seem possible for an individual to hold two perspectives in consciousness, at the same time (e.g., Miyake et al., 2000:56), and so the individual engaged in collaborative apprehension of an artwork must switch back and forth between the two perspectives.

Baxandall (1985) argued that a critic intuits the actions it took an artist to make an artwork. Similarly, I argue that an artist must imagine viewing the work, as a viewer *who is not also the artist*. William Kentridge (2014) speaks of moving back and forth between his two selves, as-artist and as-critic while making art. He describes a physical process of walking, in the studio, while making his drawings for projection. The to-and-fro movement of the embodied artist mimics the way real conversations, between two distinct partners, force us to take up positions, as initiators and as respondents, in a complex pattern of give-and-take. If the capacity to engage in intra-personal perspective-taking is an important part of making art, then arts education should focus on developing this capacity, rather than expecting learners to receive instruction from a more qualified other.

Even when it is intra-personal, the nature of this capacity must be understood as social. It follows, then, that ritualised behaviour offers us important clues about the way this capacity is developed. In addition to the proto-aesthetic quality Dissanayake (1979) ascribes to ritualised behaviour, this dramatisation of social interactive norms develops joint attention (thus laying down learning networks in the brain) and models the perspective-taking that I argue is inherent in making art. Ritualised behaviour teaches infants to engage in conversation, generally. More particularly, it does this by *positioning* the infant in the roles of initiator and respondent, in turn.

In a typical exchange of this kind, the adult (or older child) initiates a connection with the infant through a simplified, yet exaggerated, display of social conversational norms. The hope is that the infant will respond with some display of pleasure, for example: smiling, laughing, or moving their limbs. The first stage positions the adult as an initiator and the infant as-responder. However, if the infant responds with the desired reaction, the adult will *respond to* the infant *as if the infant had initiated the exchange*. For example, where language accompanies the exchange, the adult's initial gesture might include the word, 'hello'. If the infant responds favourably, the adult repeats the greeting, but this time, as if the infant had

initiated the exchange. A very interesting thing happens here. The infant is passive, at the start of the exchange. However, when her *response* to the adult is socially desirable (a happy face, rather than turning away), *she is re-positioned as an initiator* by the adult who *responds to her*. Without being in a position to play the elaborate social games that exist in a community, the infant is taken through the steps of this exchange by the adaptable and responsive behaviour of the adult.

A similar example can be taken from Meki Nzewi's[48] account of the way certain African communities initiate young children into communal dancing and musical rhythm. In this communal artistic practice, someone will begin with a single, simple rhythm, through singing, dancing, clapping, or percussion. Participants may also beat the rhythm out in physical movement or dancing. Another person will overlay the first rhythm with a second, simple rhythm. Now, the interaction of these two rhythms begins to complicate the music. One by one, participants enter the group performance by adding another layer to the music in ever-increasing complexity. Often, these participants will enter the space in the centre of the circle for a short while, then return to the edge.

A young child could be included by an adult who takes them along and encourages the child to dance or clap the single rhythm he or she has chosen. By mimicking this one rhythm, the child becomes part of a complex social interplay of musical and dance elements. If the community of musicians responds to the duo as-contributors, they position the child as a contributor, too. The socially-constructed experience lays down the neural networks that develop social learning systems in the brain.

Parents' anxiety about their children's learning often motivates them to begin instructing children in (pre)reading and number skills, at an early age. However, Frances Schachter (1979) notes that joint attention occurs more frequently in mother-child interactions when the mother *responds* to the child's interest than when she *initiates* conversation. Further, the responsive type of mother-talk is associated with greater confidence, language development and general school-readiness in the children (Schachter, 1979).

This research, by Schachter (1979), is supported by recent neuroscience research done by a team of researchers, of which Dikker is a member. In this study, Pan and others (2020) measured brain-to-brain coupling between a learner and an instructor and compared this with measures of learning. They found

[48] I first heard this explanation on a radio programme many years ago. Although I cannot acknowledge the speaker, I have heard a similar explanation from Meki Nzewi, a musicologist at the University of Pretoria. Nzewi specialises in African music.

that a scaffolded and individualised approach produced higher states of learning retention than explanatory and non-individualised approaches. This supports the idea that responsive education is better suited to engaging learners and also leads to better retention of learning concepts.

Figure 8: from the material disobedience series. Ink on paper.

In Dikker's and Oostrijk's (2014) work with joint attention and mutual gaze, the artwork makes joint attention visible through digital representations or the movement of a 'chariot'. This produces the impression that joint attention is a single objective state and that participants' brain systems communicate with each other (Hasson et al., 2012).

In brain-to-brain coupling, communicative collaborators can affect the brainwave patterns of their partners. However, the mechanisms for transmitting and receiving brainwave signals are the perceptual and motor systems of the brain. In other words, perceiving the behavioural systems of a communicative other affects the brain-wave patterns of the receiver (Stephens, Silbert and Hasson, 2010; Hasson et al., 2012). To explain this, in the context of ritualised behaviour, the adult and child each mirror the motor systems of the other. Throughout their protoconversations, they modify their behaviour to the context and the communicative patterns of the other (Hasson et al., 2012:116-119).

In ritualised behaviour, there may be two separate 'joint-attentional' states taking place. One of these would be the intra-personal synchrony occurring within the adult; the other would be a separate intra-personal synchronous state occurring within the child. To elaborate, the adult gathers information about the infant's embodied and affective systems (Norman, 2004). Then, the attentive and responsive adult mirrors (Beilock, 2015; Winnicott, 1971) the child's emotional or embodied state. The adult now has a primary and secondary (sympathetic) brain system focused on the interaction. These correspond with identities as *initiators* of joint attention and *responders* to joint attention. The primary brain system is the one in which the adult is aware of reaching out to the child. The secondary (sympathetic system) is the one that observes and mirrors the child's response. If these two systems achieve synchrony, the adult infers that they have made a connection with the child. Similarly, the child who first mirrored the adult now sees herself mirrored by the adult (Winnicott, 1971). This produces two perspectives in the child, which also synchronise. The inter-personal systems are connected through the collaborators' ability to perceive each other's body language (Norman, 2004).

Ritualised behaviour develops multi-subjectivity (multiple perspectives within a single individual) and perspective switching.[49] This allows for the multiplicity, relationality, and recursion that produces rigorous

[49] Seen as part of executive function, cognitive switching has traditionally been seen as the ability to stop attending to something and attend to something else in an effortful manner. An example would be to stop paying attention to a distracting object and pay attention to the voice of a conversational partner. Perspective switching is a similar process that requires an individual to inhibit their own knowledge about a situation so as to infer what another person sees or knows about the situation, taking their perspective into account.

thinking (Doll, 1993a). Further, since ritualised games across cultures include the development of expectancy and elaboration (Dissanayake, 1979), these experiences would increase children's tolerance of ambiguity. Perspective-taking and a tolerance of ambiguity make it possible for learners to explore that which they do not understand, rather than to rely on received explanations. This develops the capacity for complex thinking.

While both Dehaene and Dissanayake write about elaboration, I would like to explore possible differences in the ways elaboration functions in learning and ritualised behaviour. While Buschman and Miller (2014: 6) and Dehaene (2020:199-220) explain that elaboration updates the individual's mental model, and allows them to develop a more accurate prediction, in Dissanayake's (2001:3) description, elaboration appears to follow after the development of (shared) expectancy. In the first instance, elaboration leads to synchrony between the proposed model and feedback from the senses, in the second instance, elaboration extends the joint attentional space by introducing variety. In my observations of playful social interaction, such as ritualised behaviour,[50] elaboration is introduced by participants, in at least two ways. In one way, a participant introduces a variation on the theme of the exchange to insert playfulness, surprise, or merely to engage flagging attention systems. In another way, participants test the ideas they work with by introducing variations on the theme. This process stretches joint attention as it tests the boundaries of shared concepts. When joint attention 'breaks,' the shared concept is understood to have reached a boundary, for example, when a conversation veers away from mutual interests. To illustrate elaboration-as-extension (Dissanayake, 2001), I will tell a story about an adult-child interaction I observed while waiting in a queue, in a public space.

A man was holding a young girl, approximately three years old, in the queue in front of me. From the comfort of their interactions, I presumed them to be father and daughter. The child initiated a social game with the man, in which she kissed him on one cheek, then looked him in the eye, then kissed him on the other cheek and then looked him in the eye, again. She repeated this pattern about four times, alternating the cheek she kissed. Then, without warning, she changed her pattern and kissed him on the same cheek as just before. She seemed to be expecting the man to show surprise and when he did, she burst into happy laughter.

[50] I draw on my experience as a parent and also my observations of other adult-child interactions.

In this illustration, we can see all the principles Dissanayake noted. The child initiated joint attention by developing a pattern. She did this, first, through the use of simplification. The kiss can be seen as a simplified version of affectionate interaction. The second principle that can be identified is exaggeration. The child made a display of the kissing gesture; it was not a normal sign of affection, but a token in a game. Third, she used repetition, kissing one cheek after another, interspersed with gazing into the man's eyes. These principles contributed to the formation of a pattern, which would develop a sense of expectancy. Into that newly-established pattern, the girl inserted variation or elaboration. She did this *deliberately*, checking to see if her father registered surprise, and *playfully* since she found it amusing when he did.

The relationship between synchrony and elaboration is, therefore, complex and variable, depending on the intention(s) of the communicative partners or 'minds'. While learning to master a particular topic or skill has synchrony as its goal, play moves beyond synchrony. Perhaps learning in and through art employs both kinds of processes. In some cases, a learner, or a mature artist who explores a new material, relies on synchrony to signal mastery. In this case, synchrony indicates that the cortex has correctly anticipated the results of particular actions with material. In other words, the material behaved or responded in the way the actor hoped or anticipated it would.

By contrast, in some cases of a more playful or inquisitive nature, the learner or artist might introduce variations into their actions to produce novelty or surprise or even to test the limits of the material process. The surprise signals 'prediction error' (Dehaene, 2020:202, 204) but the result can be meaningful and might become part of the artist's repertoire for future decisions. In this sense, error is not failure, but exploration. However, the artist cannot predict whether the elaboration will produce new forms of meaning or meaninglessness. This references the bifurcation that Prigogine and Stengers (1983) (in Doll, 2008:198) mentions. Systems that approach phase changes can either go on to produce new forms with higher levels of organisation or they can collapse into 'failure.' Artists can learn from both of these processes if the stakes are not too high. To some extent, it is when the process tips over into meaninglessness or falls into chaos, that artists come to know the limits of their processes.

Joint attention is most often studied in the context of early childhood years (e.g. Schachter, 1979; Tomasello, 1999:110). However, while the development of joint attention in childhood offers researchers opportunities to study its components, this cognitive capacity is not limited to childhood. Infants learn to share joint attentional states with adults, who introduce them to social and cultural knowledge. Joint attention is a human psychological achievement and continues throughout the lifespan of people.

Michael Tomasello (1999:15) explains that joint attention requires an understanding that the other person is an intentional agent 'like me'. He argues that the *goal* of the communicative gesture is an essential component of human perception of communicative acts (Tomasello, 1999:30). Further, the author writes that cultural artefacts help us understand the world *through* other persons, across time and space (Tomasello, 1999:62, 92, 93). This requires the individual to *identify with* (Tomasello, 1999:14) the communicative agent, and understand the intentions with which the communicator selects and uses particular symbolic artefacts.

Tomasello's research sheds light on human development in childhood. One of the first ways children intentionally invite the joint attention of another is through pointing. However, Tomasello's work has a bearing on the way we understand evaluative perception in the making and receiving of art. If we understand that artworks are made to *share attention* (Tomasello, 1999:36) with another mind[51], it becomes possible to see an artwork as a metaphoric *pointing gesture.* These pointing gestures invite viewers into a joint attentional state with the notional artist or with the agent who the individual perceives to be intentional 'like me'.

While the focus of research is on joint attention in childhood, the arts can be understood as a particularly sophisticated form of joint attention, often involving more than two minds. Making and perceiving the artwork as a symbolic artefact has the same prerequisites as achieving joint attention: 1) the artist and viewer must both perceive the other as an intentional agent; 2) the viewer must understand the intentions behind the artist's choice of symbol(s); 3) both must understand that they collaborate to share attention with another mind. While the arts can be seen to promote states of joint attention and can therefore be understood through this framework, ritualised behaviour accounts for the social dynamics that make joint attention possible. The arts embody many, if not all of the principles that allow 'protoconversations' (Trevarthen in Tomasello, 1999:59), to engage another mind in joint attention.

Since ritualised behaviour or protoconversations are instrumental in the development of joint attention in childhood, and engagement in the arts can be understood as collaborations that intend to share 'mind' with another, the arts can also be seen as an elaborate form of ritualised behaviour, extended into adulthood. While the cultural intentions of the arts are more sophisticated than ritualised behaviour in

[51] The mind could be understood as that of the maker, acting in the role of viewer.

early childhood, the arts seem to *repurpose* (Dehaene, 2020:121-125) the body-brain systems that developed for and through socio-cultural learning.

In some performative art forms, this ritualised communicative function is highly visible as, for example, in musical *call and response*, dramatised *dialogue*, or *pas de deux,* in dance. In Visual Arts, the collaboration between maker and audience is internalised. Tomasello (1999:10) hypothesises that one of the unique features of human cognition is that it internalises 'certain types of discourse interactions into skills of metacognition, representational redescription, and dialogic thinking'.

Ritualised behaviour and joint attention offer us important clues for ways we might support the continued development of social learning systems, into adolescence and adulthood. It is also a claim that the arts in education offer a unique opportunity to support the growth of learners in very particular ways. However, it is not the specificity of art forms, such as making pictures or learning to sing in a group that is likely to be responsible for the growth. Since ritualised behaviour involves all modalities (Dissanayake, 1979) and joint attention engages the communicative intention of another mind, what the collaborators focus on is not as important as the *quality of focus*. If art is concerned with quality, it is because some artworks are better at achieving joint attention than others.

Arts educators are always located within particular cultural contexts. When they work with learners from different cultural backgrounds, they may be concerned about their ability to teach learners the *content* of their respective cultural practices. My argument is that a focus on the socio-cultural form of cognition and not its content will relieve teachers of this pressure. Viewing art as ritualised behaviour that intends to produce joint attention shifts the focus of arts education from content knowledge (skills, techniques, the symbolisms of particular cultures) to cognitive response-ability. This begins to happen when learners are engaged in joint attention by peers and educators who *respond to the learner's interests and attentional targets* (see Schachter, 1979; Tomasello, 1999:110).

A responsive (Schachter, 1979) educator would 'follow in' (Carpenter, Nagell & Tomasello in Tomasello, 1999:112) to a learner's interest. Drawing inspiration from Dissanayake's (1979) proto-aesthetic principles, this would involve simplification, repetition, and exaggeration as ways of engaging the attention of the other and clarifying the precise nature of the symbolic object the initiator wishes to *point to.* At this point, both partners begin to form a mental model of the abstract idea they are both attending to. Dissanayake calls this a 'development of expectancy'(Dissanayake, 1979). The teacher and learner, in

Figure 9: Joint attention. Watercolour on paper.

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such a collaborative partnership, both seek and offer feedback that either confirms the mental model or requires its elaboration (Dissanayake, 1979; Dehaene, 2020; Buschman & Miller, 2013).

By enacting this more sophisticated form of ritualised behaviour, educators and learners or learners and their peers can position each other as-artists, by taking on the role of the audience. This is not to say that the teacher-as-audience is uncritical[52], but that she *collaborates with* the artist in the production *and* reception of the artwork. In contrast to some traditional approaches to education, the responsive educator does not imagine or impose a predictable learning path but helps the learner identify as many adjacent possibilities[53] as she can. This scaffolds (Vygotsky, 1978) the learner's ability to make a series of decisions, but it does not direct the learner to the decision she should make. Responsive conversations position learners as initiators in joint attention and develop their subjectivities (Duchamp in Lazzarato, 2014) *as artists*. Also, these kinds of learning experiences facilitate healthy connection and the positive affect that comes from neurotransmitter rewards.

Over many interactions with responsive collaborators, a learner may acquire the capacity to switch roles and position herself as both artist and critic. As they become aware of synchrony between these roles or identities, they learn to recognise value in their artwork because it creates (the illusion of) joint attention between two minds. This is not a 'recipe' for art or for gaining the acceptance of an external audience. It is, rather, a conversational process through which education allows learners to 'become a person with agency, with independent thought, (and) a producer of meaning' (Solnit, 2016, unnumbered page).

Joint attention may be the evolutionary driver behind ritualised behaviour and cultural production. The synchrony (Dikker & Oostrijk, 2014; Miller & Antzoulatos, 2014) that signals joint attention and accompanying neurotransmitter rewards mediates social learning. It makes sense that these kinds of experiences would come to be associated with value. Since synchrony (as the sign of joint attention) may be the 'deep structure' of art in its broadest manifestations, working *with* learners' systems for social learning, by responding to their interests and initiating gestures, offers an ethical approach to the arts in education. This position challenges practices in which preselected content and standardised criteria are imposed as goals for all learners to achieve, in the arts.

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[52] I have found that relaying to a learner *how* I experience an artwork, with emphasis on embodiment, emotion, and interpretation, helps them take up the position of audience. Often, they are then able to appreciate my perspective, even if they do not agree entirely. This perspective-taking allows the learner to begin solving the problem presented by the disequilibrium between their perspective and mine.

[53] Following Stuart Kauffman's notion of the 'adjacent possible (Kauffman, 2003).

In some ways, the switch to a responsive approach may be difficult for educators. However, the more learners develop decision-making agency, the less exacting this collaborative relationship becomes. The main challenge, for many educators, might be a loss of control over the outcomes of learners' artworks, and by implication, the educator's reputation. Deciding to adopt the perspective of the learner as-artist, or to mirror the learner's stance, may also be experienced as demanding. However, I have found that this approach has led to some of the most rewarding collaborations with learners; and the positive affect I experienced as part of a collaborative team, with learners, contributed very favourably to my professional experience.

Just as the sports spectators in Beilock's (2015:214-216) account anticipated a player's next move, even before it became visible, the educator who mirrors a learner's stance can imagine next or adjacent possible moves. As the educator identifies with the learner *in their role as-artist* and proposes moves that could be made, the educator positions the learner *as-viewer*. The learner must imagine the future artwork and respond *as a viewer would* (Beilock, 2015). This allows the learner to critically examine the moves suggested by the educator and arrive at (preliminary) decisions. As with ritualised behaviour, it is the *skilful role-switching of the adult* or more experienced partner that *positions* the learner, alternately, in the roles of artist and viewer. By modelling this behaviour in a collaborative relationship, the responsive educator contributes to experiences which lay down neural networks in the learner. With time, the learner ought to internalise the 'discourse interaction' as 'dialogic thinking' (Tomasello, 1999:10).

The embodied presence of another person in the role of collaborator facilitates the learners' role reversal. As they begin to work more independently, the learner must suspend or inhibit (Long, Horton, Rhode & Sorace, 2018) her position and perspective as-artist, and adopt an 'as-if' (Damasio, 2006) perspective in which she is an objective viewer. The learner must *confront* (Moll, Meltzoff, Merzsch & Tomasello, 2013) the different perspectives of artist and viewer, not just be aware of them. In arts education, this requires a particular capacity that differs in important ways from a conventional Eurocentric understanding of the skills that need to be taught. It demonstrates that making art in isolation might be difficult for some learners. There is not a strong tradition of collaborative art-making in the education system I am familiar with and it is not something I have ever tried. However, I did act as a collaborator with learners in ways that I am suggesting, in this thesis. Since one of the goals of this doctoral study is to develop learners' decision-making agency, I would add that this form of scaffolding could be withdrawn, gradually, as learners develop their role-switching capabilities. It is likely that, as they learn to practise these skills as internalised capabilities, they will also be able to offer collaborative support to their peers in the arts class.

To summarise the model of decision-making in the process of making art I have been building, thus far, it can be claimed that, 1) we mirror the actions of others, especially when we have some experience in the kinds of performance they engage in; 2) when two people cooperate in mutual gaze or embodied performance, they exhibit synchronous brain wave patterns; 3) when an individual learns a new motor skill, the acquisition of that skill is reflected in synchronous brainwave patterns arising from the different brain regions; and 4) conative language activates motor regions in the brain. 5) It is, therefore, possible that synchrony also governs the process through which an individual achieves correspondence between her artist-self and her viewer-self. This physical process may signal value to the individual and may give us some way of understanding how evaluations are produced. The arts in education offer unique opportunities in which this kind of complex social learning can be facilitated. Finally, 6) perspective-taking is modelled through role-switching in conversation and art as sophisticated forms of ritualised behaviour.

While the critique of educational practice is sometimes aimed at teachers, it is helpful to recognise that arts educators are situated within nested systems, which constrain their practice, in particular ways. One of the constraints that govern teacher behaviour is assessment. If the process of evaluating and grading learners' artworks privileges certain forms, teachers will inevitably direct learners to make art in these, predictable, ways. Although they pay lip service to 'innovation', educational managers, in turn, are under pressure to ensure that systems they oversee produce the right measures of 'success'. In these systems, there is little tolerance for the potentially messy process of learning by discovery. This is an example of the way systemic identity causes itself (Juarrero, 1998:242). In the interests of reform, it is necessary to understand that the system is complex, and to use this understanding to devise strategies for intervention.

The terms, *complex* and *complexity*, recur frequently through this theoretical outline. While these words are often used, colloquially, to denote a degree of difficulty, this is not how I use them. Rather, I draw on complexity as a framework for thinking about non-linear systems. To call something complex is to recognise, in its ontology, an order that cannot be predicted, but can be understood in retrospect. As a framework, complexity theory permits some of the transgressions this doctoral study favours. Moreover, this framework marries seemingly incompatible concepts, such as play and seriousness; choice and structure; or the individual and the collective. The following section offers an introduction to complexity theory as it pertains to this doctoral study.

Section 5: Complexity Theories

Complexity theory is a fast-growing collection of interdisciplinary theories that seek to account for emergence in all kinds of systems. These range from the way evolution counters entropy, to the way consciousness is produced.

I use complex adaptive systems theory to do two things. Firstly, I use it to create a framework in which all of the contributory systems involved in agent-centred decision-making are brought into relationship with each other. Secondly, I use it to explain how artworks appear as complex cognitive systems. In this view, the abstract structure of emergent forms of signification (or artworks) are complex adaptive systems.

While there are many paths into complexity theory, and many theories, I have chosen two authors as guides. The first is William E. Doll (1931-2017), an educationalist and curriculum designer. The second author is Alicia Juarrero, a philosopher, whose interest in intentional behaviour and complex dynamical[54] systems is closely aligned to my interest in decision-making. I draw on both writers' bodies of work to describe the complex system within which learners make decisions in the process of making art.

I will begin this section with a broad description of complexity and relate the theory to the contexts of art and education. After that, I will consider some of the foundational qualities of complex systems and how these allow us to think about arts education in a new and generative manner. These include the self-structuring nature of complex systems; emergence; multi-level causality; attractors; constraints; and indeterminacy. While I attempt to introduce them linearly, for the sake of the reader, these components are, themselves, inter-relational and so the discussion will fold back on itself, over the next paragraphs.

Doll wrote his main works on the curriculum in the late 1980s and early 1990s. While Doll described his innovations as working towards a *postmodern* curriculum, his insights are based on a recognition of the complex nature of reality and the need to create an appropriate response in education. In Doll's words, '[t]o study post-modernism (or any of the other "posts") for curricular implications means to question much of what we have heretofore considered natural or normal' (1993b: unnumbered page). Since many

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[54] The distinction between the terms, *adaptive* and *dynamical*, in complex systems theory seems to be blurred in many texts on complexity. There is a suggestion that *adaptive* systems form new higher-level systems in order to adapt to the changing environment, while *dynamical* systems learn and affect the environment they are part of. The environment, then, then folds back into the system and influences its further development. A further distinction is that while adaptive systems are hierarchies, dynamical systems are heterarchies, with causality flowing both ways. In this view, human systems are dynamical, since they influence the environment as part of their adaptive strategy. However, I will use the term *complex adaptive systems*, since it is used more widely and seems to have a more inclusive meaning.

curricula retain their measured quality into the 2020s, Doll's critique remains valid. In the context of the continued insurgence of market-economy values into education, his alternatives to the Tyler rationale[55] (Doll, 1993a) offer some of the most useful perspectives from which to approach curriculum, with complexity in mind.

In the article, *Complexity and the Culture of Curriculum*, Doll (2008) gives an overview of complexity theory as it pertains to education and the design of the curriculum. He includes some of the historical narratives of the development of complexity theory from its beginnings in the recognition, by scientists, that chaos was more ordered than originally thought. As a background to the story of complexity, the author lays out the history of the curriculum we recognise as a well-defined course (Doll, 1993a). In the formulation and dissemination of this linear view of education as a series of steps or stations, education adopted an efficiency model and simultaneously reduced knowledge to atomistic units that could be contained in textbooks and measured through standardised tests. In this development, learning was replaced with schooling, and knowledge was limited to that which derived from closed systems. Life outside the laboratory was not material for study, nor did the person of the learner enter into consideration (Doll, 1993). In its place, Doll advocates for curriculum in the infinitive form of the Latin word, *currere*, where the focus is on 'the activity of running or, metaphorically, on the activity of our making meaning from the course—our interpreting or dialoguing with the course' (1993: unnumbered page).

However attractive stability may have been to modern educationalists, in biological systems, 'equilibrium corresponds to death' (Kauffman in Doll, 2008:200). As Doll (2008:197) recounts, Bertalanffy (1981) had argued that open systems maintain *disequilibrium*, which provides the energy and creative urge to transform to higher levels of organisation. Unlike the closed system that educational curricula present, life occurs in an open system and is, consequently, capable of play, the poetic, and possibility. Where Prigogine (1984) considered that turbulence and instability actually 'gives birth to new structures' (in Doll, 2008:194), an educational approach that is a one-way stream of information from teacher to learner can be seen as 'dead', 'inert', 'useless', and 'barren' (Whitehead (1929/1967) in Doll, 2008:200).

Conventionally, order and chaos had been seen as opposites. However, in chaos and complexity, 'order and disorder are structurally intertwined,' (Hayles, 1991 in Doll, 2008:193). Doll (2008) contends that the

[55] Doll describes Tyler's Basic Principles of curriculum design as goal-directed and concerned with measurement. These principles were based on factory-style management strategies, rather than an understanding of the organic nature of learning.

chaos/order antagonism in modern thinking is a direct product of the tendency to categorise information and reduce it to method. In a curriculum designed for complexity, it is not the information that matters, as much as the *relations* between things.

Following Kauffman (1995 in Doll, 2008:200), complexity lies in an intermediate space between chaos and order. It is where imbalance gives rise to excess energy and matter and allows organisms to project themselves into the future (Damasio, 201931). Complexity theory's ability to accommodate this messy quality into its structure helps us understand emergence in biological ecosystems, in human social systems, and the production of meaning, through art, for example.

Complexity and the system of education

Complexity theory is useful for understanding the position the arts occupy in education. This is because, like all complex adaptive systems, education is a self-causing structure, and because its inter-level causality is folded back into the decisions learners make in the process of making their artworks. An example of the self-structuring nature of education can be seen in the failure of many educational reforms. When policy-makers continue to think of the system as linear, they implement change in top-down ways, without consulting educators or drawing them into the process. Despite the apparent advantages of reform, the system finds ways of maintaining its old structure or rebounding from the reform.

In South Africa, which is where my teaching practice was based, post-1994 reforms were implemented by the Department of Education, in top-down ways. Unfortunately, the initiative failed to achieve the hopeful goals of a more equal and equitable education system for all. A complexity perspective of this failure would attribute it to the inability of top-down policy to change what happens at the level of the classroom. It can also be attributed to misunderstanding or mis-recognising the dynamics that produce inequality in the first place.

A linear approach to implementing reform in education is a direct result of the measured curriculum (Doll, 1989:244) that reformers are, themselves, graduates of. This is a perfect, if disheartening, illustration of the self-structuring function of a complex adaptive system and demonstrates the power of this theory. Since the Newtonian version of cause limits knowledge to that which can be predicted, it excludes from the curriculum the range of human experience that is unpredictable and untestable. It certainly does not account for the context-sensitive way that individuals make decisions. In particular, it cannot theorise the

way an individual's interior systems, which encode their personal history, are dynamically related to external environments, which include social, cultural, and historical contexts.

Complex adaptive systems theory

Alicia Juarrero (1998; 1999; 2000; 2010) is a philosopher who explores the idea of intentionality as a complex system. While a lot has been written in the field of complexity since Juarrero first published her book, *Dynamics in action: intentional behaviour as a complex dynamical system*, in 1999, I find her writing particularly applicable to decision-making in non-veridical contexts. Also, the inter-disciplinary nature of complexity theory means that a lot of writing has minimal application to the inquiry of this doctoral study. In the discussion that follows, I apply Juarrero's thinking to the contexts of arts education and learners' decision-making, in particular.

Juarrero (2004:para 11) describes a complex adaptive system as a 'structured structuring structure'. This means that component parts self-organise to form a new whole, after which the new emergent level controls the selection and behaviour of components parts. In contradistinction to Newtonian theories of causation, Juarrero (2004:190) argues that such a system *causes itself*.

In addition to being self-structuring, complex adaptive systems produce new levels of organisation with a surprising capacity for signification. In other words, the new whole is capable of more than the simple sum of its parts. This new capacity, which is produced by the particular ways parts of the system are related, is called emergence.

We might think of an artwork as a complex adaptive system since the whole has potential for meaning that the unrelated parts do not have (Juarrero, 1998:241, 242). Similarly, a decision made by an artist, in the process of making art, is a complex adaptive system. A decision emerges from the interactions of contributory body-brain systems and their histories (Damasio, 2006). These produce a new evaluative position vis-a-vis the range of available options from which artists can select a move. Juarrero (2004) continues that, since parts contribute to the whole and wholes control the behaviour of the parts, complex adaptive systems have inter-level[56] causality. This expands the conventional idea of what counts as causality and introduces a hermeneutic tacking back and forth between part and whole to account for the identity of the system. If we consider a decision-maker's body-brain system as a lower level of the system,

[56] While there seems to be an implicit hierarchy in these levels, a related theory, complex dynamical systems theory, restates this relationship as heterarchy, with causality flowing both ways. Apart from this and other small differences (for the context of this study), these theories appear very similar.

and the emergent decision as the level of focus, then the context in which the decision is being made is a higher-level environmental component of the system. However, since the decision-maker is subject to pressures from the context, the environment feeds back into the system and becomes part of its causality.

The ideas discussed above, can be applied to the arts education context. Learners' decisions, made in the process of making art, are situated within multi-level, nested, systems. The three biological component systems Damasio (2006:191, 230, 239, 241) listed (emotions, feelings, and the structuring role of the cortex) produce a decision as a new temporary complex adaptive system in the brain (Juarreo, 1999). While this decision is produced by the biological systems, they are, in turn, responsive to material, social, and cultural contexts, in which the decision has meaning. These include the classroom dynamics, the meanings learners attribute to the term 'art', assessment systems, and the school culture. Similarly, the educator is situated in nested systems, such as systems of appraisal, professional, social, and cultural networks, the assessment institution, and ideologies that inform the design of the curriculum.

A further reason for selecting complexity as a framing theory is the understanding that patterns which recur across inter-level systems help us interpret the system, as a whole (Agazarian & Gantt, 2005). From an information-theory perspective, pattern is a far-from-random event and is *understood as* having meaning (Juarrero, 2004). While the overall indeterminacy of complexity means that there may be no meaning in a pattern, the probability is high that pattern represents a meaningful signal, even if we do not know what the signal means (Juarrero, 1998:235, 239; 2006, p. 34).

Following Yvonne Agazarian and Susan Gantt (2005), however, I argue that, when pattern recurs on several levels within a multi-level system, this gives us reason to believe that the system is isomorphic and that a similar pattern identifies other levels in the system. This isomorphic quality allows complexity theory to act as a mediating theory between other, disparate, disciplines. Recurring patterns can be interpreted critically, following a hermeneutic cycle and by comparing different levels within a system.

An accessible example of an isomorphic, multilevel structure is the shifting boundary where land meets the sea. When seen from a high altitude, a shoreline undulates along the edges of tides, on a large scale. If we zoom in to a standing height, we see the smaller undulations that form on the foamy edges of waves. We could zoom in, further, and examine the wet-dry boundaries at the level of individual grains of sand and we would see a similar pattern, once again.

An example of an isomorphic pattern that crosses disciplinary boundaries can be found in branching forms or bifurcations. These can be seen above and below ground, in the branches and roots of actual trees.

However, they can also be discovered in systems that need to maximise flow or allow information to pass rapidly through them. For example, the cooling sumps of computer hardware have a tree-like structure and so do cognitive flow diagrams. Dehaene (2020:79-80) explains that Broca's area of the brain forms physical branching patterns and that this part of the brain is used to process information most suited to this particular structure. Language and biological classifications are examples of abstract domains that use a branching structure to order categories, and categories of categories, according to domain-specific logical rules (Dehaene, 2020:35; Tversky, 2011a).

Branching patterns are also known as bifurcations. When applied to temporal and structural changes in a system, this word describes the way complex adaptive systems suddenly approach a phase change that could go one way or another. A bifurcation might produce a new form of meaning or it may fail altogether (Prigogine in Doll, 2008:198). In a complex adaptive system, the phase change does not produce two new systems, but the branching or bifurcation represents the understanding that the system can either progress to a new level or dissolve. Bifurcation is a conceptual representation of the indeterminacy of the system.

In art-making, we progress by alternating between the perspectives of the artist and the viewer. (This is also potentially a kind of bifurcation). However, what must be acknowledged is that each of these perspectives would have drawn feedback from its internal levels, and contextual systems, fed through the perceptual systems. When switching from an artist perspective to a viewer perspective, the individual must draw on different sources of feedback (different forms of embodiment), and different contexts within which meaning is made. The artist perspective entrains systems that bring personal histories to bear on decisions, while the viewer perspective must entrain the context within which the artefact has meaning. Processes of attending and inhibiting cause the system to bifurcate and produce fleeting subjectivities. In the one subjectivity, the artist is intimately acquainted with their intention for the artwork. In the other subjectivity, the viewer is not acquainted with the artist's intention but is attentively focused on the way the artwork acts on them (Damasio, 2006:242), as a naïve observer.

Seen as a pattern (and acknowledging that there is deep complexity within each of the components I use to describe this pattern) I propose the following: joint attention is a neuro-psycho-social state in which the entrainment of contributory systems brings about a new state of emergence. I posit that the self and other identities (in joint attention) come to represent (as in *stand for* and *offer the perspectives of*) 1) the situated individual; and 2) socio-contextual systems. The self brings personal history, encoded in the body, while the other offers socio-contextual feedback through the projected perspective of 'the other'.

Early forms of joint attention involve the young child and the mother, but as these embodied experiences become habituated, they are internalised as dialogic forms of cognition (Tomasello, 1999:10). Artists draw on these processes when they make and view their own artworks. My point is that to internalise this process and develop independent decision-making agency, the individual must be able to take up different perspectives, at will. I hope that this doctoral study will focus more attention on these capacities and encourage teachers and learners to work together to develop these. This will, I believe, lead to greater decision-making agency and to the development of thinking that is rich, rigorous, relational, and recursive (Doll, 1993a).

The identity of a complex adaptive system can be read as the particular dynamics that constitute the global level (Juarrero, 2000:40-46). These can be represented as a probability landscape (see Figure 11) in which hills and valleys represent the tendency of the system to behave in particular ways. Valleys, in such a landscape, are the attractor basins that indicate states the system tends towards, while hills or separatrices are states the system tends away from. For example, if I represented my choice of artistic media and discipline as a probability landscape, regular choices would be represented as valleys, choices I resist would be represented as peaks, and those I am ambivalent about would lie on the slopes. I tend to work with painterly material, so this might be represented as a fairly deep valley. Since I am not drawn to making digital art that might be represented as a peak in the landscape of my decision-making. Neither the deep valleys nor the high peaks are likely to change. However, slopes in the landscape represent places where the system is less fixed and therefore where change is more likely to happen. I am not drawn to video as a creative medium, but I am willing to use it to document the time-based nature of paging through my artists' books. Consequently, on the probability map of my own practice, video would be located on a slope. The position of this system state indicates that, under the right conditions, I might use video more often and in more ways.

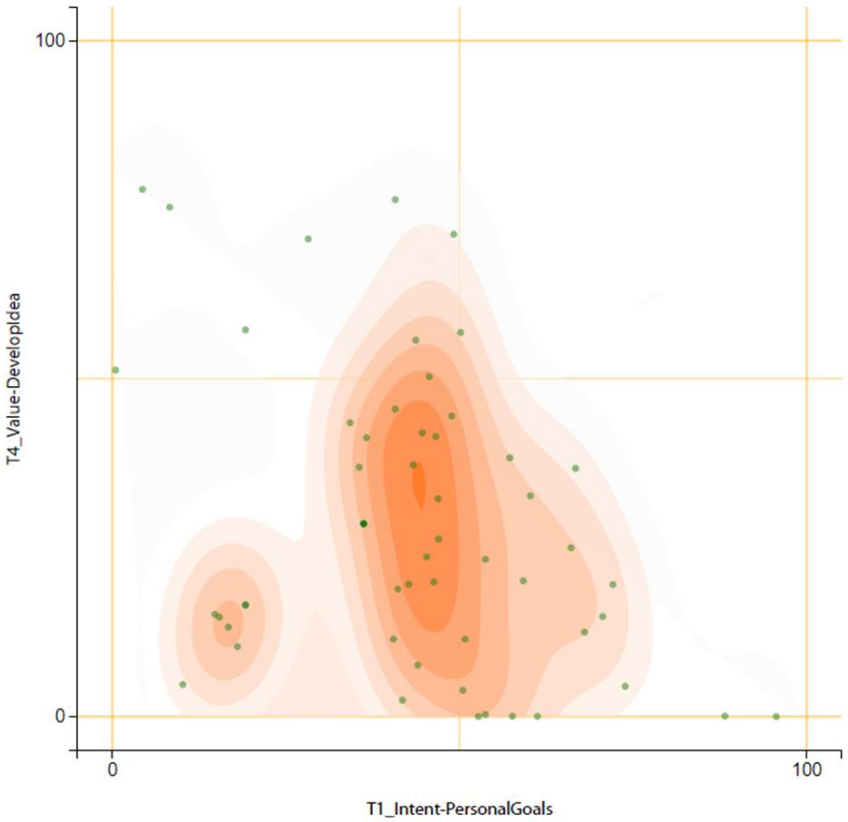

Figure 10: Probability landscape: Intent-personal Goals vs Value-Develop idea. When this graph is read as a landscape, the lines that are positioned close together signify a steep slope, while places where lines are far apart indicate gentle slopes. Peaks are represented by small areas of darkest shade, while valleys are represented by light areas that lie between slopes. Peaks and valleys represent stable states in the system, while slopes indicate dynamics that are open to change. Consequently, the narratives located on slopes offer clues for the design of interventions.

A central idea in Juarrero's work (2000) is intention as a behavioural constraint. She describes intentional behaviours[57] as those, which are logically and semantically consistent with the intention. Intentions, therefore, shape the attractor basins of the system. In the process of making art, the learner's intentions for the artwork set up an attractor basin towards which end the resulting artwork is produced. The

[57] For clarity, this theory is distinct from behaviourism, precisely because it acknowledges the contribution of an agent's state of mind, history, and context (Juarrero, 2000) in the behaviour that ensues.

behaviours that produce the artwork flow from the intention. Juarrero (2000) argues that once an intention is set, behaviour that contradicts the intention is unlikely. 'Insofar as all self-organizing structures, from hurricanes to ecosystems, act to preserve and enhance the overall global level, even at the expense of the particular components, complex systems are goal directed, if not fully goal intended' (Dretske , 1988 in Juarrero, 2000:46).

This has implications for the ways that learners understand and set goals for their artworks. Prior intentions constrain the range of decisions a learner can make in the process of making an artwork. If learners set their intentions for the artwork, before they begin making, they are not able, within this view of intentionality, to admit the chance occurrences that occur as a natural part of material processes. The reason is that learners cannot count, *as intentional behaviour*, events that they were not even vaguely aware of as possible outcomes (Juarrero, 2000). This removes the contribution that material processes make to many artists' work, from learners' processes. More significantly, it means that learners are not in a position to learn from their processes, but can only learn how to complete the process by closing the gap between the artwork-in-progress and their intentions. Further, if educational programs and assessment systems constrain the ways that learners can imagine their future artworks, they constrain their ability to be creative and think critically.

While intentions limit future actions, many other structures contribute to the identity of the system and its ability to produce a new higher level or emergence. Juarrero (2004) argues that complex adaptive systems theory can account for the evolutionary or creative phenomena of systems, through the notion of constraints. In complexity theory, these are structures that impose limitations on an otherwise-undifferentiated system. To explain this concept, I will apply this thinking to sculpture. A clay deposit at the river is undifferentiated, in an artistic sense. It may have meaning in natural ecology, and a self-reliant potter may see it as a potential resource, but to most people, the clay, while it is still *in situ*, does not signal cultural *meaning*. By contrast, a lump of clay on a potter's table has had top-down constraints imposed on it and is imbued with potential meaning. To produce meaning in the clay, however, requires the artist to arrange clay masses and voids relative to each other, to the sculptural whole, and to the notion of sculpture in a particular cultural context.

Juarrero (2000) identifies two types of constraints. One kind is described as context-free or top-down; the other as context-sensitive or bottom-up. In the example above, the initial decision to work with clay (and not paint) can be seen as a top-down or context-free constraint. While such constraints place restrictions on the possibilities within a system, these limitations increase the potential for meaning in the system.

The second type of constraint, following Juarrero (2000), also places limitations on the range of possibilities in the system, but it does so by relating the parts to each other in specific ways. This kind of constraint produces a higher level of organisation with increased potential for signification. It is only by arranging masses and voids *relative to each other* that a sculpture comes into being. Therefore, while both kinds of constraints place limitations on a system, top-down constraints, alone, would produce systems that experience successively less freedom. The combination of top-down *and* bottom-up constraints give complex adaptive systems their potential for emergence (Juarrero, 2000).

Complex adaptive systems theory offers what Juarrero (2000:25) calls a 'theory-constitutive metaphor' for what emerges in art, through the decisions artists make. It enables the construction of a model of decision-making in the process of making art and allows for the development of vocabulary and language with which to point to the emergent. Consequently, this theory offers a framework that supports learners' and educators' awareness of the systems involved in decision-making in the process of making art.

Once I had been taught this lesson by the fluid medium, I soon learned another. Just as material can bleed through the confined spaces of a drawing, so it can refuse to occupy a space designated and delineated for it. Despite being based on observation, the drawings were abstract. This made it easier to pay attention to what was happening on the paper, than before. I could barely recognise the parts of the space I was working with. (I was beginning to hide things from myself.) I became more sensitive to the interaction of the image, the material and my own updated and updating response to the developing drawing. Sometimes, I stopped before the (pre-conceived) image was complete. The material seemed to refuse *to enter, like a horse that is shy of a stable, or a child that does not want to hug a grandparent. I let it be. There are boundaries we see or perceive that can be breached; there are others we do not see that powerfully prevent us from moving forward. The ones we do not see are the most important because we do not acknowledge their existence. We have no names for them.*

What does it mean for me to be disobedient, as a teacher? How does my breaking rank with colleagues over the definitions and standards for assessment constitute a betrayal and when does it offer a window onto another way of thinking? When is it an open door? What will I do with these questions?

Why should I discipline the medium into obedience? Why should I make learners stay within the bounds of the assessment system if these are worse than arbitrary? How can I stay in the role and position of authority the educational system gives me, as a teacher, when the daily acts of drawing lines and making bodies sit or stand one way or another forces them to trample those delicate inner boundaries they have, drawn within them (Personal notes)?

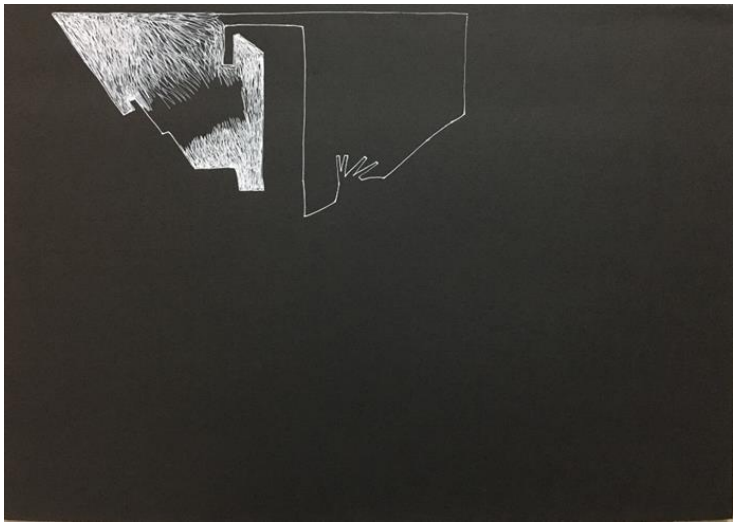

Figure 11: From the seeing in the dark series. Milky pen on black paper.

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Chapter Two:
Learner's decisions in the process of making art

In Chapter One, I briefly introduced the two main research components of this doctoral study. One of these studies the decisions that learners made, in the process of making art; the other is an auto-ethnographic account of my own decisions, made as part of my creative practice. In this chapter, I will focus my discussion on the research into learners' decisions, but I will refer to the way the auto-ethnographic study acted as an interpretive lens. This is useful for four reasons. The first is that I worked as a Visual Arts educator within the IEB system (from which participants were drawn) and am implicated, to some extent, in the kinds of decision-making patterns that emerge from the system as a whole. The second reason is that, as I discovered, my own practice did not necessarily conform to the curriculum I and other IEB teachers mediated for learners. The third point is related to the fact that as a researcher, I would naturally try to make sense of the patterns in learners' decision-making behaviour, made visible through the SenseMaker study. However, my position within the system would bias me towards the system's own ways of understanding 'art'. By using the same set of questions to study my own decision-making as I put to participants in the SenseMaker study, I exposed some personal biases that might have produced a different interpretation of the results, had they remained unconscious.

The fourth advantage of comparing my own decision-making with that of participants comes from Juarrero's (2000) thinking. She writes,

> The difference between the behavior of objects while they are independent entities and their behavior once correlated and interdependent provides a measure of the contextual constraints in effect at the global level (2000:45).

From this, I argue that a comparison of my own decision-making, as an independent artist, with the decision-making of learners, situated within a particular assessment system, reveals the nature of the constraints operating on learners. This can be seen as the particular identity of the system of Visual Arts in the IEB. However, since this system is situated within broader educational systems in South Africa, it also reveals some of the identity dynamics of the education system, more generally (following Gantt & Agazarian, 2010).

This chapter begins by describing the contextual gap this study aims to address. Next, the language of the study is clarified by referring to the theoretical framing(s) of the study, followed by a discussion of the methodology and method employed. A detailed discussion of the study and the information it surfaces is offered, after which I discuss the visible patterns in the light of both theory and my creative and teaching practices. This first-level interpretation is deepened by identifying two particular areas that require intervention. I return to the information in the study to identify outlier narratives that suggest where and what kinds of interventions might be helpful, before summarising the main findings and suggestions.

Background and rationale for the study

In Chapter One of this thesis, I discussed some of the problems with the term, art, in the context of education. As Gaztambide-Fernández (2013a:227 - 228) argues, the arts are a classificatory system that exists to construct some forms of cultural practice or production as superior to others. In particular, the arts are understood to represent the high point of European culture and thought and were part of the colonising project through which Europeans believed they could 'civilise' the other (Gaztambide-Fernández, 2012:2; Wolukau-Wanambwa, 2018:86). As evidence of this approach, Emma Wolukau-Wanambwa (2018) has identified a sub-category of literature created to guide teachers on how to instruct (specifically) African learners in the arts. Since Europeans regarded a particular type of arts object, such as representational or figurative paintings, as evidence of a culture's sophistication, they were not in a position to recognise the depth of cultural practice that existed (exists) in all cultures, everywhere. Introducing the arts to colonised peoples was promoted as a charitable action, but was simultaneously a form of anti-Black racism (Gaztambide-Fernández, Craehe & Carpenter, 2018).

Whether we consider the problem of the arts in education as an ideological issue or as an onto-epistemological problem, we arrive at a very similar question. From an ideological perspective, social justice requires curricula that are inclusive of all the ways people 'arrange' the 'symbolic material' of their lives (Gaztambide-Fernández, 2013a:227). The conundrum we are presented with is this: how do art teachers, who have been educated within the hegemonic education system and have adopted European

notions of art[58] and knowledge, guide and assess learners' development in cultural practices originating *in other contexts*? In other words, how do educators recognise and support rigour in value systems they are not experts in? My point is that the education system appoints teachers who are educated through its own processes and can mediate its own curriculum.[59]

The current system has located value in art in the external objects or artefacts, which are produced by creative and cultural practices. Further, the criteria used to assess these artworks are concrete and tangible elements that can be observed within the artwork. For example, an effective artwork must evince the technical proficiency of the learner. The consequence of such a model of ascribing value is that educators lack the expertise that would allow them to recognise value in the cultural work of groups other than their own. A more useful approach is to inquire how people, generally, attribute value in cultural practices. In other words, this inquiry does not seek concrete evidence of value in the artwork but enquires into the socio-cultural processes by which people decide that something has value for them.

If we consider the problem of arts education from an onto-epistemological perspective, we must acknowledge that both 'art' and 'cultural production' are constructed in material-discursive ways. As Barad (2014) makes us aware, it is not possible to separate *what is* from how we know or observe it. There is nothing objective about 'objective' reality. Rather, what we refer to as reality is constructed by the apparatus through which we observe it (Barad, 2013). This onto-epistemological perspective brings me back to a similar question I asked earlier, namely, what material-discursive apparatus (Barad, 2014) do we use to recognise value in art or cultural production? The answer(s) to these questions can inform the ways educators and learners work together to recognise what *matters* and work towards improving learners' decision-making efficacy.

Since a desire to offer equitable learning opportunities in and through cultural practice must acknowledge the rich and diverse nature of the practices and products that are involved, this thesis is concerned, not with what it is that learners *do* or *produce*, but with *how* it is that learners and more experienced cultural

[58] On the one hand, I am referring to White teachers, like myself. On the other hand, I also refer to teachers of Colour who may want to decolonise the curriculum, but whose own experience under hegemonic education systems may have elided their own ways of knowing.

[59] Post 1994, Arts and Culture teachers were encouraged to think of community artists as resources they could draw on to enrich learners' educational experiences. However, in my experience, none of the private schools invited artists whose practices were not already seen as part of the Western system of 'art'. The pressure of assessment and its constrained way of identifying something as 'art' means that teachers point learners to models that are within the system.

practitioners make decisions in the process of their practice. This recalls Perkins and others' (2000:5) writing that conventional assessments fail to capture *the way learners make use of* cognitive strategies and resources. The authors write that while tests measure ability under specific conditions, they do not measure learners' 'inclination' or 'sensitivity' (the likelihood of noticing occasions to engage in the behaviour). In effect, they do not tell us 'how [they] tend[ed] to deploy those resources' (Perkins et al., 2000:3).

A supportive and transparent learning environment ought to develop learners' awareness of how it is different people attribute value; and how cultural practitioners recognise value when they see it in their own processes. Shalem, Dison, Gennrich and Nkambule (2013) argue that epistemic form, in academic writing, incorporates notions of depersonalisation, systemisation, and boundedness. They argue that students who experience difficulties with epistemological access are unaware of the ways that *form* differs from *content* in academic writing. Consequently, they argue that the assessment criteria should make these qualities more explicit.

I share the authors' commitment to transparency. In my experience, learners found themselves outside the circle of literacy and became dependent on educators to show them how to make art. My rationale for conducting this research is precisely to address these forms of exclusion. However, in this thesis, I do not attempt to describe epistemic form (Shalem et al., 2013). While it may be argued that academic writing and discourses exist because of these elements of form, in arts education, the form that has been promulgated is based on the cultural work of a particular group of people. Any claims that these elements of form are universal, arises from the way European art has been imposed on the meaning-making of others, through education.

In arts education, a more productive approach would be to ask *how boundaries are drawn* and not *where they lie*. Consequently, I inquire into value understood as a responsive and receptive orientation, on the part of the evaluator. I am interested in the cognitive-psycho-socio-cultural processes that allow an evaluator to identify value. Such an approach would make it possible for learners and educators to collaborate in aiming for Doll's (1993a:259) version of 'rigor', in which 'interpretation' and 'indeterminacy' both play a role. In this study, there is no desire to see decisions made *in particular ways*, but there is an interest *in the ways that decisions are made*.

To gain an understanding of the way learners recognise and create value in the process of making their artworks, it is necessary to gather information about decisions they make independently, and not under

test conditions. At first glance, this would require a study of participants' behaviour outside of a controlled research context, which is precluded by ethical considerations. However, complex authentic tasks require learners to make so many micro-decisions, over such a long period, that educators cannot, practically, guide them all. In a typical three-month project in Visual Arts[60], the majority of learners' decisions are, therefore, independent, even though they are made within the context of school-based assessment.[61] In the process of making artworks, learners must first *recognise opportunities* to draw on cognitive strategies and resources they have access to; then they must *choose* whether to make use of these resources, and in which ways. This makes it possible to claim that mapping the decisions learners make in the process of making art will reveal what conventional assessments do not capture, that is, learners' *inclination* to use available strategies and resources, as well as learners' *sensitivity* to contexts as opportunities to apply these cognitive tools (Perkins et al, 2000).

Here, I think with Juarrero (2000), to add that, in independent decision making, learners' *awareness* of the available strategies and resources necessarily constrains their intentions. In other words, while examiners may prescribe particular strategies and resources learners should draw on in tests, the curriculum's *elision* of non-hegemonic strategies and resources unhelpfully constrains decision-making competency. In particular, if embodied processes are a necessary part of decision-making (Damasio, 2006:xxiii), but are suppressed by European-style education systems, learners may have limited awareness of the availability of these strategies and resources. Further, if the body is denigrated in Western epistemology, learners would have been taught to discipline their bodies, rather than learn through them. This may lead to an 'equally important source of irrational behaviour' (Damasio, 2006: 53).

Following this line of thinking, learners may not be in a position to *demonstrate* 'ability', inclination, or sensitivity (Perkins et al, 2000) to contexts in which these cognitive tools could be applied. In addition, I would argue that where the education system itself has elided particular strategies, learners' lack of awareness *does not reflect inadequate ability*, but rather, the *constraints imposed by the education system* on the development of decision-making competency.

Visual Arts is a subject in which there are, technically, no right answers. Making decisions about value in non-veridical contexts requires agents to draw on a range of *strategies*, such as emotions, feelings, and

[60] In the IEB curriculum, learners often make one resolved artwork in a term. This translates to a three-to-four month period in the South African independent school calendar.

[61] This is not to suggest that the assessment context does not influence the decisions, just that the decisions are not directed by the clear instructions of an examiner, on a micro-level.

the structuring role of the cortex (Damasio, 2006:70), and *resources*, such as personal histories (encoded in the somatic system) long-term memory, artefacts, and personal qualities (Kagan & Snidman, 1991).

The questions posed to participants in this study are all neutral in tone and there are no preferred answers. Based on the literature, we could expect an even distribution of decision-making approaches, in the absence of other forms of bias. A sufficiently large group of participants should report behaviour across the range of options within the study. Consequently, if patterns show up in the map of the decision landscape, we can assume that these are the effects of constraints in the system (Juarrero, 2000:45).

Mapping participants' responses provides a probability landscape of the system within which they make decisions. The probability landscape of the whole cohort's responses reveals what the system *tends towards*. If a large number of respondents report using a particular approach, this would represent an attractor in the system. If a particular approach was significantly underrepresented, this would represent a 'separatrix' (Juarrero, 2000:42) in the probability landscape. Such a separatrix is behaviour the system 'shies away from' (Juarrero, 2000:42). This is likely to be the result of particular constraints. One of these constraints could be that the system has, historically, suppressed particular ways of knowing and is, therefore, no longer aware of these as options.

Since this study does not tell us *what kinds of* culturally relevant decisions participants made, it is not evaluative. Further, since it reveals learners' *awareness of*, *sensitivity* and *inclination* to use particular decision making approaches (Perkins et al, 2000), the study may be more predictive than conventional assessments. It is necessary to note, however, that since the artworks were made to be assessed, the results do not have predictive value for cultural practices outside of secondary school assessment contexts. This is a limitation of the study, constrained as it is by the ethical protocols for researching with minors.

In my own creative practice, however, there was no expectation that the visual objects I made would be assessed. By using the same set of questions to gather information from learners and to reflect on my own processes, the two studies offer a point of comparison. This reveals differences that can be related to the Visual Arts curriculum, private-school culture, and the assessment of school-based artworks. It may be worth noting that, while I have many years of experience in creative practice, the study gathers information about the 'apparatus' (Barad, 2014:815) we use to make evaluations and not the nature or quality of the objects as-art. Consequently, I argue the comparison is fruitful.

Purpose Statement

The question that this pre-hypothesis[62] research addresses is, broadly:

What can be learned by mapping learners' independent decisions, made in the process of making art? Within this broad question, what can such a map reveal concerning:

1. learners' awareness[63] of available[64] decision-making strategies and resources;
2. learners' sensitivity to opportunities for drawing on available strategies and resources;
3. learners' inclination to use these strategies and resources; and
4. the constraints that exist in the system?

Theoretical framing

While this doctoral study is situated in Visual Arts and concerns the decision-making practices of learners in the arts, the inquiry extends beyond the bounds of what we might understand as art or cultural production and has implications for decision-making in all non-linear contexts where predictions are not possible. There is a significant overlap between *making decisions in uncertain contexts* and the way that *learning* is modelled by psychology and the brain sciences (see Dehaene, 2020). It can therefore be argued that 1) this research has implications for the way we understand *learning*, more generally; and 2) the processes, practices, and products associated with culture do not improve(s) learning but (*are*) learning (Gaztambide-Fernández, 2013a:227).

The decision-making model I construct from a broad range of perspectives can be thought of as bio-cultural (Boyd, 2009). It is both biologically supported, by, for example, drawing on neuroscience research, and culturally sensitive, in that it is open to culturally diverse ways of ascribing value. It is, further, an acknowledgement that 'knowing' is a collective endeavour. By drawing on different knowledges I aim to give a more complex picture of the subject of inquiry and make the research applicable in diverse contexts. Consequently, this research draws on other fields that have conceived of and inquire into decision-making, particularly when these are made under conditions of indeterminacy or ambiguity. I use complex

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[62] While it may be argued that research in the Humanities is by nature pre-hypothesis, the existence of epistemic form and classificatory terms, such as 'art' (Gaztambide-Fernández, 2013a) means that a lot of research hopes to find examples of the form the particular discourse propagates.

[63] This notion is derived from Juarrero's (2000) work on intention in complex adaptive systems. The author writes that it is not possible for an agent to intend something they are not aware of.

[64] The notion of availability is based on evidence from neuroscience.

adaptive systems theory as a framework to support this trans-disciplinary inquiry. In particular, I draw on Juarrero's (1998; 1999; 2000) work with intention and emergence, as explained by complex dynamical systems theory, to account for the way decisions made in creative practice produce outcomes that are non-linear, unpredictable and, often, surprising. I have discussed the theories I draw on in Chapter 1 of this thesis and I will describe their application to my model in more detail, as I introduce the study.

While studies in the arts tend to focus on the real or notional artwork, psychology and the 'brain sciences' inquire into veiled processes occurring within an individual's body-brain and between different minds. Joseph LeDoux (1998:66, 67) explains that language-based self-reflection does not access unconscious processes, such as preference, and the way personal histories bias our decision-making. This is because unconscious neural networks have no physical connectivity to the brain's language systems (LeDoux, 1998:161). While self-reflection is proffered as a way to gain meta-cognitive awareness of people's thinking (following the writing of Schön (1987), LeDoux (1998:32) would argue that it is likely to provide post-rationalised explanations that fit the accepted norms and values of the context in which they are shared. Self-reflection does not reveal the ways people's personal histories affect their choices.

LeDoux (1998:29-32, 67) argues that while language is limited in its ability to uncover emotional processes, other, non-linguistic methods, may make it possible to breach this barrier. Further, he suggests that the boundary between conscious and unconscious lies in different places, in different individuals and at different times (LeDoux, 1998:67). Drawing on Jungian psychoanalysis (Estés, 2008) and narrative psychology,[65] I suggest that arts-based research (in the broadest form of the term) breaks through this barrier in various ways, albeit incompletely.

Cultural products, processes, and practices can be seen as complex adaptive systems. In this view, self-organising higher levels of the system are not reducible to the sum of the component parts. In the entrainment of the new higher-level system, a particular set of relationships between components produces new meanings. While the new form cannot be translated adequately into language used in a linear, explanatory manner, the practitioner can stand *in relation to* the outcome of their own practice and be moved by it, as the viewer/audience. Following Damasio (2006:70), the perceiver processes the new (mental) object via the emotional, somatic, and cortical systems. The somatic system, in particular,

[65] Following Theodore Sarbin (1986), humans make sense of experience through the stories they tell and listen to.

allows unconscious associations and relationships between the (mental) objects and the artist-viewer to become (more) conscious.

One of the ways the unconscious becomes conscious is through the body's changed somatic state. These are feelings that are produced by unconscious reactions within the body-brain (Damasio, 2006:239). From my practice and discussions with learners, it is easier to make an embodied response to the updated and updating somatic state, than to give a verbal explanation. Therefore, if the practitioner responds to the new cultural product through a new *embodied* response, that reaction might be significantly more accurate than a response that must first be reduced into an explanation before being acted on. In the SenseMaker study, I ask participants to respond to questions by placing a marker within a field (bounded by signifiers). Since this action requires an embodied response to the signifiers and a spatial judgement of their position relative to the signifiers, it is more likely to elicit relational understanding than a purely linguistic method would. This is especially so, if there are contextual expectations of the kinds of language the participant should use. A culture of 'right answers' can be particularly inhibiting, in this regard.

One further aspect of cultural practice, which may make the conscious-unconscious brain boundary more permeable, is uncertainty or ambiguity. Following Massi et al (2018), the variability and ambiguity that accompanies creative practice constitute it as a *learning process*, rather than a demonstration of expertise. This means that, while *skill* is automated and habituates (becomes unconscious) through repetition, making decisions under conditions of uncertainty remains a largely conscious process.

Methodology

The SenseMaker study of learners' decision-making is based on narrative research. For clarity, in this methodology, narrative is understood very broadly and includes cultural artefacts and performances, including visual and sound images. While there are aspects of decision-making that are likely to be unconscious and inaccessible to language-based self-reflection (LeDoux, 1998:29-32), it can be argued that metaphor and related forms of meaning-making can reveal what direct introspection cannot do. In their structure, narratives/creative practices reveal the *sense* people make of things. To this extent, they also reveal connections between narrators and the narrative content. More importantly, when people narrate their experiences, they point to the *relationships between* ideas, objects, and events *that constitute the particularities of* their experiences. As a consequence, narratives (and/or artworks) contributed by participants make it possible for participants to access more complex information about their decision-making practices than questionnaires can elicit.

Within the school system, learners are often positioned as passive recipients of knowledge. Against this backdrop, inviting narratives from learners potentially 'challenges the perceived wisdom of those at society's centre…; and open(s) new windows into the reality of those at the margins' (Chilisa, 2012:66). Narrative constructs experience *as* knowledge (Chilisa, 2012) and undermines deficit-theorising of children as those who 'do not know'.

The pre-hypothesis approach of this study is well suited to cultural practice, broadly conceived. It does not imagine desirable decisions or even desirable ways of making decisions. It is accepted that people make decisions in different ways, in different contexts. Therefore, all the approaches to decision-making I used to construct the model are understood as equally valuable and equiprobable, except under the influence of local constraints. Any patterns that emerge are therefore understood to be the result of constraints acting on the system.

Method

As rich sources of information about participants and their perspectives, narratives can be time-consuming to analyse. This often leads to small sample sizes in narrative-based studies. The interpretation and analysis of narratives are also subject to researcher bias. To address both of these concerns, I made use of a digital research tool that allows participants to enter and self-index their own narratives. SenseMaker is a commercial[66] app for computers or smartphones. Participants enter their own narratives, (text, image, or voice notes) without the mediation of a researcher, in the language or modality that suits them best. Next, participants are invited to title their narratives and then self-index them by responding to a series of questions. In this self-indexing or self-signification process, participants move a marker within a digital space which has a triangular shape. Each apex of this triadic space has a signifier attached. This is a word or phrase taken from the literature that represents a direction on which decisions might tend. As participants position their marker in this field, they index their stories relative to signifiers (see Figure 12, below). The exact position of the marker can be converted to numerical data and made available for mathematical analysis[67].

[66]I wish to acknowledge my gratitude to Dave Snowden and Sonja Blignaut, of Cognitive Edge, for the free use of this tool, for educational purposes.
[67] I made use of the built-in statistical analysis function of the app.

The interactive feature of the SenseMaker app addresses the usual shortcomings of self-reflection (see LeDoux, 1998:32). Since participants position a marker in digital space, as a response to the relationships they identify within their practices, they engage an embodied form of participation with their own stories and access deeper structures within their decision-making systems, in sensitive ways. When I answered these questions concerning my own processes, I was surprised by the results, even though I had designed the questions. I, therefore, argue that the study bypasses the script that educational contexts offer participants as suitable answers for their questions.

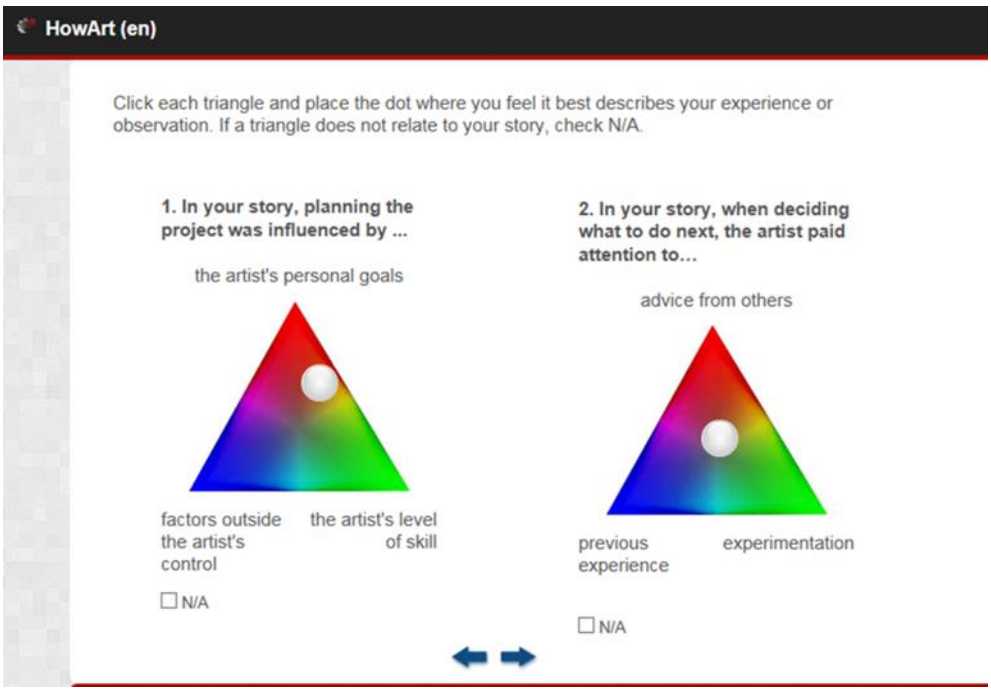

Figure 12: Screen-shot of triad 1 and 2, Desk-top version

In the design of questions for a SenseMaker study, it is important to choose signifiers that do not vary in value. In other words, it should not be possible to identify institutional or researcher bias in the signifiers. Participants should not be able to 'gift' the researcher with desired responses (Snowden, 2009) or 'game' the study in an attempt to appear 'competent'. This makes it unlikely that participants would perceive any single answer as more correct than another. If participants consider a particular set of signifiers to be

irrelevant, or, if for any other reason they do not wish to answer the question, they can check the N/A (not applicable) box.[68]

In each triad, the three signifiers operate in tension with one another. There is no hierarchy in tone or value between the three signifiers and I do not look for particular answers. I expect all the signifiers to play a role. The study seeks to understand the *awareness*[69] learners have of these factors; their sensitivity to contexts as opportunities to apply cognitive strategies and resources; and their inclination to apply them as decision tools. When a participant positions their story in the triad, they reveal the way their decision(s), taken while making the particular artwork, were related to the three signifiers. The process of responding to the questions frames participants' decision-making through the theory on which the triad is based.

Another feature of SenseMaker, is the way these individual responses are made available as a collective graph or map. In the SenseMaker approach, researchers are advised against making predictions but are encouraged to explore the patterns that are presented in the collective responses.

While the patterns are abstract (graphical and mathematical patterns), they are identified by the codes (e.g., signifiers) used in the study. Researchers can use the SenseMaker analysis app to plot the data from one signifier against another. This makes it possible to see a correspondence between different elements in the system.

In the SenseMaker approach, researchers do not begin by reading participant narratives, but engage with their information as 'maps'. While this approach is unusual in narrative-based research, it avoids the bias that researchers are likely to develop after reading two to three narratives, which can then be imposed, unconsciously, on the reading of subsequent stories. In the SenseMaker approach, the researcher is encouraged to consult individual narratives after the patterns have been identified and not before. This allows her to confirm the analysis, interpret the pattern in context, and understand the specificity of individual contributions.

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[68] On the digital platform, a question must be completed before the participant can move to the next screen. The N/A box allows participants to opt out of a question.

[69] By awareness, I do not mean that participants would spontaneously offer information about these resources. The triadic questions trigger awareness by naming resources as signifiers. In my own experience of this study (as a participant), the process of answering questions, after having made a series of decisions, revealed the resources I had drawn on. I do not believe I would have been able to identify these strategies or resources, in advance.

SenseMaker's analysis app converts each spatially-positioned marker to numerical values. It is important to stress that this conversion does not imply a loss of the qualitative information (narratives are retained in the system, in their original form). It merely translates participants' spatially-positioned responses into numerical values, which makes further operations possible. What is more, the collective responses are not reduced to a sum or an average. Where statistical models often discount outliers, the SenseMaker approach considers every contribution as valuable. The narratives at the edge of systems offer the greatest potential for transformation.

While the first interaction researchers have with the collected stories is through these graphic images, the individual narratives remain linked to the markers. This makes it possible for the researcher to call up a particular story and explore the specificity of the participant's contribution. There is, therefore, both a *critical distance* and a *critical proximity* to participants' perspectives, as revealed in their narratives. This positions *SenseMaker* as well-aligned with a relational axiology (Chilisa, 2012:22, 117-122; Doll, 1993a), in which the individual is as important as the group.

A final feature of this tool, to be discussed here, is that it allows cross-referencing between different questions. For example, two triads can be compared, or a triad can be cross-sectioned with one of the multiple-choice questions. As patterns emerge, it becomes possible to see the particular cohort's responses as a probability map. In the context of large numbers of indexed narratives, this software support greatly enhances the ability to tease out the implications of participants' self-signification and surfaces systemic patterns that we are often unaware of.

The study

Forty-seven schools that offer Visual Arts in the IEB system were approached to allow learners to participate in the research. Ten school principals, all in the greater Johannesburg region, permitted the school's Visual Arts teacher to distribute letters of information, consent and assent forms to their learners. Letters of consent and assent were received, and, finally, fifty-four narrative fragments were entered and indexed. Participation on the app is anonymous, so while I have letters of consent and assent, I cannot trace these to particular entries. The benefit of the multi-school cohort is that trends can be seen to represent a larger picture than that of a particular school environment.

In the study, I invited participants to contribute narratives through an open-ended question:

> *Tell us about an art project, which shifted your attitude to art. (You may either be the artist or have observed the project closely.)*

I hoped that the reference to a *change in attitude* would elicit stories of art-making that had *affective* associations for the participants. (See Figure 13, below.)

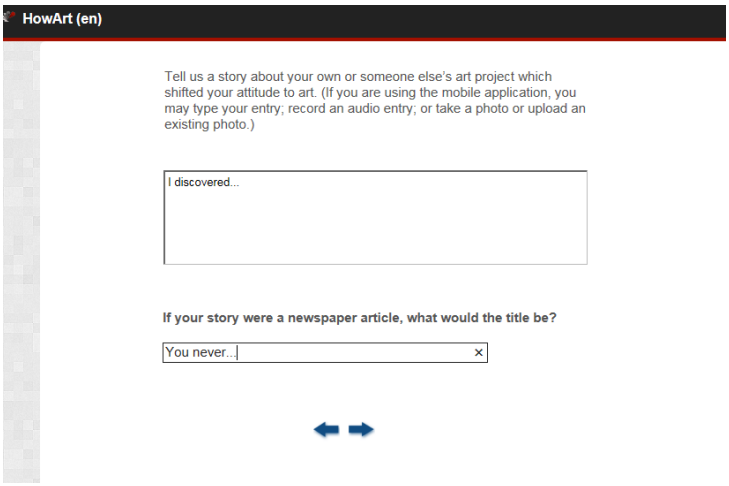

Figure 13: screen-shot of the invitation to offer a story (demonstration only).

Following the elicitation of the narrative, participants were invited to give the narrative a title. Next, participants were invited to interact with the app through questions, in the form of triads. After this, multiple-choice questions asked participants how they felt about the artworks they referred to; how they thought the artwork might be graded by an examiner; about their exposure to formal and informal arts education; and basic demographics.

Triads, Signifiers, and the design of the study

Six triads were designed to correspond with six decision points[70] in the process of making art. Based on my teaching experience, I identified decision points at which learners would typically ask for support,

[70] This is a concept I gained from Sonja Blignaut, in personal conversation.

advice, or clarification. It is important to note that although the term, 'decision point', suggests a single moment in time, these decisions are neither steps in a linear process, nor are they to be seen as instantaneous. These are *kinds of* decisions and are best thought of as processes (Dominguez et al, 2004:8).

The decision points chosen for this study were: 1) planning or goal-setting (**intent**[71]); 2) drawing on **resources** to inform the next move(s); 3) **strategies** for weighing up options; 4) **evaluation** of work-in-progress; 5) managing some of the **constraints** that shape the process; and 6) working to achieve the approval of a particular **audience**. Each of these decision points became the subject of a triad (a question with three signifiers, arranged as a triangle).

[71] While these ideas are best described as phrases, the analysis app is constrained to single-word terms. The bold words were specifically chosen for cross-referencing in the app.

Triad 1

The first triad elicits information about the first decision point, planning or setting a goal. The signifiers for this decision point were based on research in the psychology of judgment and decision-making, by Dominguez and others (2004). Writing from the field of medical decision-making[72], the authors describe decision-making under complex conditions as a trade-off between *goals (such as the health of the patient)*; the surgeon's *level of skill*; and the *affordances* of the context (the health of tissue in the particular patient's body). Applied to the process of making art, these translate into the learner's *personal goals*; their *skill level*; and *external factors* (easier to understand than *affordances*).

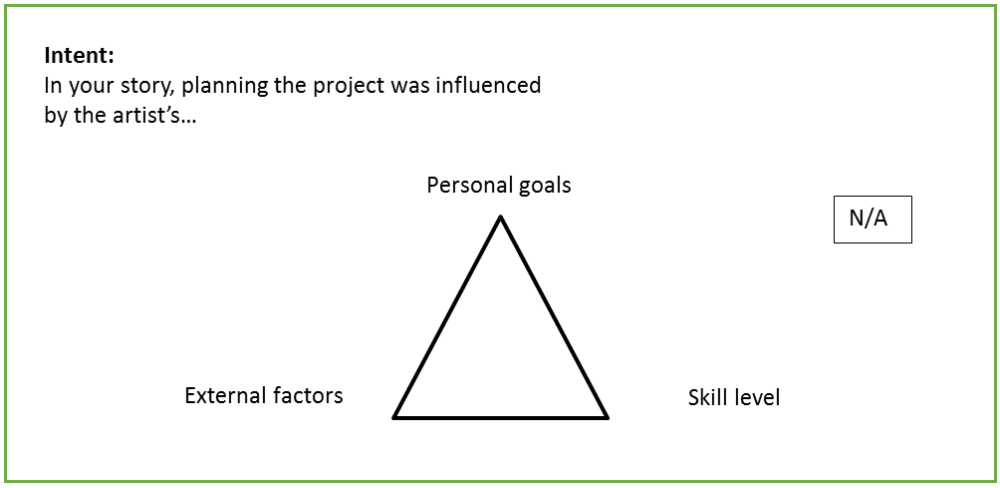

Figure 14:Triad 1: Intent

[72] In this study, surgeons reflected on their decisions whether or not to convert a laparoscopy procedure to an open operation, in aged patients.

Triad 2

The second triad captures responses concerning the decision point, drawing on resources to inform the next move(s). Perkins and others (2000) use the term *cognitive resources* to refer to types of information or knowledge that a decision-maker has access to, while *strategies* are mental operations the decision-maker applies to ideas. To elaborate on the kinds of resources a cultural practitioner might have, I drew on Donald Schön's (1987, p.) description of the three ways a studio master collaborates with students: 1) the studio master makes sketches (*explores*); 2) comments on the sketches he makes (explains or gives *advice*); and 3) draws on his vast repertoire of moves (*experience* encoded as memory). It stands to reason that learners would be able to draw on the same kinds of resources, in their own way. For example, 1) learners explore different ways of interpreting a brief; 2) they bring their life experiences as resources to the art-making process, and 3) where the studio master offers advice, learners may seek advice.

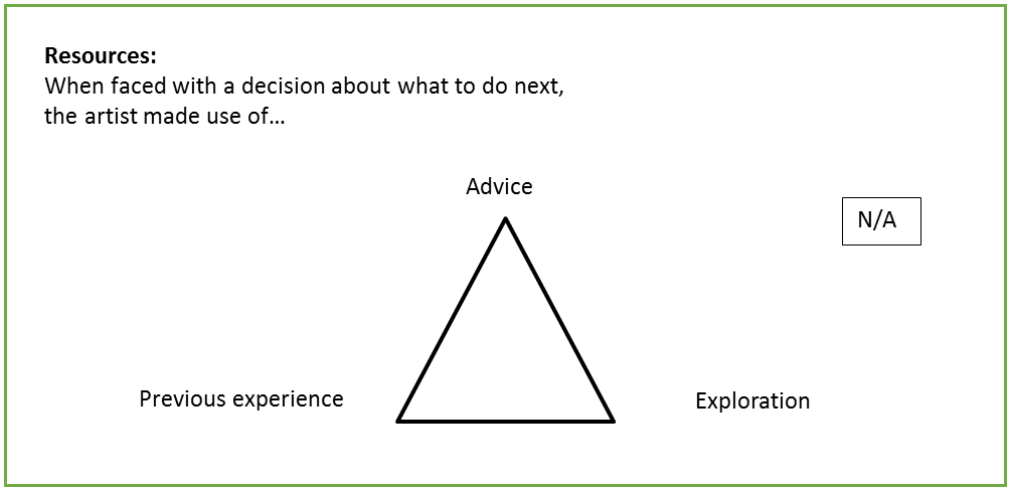

Figure 15: Triad 2: Resources

Triad 3

The third triad (see Figure 16, below) gathers information about the decision point, *selecting strategies for weighing up options*. Following Damasio (2006:70) people make use of three brain systems in decision-making, emotions, (somatic) feelings, and the structuring role of the cortex. While the neuroscientist insists that these systems are invariably at play in decision-making, it is possible to argue that people are not always aware of them. One of the legacies of Christian National Education in South Africa is an approach to knowledge that disregards the body. In the school system, as I experienced it, cognition was thought of as rational and located in the mind, as distinct from the body. In working with Damasio's theories of the neural basis for emotion and the role of the body in cognition, I wanted to ascertain whether Visual Arts learners are *aware of* drawing on these systems (LeDoux, 1998; Juarrero, 2000).

Some points about the language used in this triad may be necessary. First, while other writers (e.g., Norman, 2004) combine the emotional and somatic systems as a single, *affective* system, I chose to use Damasio's (2006:149-150) thinking in which *emotions* and the *body* are seen to have distinct, if collaborative, contributions. This would make it possible to see what, if any, effect the school system has had on learners' awareness of embodiment as a cognitive strategy.

Second, the use of the term, *emotion*, differs in colloquial use from the way Damasio uses it. While many people use emotion to describe their experience of feeling sad, happy, excited, and so forth, Damasio uses the term to denote the automatic and unconscious systems that make an organism approach something or recoil from it. These automatic systems are inherited and function to keep the individual safe from danger. While there are some very primal responses, such as recoiling from predators, there are also learned responses, such as an aversion for objects associated with shame, in cultural contexts. Since emotions lead to automatic movements within the body, these produce changes in the somatic state, which individuals experience as *feelings*. Generally, when people give explanations for their feelings, they interpret the somatic state in a causal manner. These interpretations are not always accurate but draw on available social scripts as reasons for the experience of embodied states (LeDoux, 1998:32).

While learners might use the term, *emotion,* in a way that differs from Damasio's use of it, I, nevertheless, argue that the separation of *physical sensations* from *emotions* is necessary to reflect learners' awareness of the *body* as a distinct feedback system in decision-making. For the last signifier in this triad, I used the term, *rational thoughts* for the cortical function. I felt it was closest to the way learners might understand the explanatory role played by the cortex.

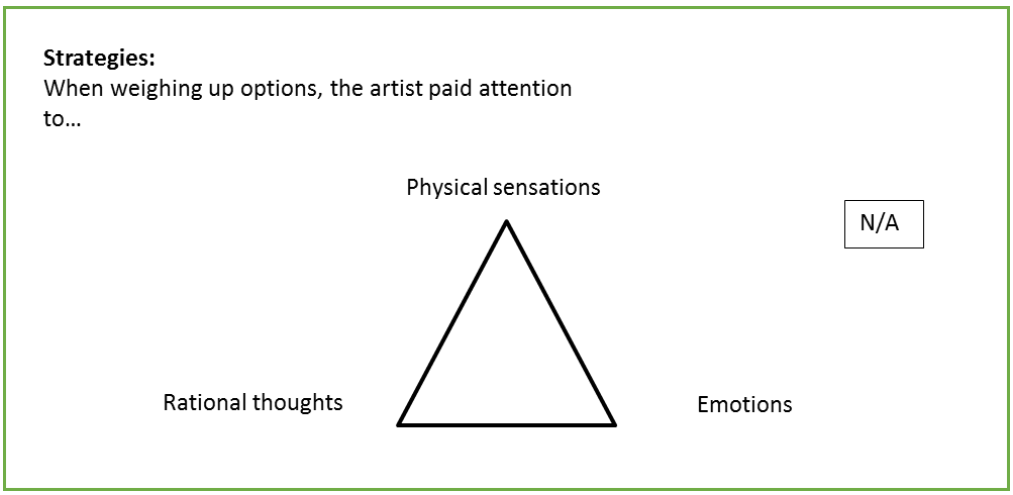

Figure 16: Triad 3: Strategies

Triad 4

Triad 4 (see Figure 17, below) concerns the decision point or points at which learners *evaluate work-in-progress.* Signifiers for this triad are derived from the idea that cultural production has a social-evolutionary function (Boyd, 2009; Dissanayake, 2009), which may have evolved from ritualised behaviours (Dissanayake, 2009) and the social learning systems these gave rise to. To be effective as communication, all human expression must gain the attention of the audience (even if this is also the artist). However, the brain soon habituates repetitive information (Schultz, 2006:101), so elaboration is necessary to maintain attention (Schultz, 2017:370). In ritualised behaviour, collaborators develop a shared expectancy, which is then *elaborated on* (Dissanayke, 2009). Without elaboration, ideas become stale, but neural processes also habituate. That makes them unavailable to consciousness. Also, the brain does not reward task-directed behaviour (such as paying attention or learning) when the outcome is familiar (Rescorla & Wagner, 1972 in Schultz, 2006).

Wolfram Schultz (2006:93) writes that, while a stimulus can become associated with a reward and can be perceived as a reward predictor, 'a reward that is fully predicted does not contribute to learning […] Learning advances only to the extent to which a reinforcer is unpredicted and slows progressively as the reinforcer becomes more predicted'. In this way, neurotransmitters mediate the process of learning to predict opportunities for rewards. This explains why socio-cultural interactions which create tension

between expectancy and elaboration maintain joint attention between participants (through the neurotransmitter reward system) and make social learning possible.

In joint attention, two participants attend, jointly, to an attentional target (Tomasello & Farrar, 1986: 1460). Similarly, in ritualised behaviour, the participants attend to the modality of the interaction and are engaged by the principles which shape the interaction. The attentional target of joint attention translates to the learner's intention for their artworks. In other words, their intentions signify what they wish to point to, through the artwork as a pointing gesture. It stands to reason that socio-cultural connection is effective when it can be ascertained that the audience attends to the target object the artist wishes to engage them on. Nevertheless, the elaborative component of ritualised behaviour allows participants to sustain attention by developing the target of attention. This form of joint attention does not conclude with a shared experience of perceiving something, only, but includes mutuality and shared affect. Consequently, elaboration may be seen in two ways. On the one hand, it serves to sustain attention by introducing some uncertainty about predicted neurotransmitter reward (Schultz, 2017). On the other hand, it signals the adjustments participants make to synchronise their perceptual systems (Stephens et al., 2010; Hasson et al., 2012; Dikker et al., 2014). Consequently, the three signifiers for this triad are, *attract attention*, *express the artist's intention*, and *develop an idea* (elaborate on the attentional target.)

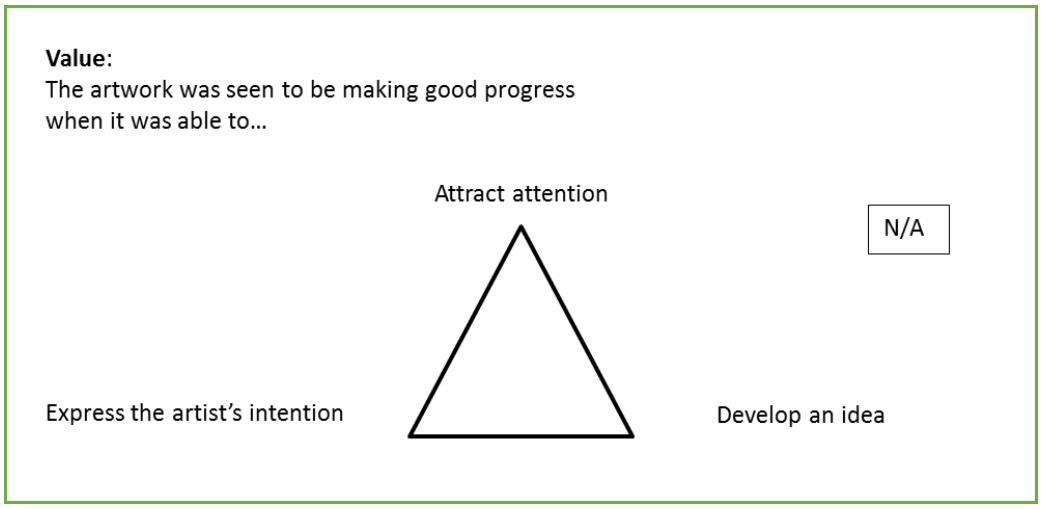

Figure 17: Triad 4: Value

Triad 5

The fifth triad (see Figure 18, below) explored the idea of constraints and the decision learners make to navigate these. Visual Arts as a school subject is constrained by many visible and invisible structures (Bandura, 2006). For this triad, I focused on *time pressure*; *access to materials*; and *a space to work in*. These are practical examples, selected because of the way I saw them play out in learners' processes and also because I found I had to navigate these constraints in my own practice.

The purpose of this triad was to discover how institutional constraints placed on time, space, and materials impacted learners' decisions. I used the terms, 'challenges', and 'take something into account', to make the notion of constraints accessible to participants.

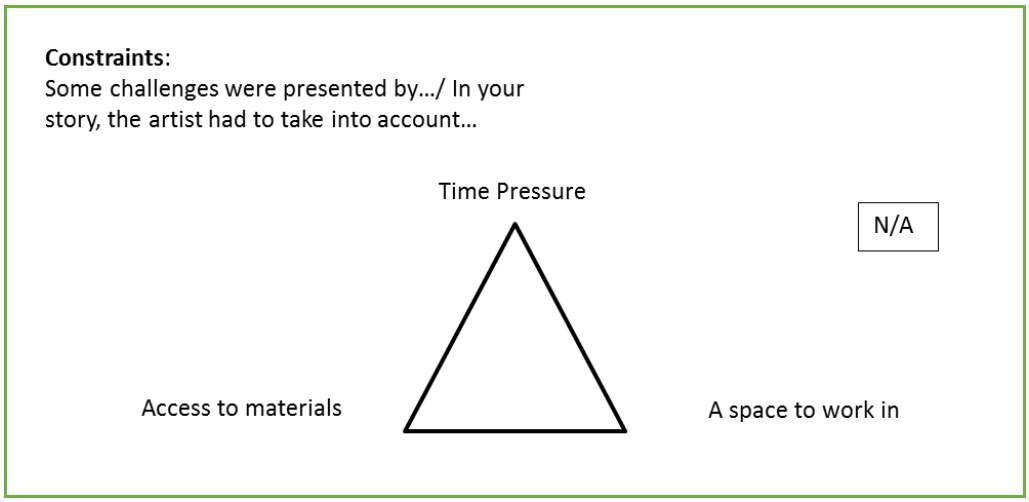

Figure 18: Triad 5: Constraints

Triad 6

In the sixth and final triad (see Figure 19, below), I wanted to know how learners work to achieve the approval of a particular audience. In designing this triad, I was influenced by Pollock's (2005) and Kentridge's (2014) view of the artist as first viewer or critic. This idea is supported by Dehaene (2020: 19) who describes learning as an iterative negotiation within an intra-personal actor-critic relationship. It can also be related to Vygotsky's (1978:57) claim that all learning begins as social learning, after which this relational aspect is internalised.

I argue that the intra-personal conversation (Vygotsky, 1978; Dehaene, 2020:208) is influenced by *the way we imagine the viewer*. If the viewer is understood to be a collaborator, with the artist, this will produce a different intra-personal conversation from a situation where the viewer is imagined as a judgemental critic. This triad tries to understand who learners imagine as their conversational partners in producing meaning, with the artwork as an initiating gesture.

There are occasions where learners consult their intended audiences to help them make decisions. For example, learners might ask peers or the teacher for advice. However, learners make many, if not most, of their decisions independently. In this process, the internalised audience provides a proxy for the intended audience. Based on the context of Visual Arts, I have chosen to identify teachers and examiners as potential audiences, along with the learners, themselves.

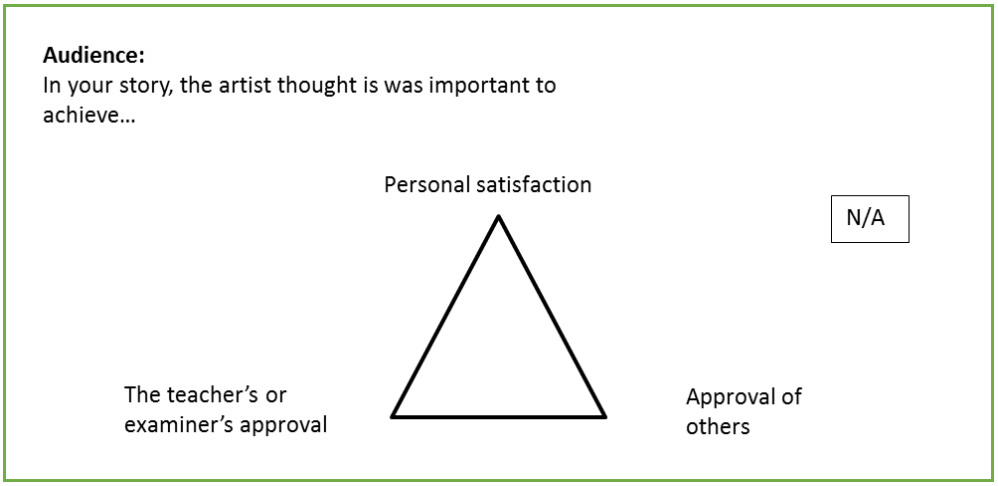

Figure 19: Triad 6: Audience

Limitations of the study

Taken from learners who offer Visual arts as a subject in IEB schools, the sample of narratives, collected for this study, is not demographically representative of all learners in South Africa. Also, I recognise that my privilege as a White South African and my experience as an educator produces 'epistemic blindness'[73] about the experience of the learners in art classes, in a variety of contexts. The design of the signifiers, therefore, are prone to not-seeing what my privilege occludes. Nevertheless, the model I constructed to design the signifiers is based on the literature on decision-making and was tested through my own creative and teaching practice. Further, I work with Agazarian's (Gantt & Agazarian, 2010) concept of isomorphic social systems, in which one level of a system can give insight into the identity of the system as a whole. Consequently, I argue that while the view I can offer is of a particular demographic of learners making decisions in a particular context, the results are suggestive for the system as a whole. The findings offer a significant starting point for a discussion about how value is attributed; how decisions are made in uncertain contexts; and therefore, how learners and teachers might work together to improve meta-cognitive awareness and self-efficacy in this regard. Furthermore, the methodology, method, and design of the study address a knowledge gap by offering a way of mapping emergent learning, rather than measuring programmatic learning, which is learning in relation to predetermined outcomes.

This study, like the cultural practices it inquires into, should be seen as a particular stage in what I hope might be an elaborative conversation with other researchers, educators, and cultural practitioners. Further research, in informal arts education and social learning contexts, would be able to add meaningfully to the current map of learners' decision-making in the process of making art.

Discussion

Having given a detailed description of the study's design, I now offer the results of the study and a first-level discussion of the patterns that emerge. At this stage in the process of analysis, the results are viewed as a graph, in which the collective responses of the participants are represented as a scatter pattern. Some potential interpretations make themselves visible on the immediate reading. Others surface after some probing.

[73] Peace Kigua, personal communication, 2018.

Triad 1: Intent

Figure 20: Results of Triad 1: Intent

In the first triad (see Figure 20), the grouping of markers in the middle of the triad and towards *the artist's personal goals* can be observed, with several scattered markers nudging towards *external factors* and two, rather isolated, markers approaching *the artist's skill level*. The number of participants who did not consider their own goals as significant was quite small. These participants ranged across Grades 10 to 12. Four participants, whose markers appear close to *external factors*, used language that suggested a fairly narrow brief given by the teacher, but others seem to be referring to life experiences. I was positively surprised by the low number of participants whose skill level significantly influenced their planning, either positively or negatively. The implications are that learners believe they have the requisite ability to make the artworks of their choice or have the ability to acquire these skills, in the process. This is important in resisting deficit-theorising, in education.

Triad 2: Resources

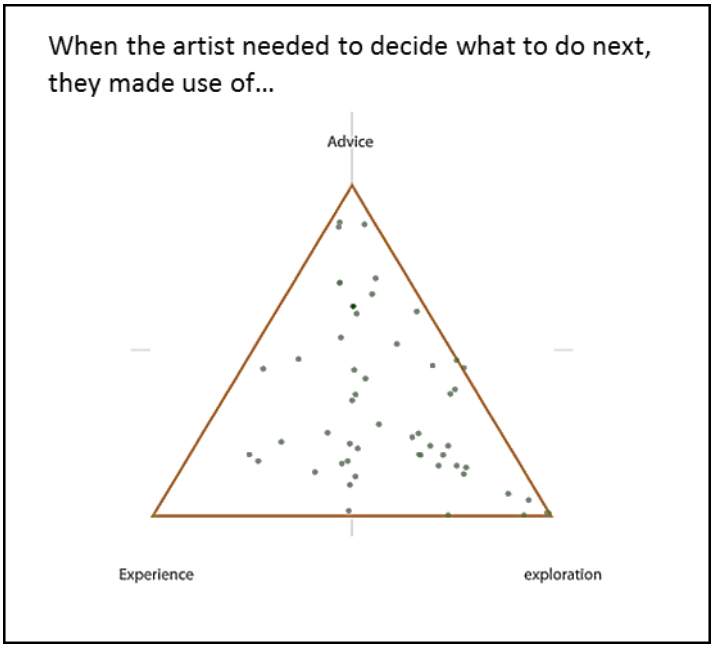

Figure 21: Results of Triad 2: Resources

In the second triad (see Figure 21), participants' responses are reasonably well distributed across the triad, with *exploration* drawing the greater number of responses. It is of interest that participants' narratives indicate they did not consider *experience* limited to aesthetic experience. This makes an argument for the inclusion of all aspects of life as material in the process of making art. At the same time, *current* experience (*exploration*) seems to be a more readily available resource for adolescent learners than memories or lessons learned in the past.

When I cross-referenced Triad 2 (resources) with Triad 5 (constraints) I found that the exploration learners engaged in did not correlate with material or space, seen as constraints. Further cross-referencing with Triad 4 (value) revealed no correlation between *exploration* and *developing an idea*. Rather, *exploration* was associated with *expressing the artist's intention*.

Learners in Visual Arts, in South African schools, are required to plan their projects and document this planning in a journal, which is assessed separately. I suspect that learners understand exploration as this planning phase and that when they begin work on the 'artwork proper', they execute these plans, as

closely as possible. This is supported by at least one narrative in which a participant wrote, 'my theory on art is once I have my idea and I have started creating it, there is no turning back…'

Triad 3: Strategies:

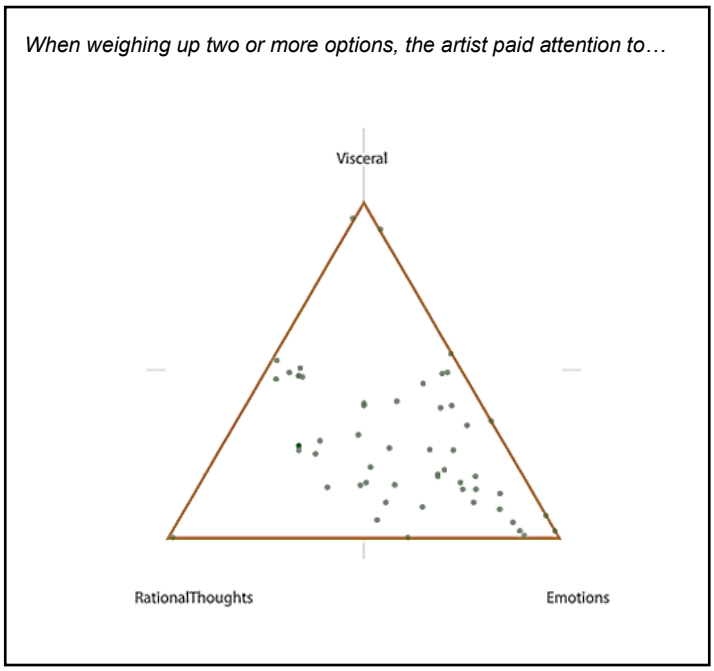

Figure 22: Results of Triad 3: Strategies

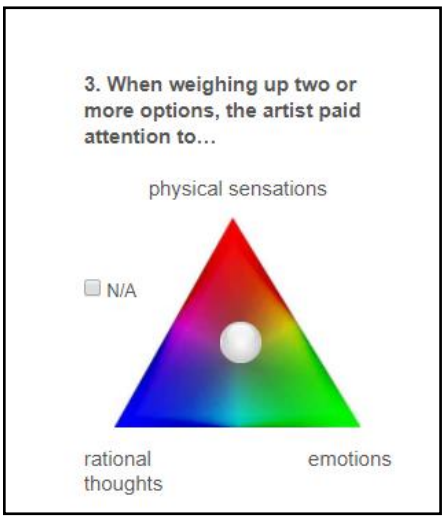

Figure 23: Screen image of Triad 3, showing language the participants encountered.

This triad is based on the theory that decision-making involves emotions, somatic feelings, and the explanatory or structural role of the cortex (Damasio, 2006:70). Gaztambide-Fernández (2020) uses the term, *the affective order*, to account for the body, emotions, and desires engaged by cultural production. In this study, emotions featured heavily in participants' awareness while rational or embodied processes did not. Only one marker is positioned in the *rational thought* apex. The narrative attached to this response described learning to use a 'formula' for the proportions of the face, in creating portraits. Of the two participants who indicated that *physical sensations* mattered, one mentioned the 'feeling of fresh clay' in their hands and the other used the metaphor, 'touch people'.

One explanation for the heightened awareness of emotion in this triad might be a Western middle-class preoccupation with the experience of the individual (Niu & Sternberg, 2006). In this regard, the attention paid to European and American Modern painting in the Grades 11 and 12 syllabi supports an image of the

artist preoccupied with emotional experience, rather than external, social, or embodied realities. The implied individualism reveals the lack of relational philosophies underlying the Euro-western arts education model. Further, the absence of the body in Visual Arts learners' narratives reflects the separation of the arts into discrete modalities, in current assessment systems, in contrast with a multimodal approach.

In my teaching practice, learners have often described art's function as offering opportunities to express emotion.[74] I, therefore, expected emotion to feature in their responses, here. While I anticipated that learners would use the term emotion, in ways that differ from Damasio's, I was surprised by the profound absence of the body in learners' awareness. In my own experience, growing up with Christian doctrine and attending an English-medium boarding school, I see this lack of embodied awareness as a second-generation effect of Christian Nationalist Education models. Yousuf Eshak's (Eshak, 1987) analysis of Du Plooy and Kilian's Article 4 of the *Christelike Nasionale Onderwysbeleid* reveals an education policy in which the body is seen to need 'discipline' (1987:17), 'compulsion' (1987:29) and even 'punishment' 1987:30). Despite the attention given to the body in sports education, schools institute a 'strong disciplinary and contradictory relationship with the body' and effectively 'efface or erase children's bodies' from awareness in the context of the school (Paechter, 2011:4).

Included in the suppression of the body are strategies that impose (binary) gender ideals; body-image ideals represented as health education; and the disciplining of the body's natural urge to move. Schools enforce the expectation that learners sit still, in particular ways, and move about only with permission; that they wear restricting and restrictive clothing; and that movement, when it happens, is in concert with the group, producing a militarisation of the control of the learner's body (Eshak, 1987; Paechter, 2011). In independent schools, where the majority of staff members are White, an inability to make embodied knowledge a normal part of educational discussions normalises White experience and continues to marginalise many Black learners.

[74] At the start of the Grade 10 year, I would ask learners to tell the class why they chose art as a subject. The majority indicated that, as distinct from other subjects, art gave them an opportunity to express their emotions.

Triad 4: Value

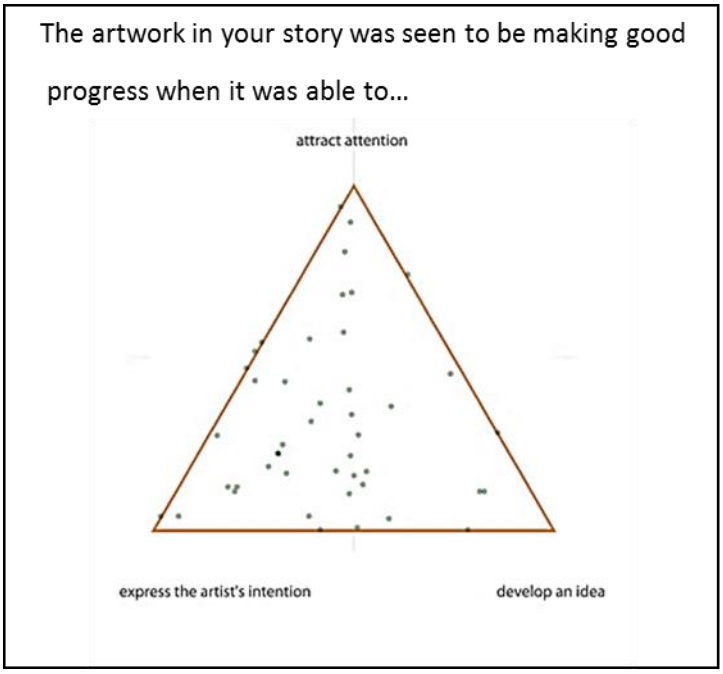

Figure 24: Results of Triad 4: Value

From the distribution of responses on this triad (see Figure 24), learners understand that an artwork has value when it *expresses the artist's intention* and, to some extent, *attracts attention*. In a few rare cases, an artwork was seen to have value when it *developed an idea*. The latter group of narratives concerned projects in which teachers set fairly rigid constraints. I interpret this as learners recognising that when they participated in teacher-led projects, their task was to learn something new or take on new ideas.

Where learners had more freedom to develop their concepts and interpretations of a brief, they did not welcome the development of their ideas. Learners may have understood the conceptual phase of the process as one that *concludes* in an *intention*, after which they begin making the artwork. This mirrors the curriculum in Visual Arts, in South Africa. Assessment protocols award marks, separately, to Conceptualising, Making and Presenting, and Visual Culture Studies. This practice may inadvertently communicate to learners that *conceptualising* is what happens in the planning phase, while *making* happens with material, such as canvas and paint.

There are, potentially, two issues at stake, here. One has to do with notions of goal-directed behaviour[75] as part of a 'measured curriculum' (Doll, 1986:11). The other has to do with the non-linear and unpredictable nature of the creative process. The first deals with the larger context of schooling, while the second deals with arts education, more particularly.

In this thesis, I have taken the perspective that while learning in and through the arts produces particular cultural products or outcomes, it is a form of learning in and for complex contexts where uncertainty prevails. As a result, I am disturbed that learners in Visual Arts do not reflect an openness to exploration, beyond a particular point. It is as if creative thinking is limited to a particular phase after which goal-directed behaviour takes over.

Belluigi (2015) found a disparity between espoused values and values-in-practice in the assessment of studio art in certain South African art schools. Similarly, while the IEB guideline booklet (2017)[76] for Grade 12 students lists 'risk-taking' as a desirable quality, the consequences of the risks learners face are not confined to the artwork, alone. The learner's success, or otherwise, reflects on the teacher as well as the school, in national examinations.

The conclusion that learners do not value developments in their artworks that take their thinking forward points to a lack of confidence on the part of both learners and teachers with knowledge acting as a limitation (Langer, 1989:119-122). While I acknowledge Cunliffe's (1999) critique of risk-taking in the absence of a background, which gives these risks meaning, I see ambiguity as an unavoidable component of complex tasks. Consequently, tolerance of ambiguity marks environments in which complex learning and thinking are supported.

[75] See Design Thinking and *stages of the creative process*, as examples.
[76] These are internal documents and not for public view.

Triad 5: Constraints

Figure 25: Results of Triad 5: Constraints

From my interpretation of Triad 5 (see Figure 25, above), participants seem to understand Visual Arts as the production of small-scale objects, using conventional art materials. Participants found 'time pressure' to be the biggest constraint, even though IEB guidelines[77] allow approximately three months for the completion of projects. Many colleagues have shared observations that learners appeared to procrastinate or to take a long time to come up with an idea. Some learners only began working on the physical artwork when the deadline was imminent.

This study points to the internalisation of the creative process (coming up with an idea) as a possible reason for what appears as procrastination. When I cross-reference between questions in the study, the few participants who did not find time pressure to be a significant constraint acknowledged the development of their ideas as valuable (and described teacher-led projects). This suggests that the most time-consuming part of the art project is the conceptualising phase, which learners appear to understand

[77] These are internal documents and not for public view.

as coming up with the initial intention for the artwork. When this is over-ridden by a teacher-directed project, learners manage the deadlines and learn from the process of making.

From responses to this triad, it is clear that access to materials and a space to work in were not experienced as particularly challenging. It is important to note that most of the participants would have been from families who could afford to pay high fees demanded by private schools, and the schools themselves are generally well-resourced. However, art supplies are usually an additional cost, in addition to school fees and other monies for various extramural activities and excursions. In my experience, the arts were not very well funded and budgets for art supplies were often small. At the same time, in these contexts, art was seen as a something people made with dedicated art supplies, and not with found materials or as Gaztambide-Fernández (2013a:226) puts it, the 'symbolic material' of learners' lives.

On the surface, this reflects the middle-class nature of the participants or, at least, their schools. At second glance, however, the lack of awareness of space or materials as constraints reveals an *acceptance* of the materials and space available at school or home. I was particularly surprised by this result, since I found material and space to be significant constraints, in my practice. This is not necessarily only about economic agency, but about material and dimension or space as constitutive elements of cultural practice.

Although participants indicated they made use of exploration as a resource (Triad 2), this triad (Triad 5) reveals that the exploration was managed *within the confines* of available material and space. When I consider the nature and format of materials many schools recommend or provide learners with (paper or canvas sized A3-A2; pencil, pastel or charcoal, and paint), I can see how *not experiencing these as constraints* contributes to the similarities in medium and scale of much of the art that is produced in schools.

Triad 6: Audience

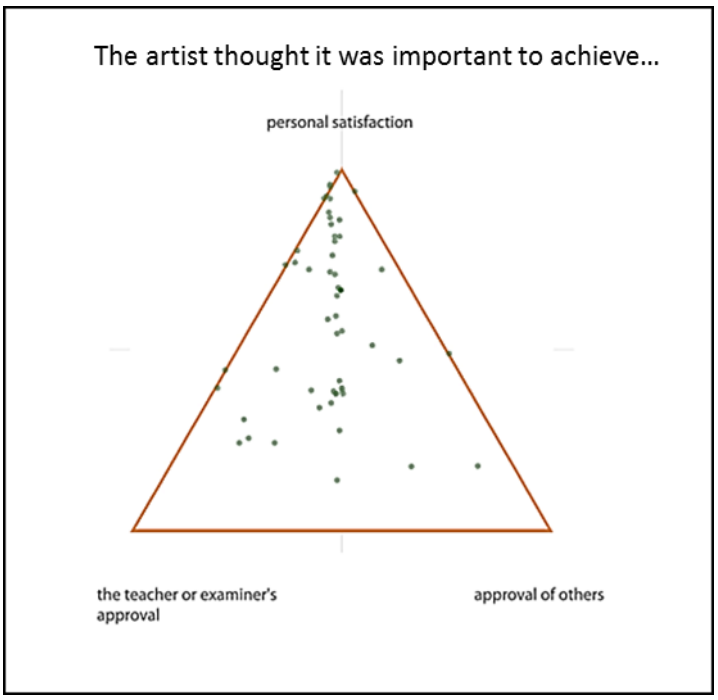

Figure 26: Results of Triad 6: Audience

Although learners' artworks are assessed for examination purposes, roughly three-quarters of the participants considered their own satisfaction to be more important than the approval of others, including the teacher or examiner (see Figure 26, above). What is more, the vast majority of participants contributed narratives about artworks they were pleased with. Among the participants of our study, learners who prioritised personal satisfaction as a measure of achievement and those who balanced personal satisfaction with a teacher's approval were equally likely to receive good marks and to create work that they rated highly. This group of artworks would have been awarded A+, A and B grades by teachers, according to learners' estimates. This suggests these learners have adopted an evaluative system that works in the context of the subject, Visual Arts. In other words, their own evaluations align with those of the assessors. While it is not clear, from this study, how learners evaluate artworks outside of a school context, their responses indicate that they have learned to adopt the values of the school-based assessment system, in context.

The fact that learners see themselves as the primary audience of their work can be interpreted in different ways. One is that learners are aware, at some level, of having intra-personal dialogic thinking processes.

If learners make their decisions through this internalised conversation, they may also consider this inner critic as the primary audience for their artworks. Another response to learners' seeing themselves as the audience of their work is less favourable. If perspective-switching allows artists to consider the target object from different vantage points and gain access to information they may ordinarily have been blind to, it also contributes to the richness and rigour (Doll, 1993a) of their thinking and work. Learners who consider themselves the primary audience of their work are not accessing the cognitive strategies available to them for developing criticality. When feedback offers information that differs from the original proposal, it produces discomfort. This negative affect might explain why learners prefer to consider themselves as the audience of their own work. The question this raises, however, is how learners might begin to seek and draw on feedback from the learning environment, which includes the reactions of those in their social and learning circles and from the developing artwork itself since this will contribute to their growth as artists and thinkers.

Noticing patterns

Having given a broad description and interpretation of the patterns as I encountered them, I now consider the implications of these patterns, seen through the two lenses of my creative practice and teaching experience. It may be necessary to restate my position, that no single decision can be said to be either 'good' or 'bad'. In my creative practice, I found that different contexts (different drawings, for instance) called for different decision-making strategies. However, when trends appear in an equiprobable decision space (Juarrero, 2000), they can be seen to reveal the identity of the system. Further, when independent processes are compared with processes that are interdependent with the system, the difference between them reveals the action of constraints on the system (Juarrero, 2000:45). Consequently, the trends that are visible from this study reveal the action of constraints on learners' decisions and, by implication, the identity of the broader system of education. I now turn to a discussion of the system identity that is revealed by this study.

I will use five main themes to structure this discussion, but as will be evident, they are all inter-related, in some way.

1) The first theme is that participants in this study have found ways to navigate the school and assessment system. None of the participants in this study reflected a generally negative tone (multiple choice question). All the participants told stories about artworks for which Grades B, A, and A+ would have been awarded and the participants were all fairly satisfied with their projects.

There were no serious differences between the self-assessment of the artworks participants described making in their narratives and the grades they imagined a teacher or examiner would give them.

From my own experience in teaching, not all learners are happy with the way their work is graded. I also know that grades for Visual Arts lie across the spectrum, in contrast with the narrow range of grades these artworks would have received. Since the learners who chose to participate in this study report positive attitudes to Visual Arts and little conflict with the way their artworks would have been assessed in the school-based system, they can be seen to have adopted a school-based approach to the arts. This may happen as a result of direct experiences with Visual Arts or, indirectly, through observing exhibitions of older learners' artworks over the years from junior high to Grades ten, eleven and twelve.

2) The second theme to emerge is that learners in this study generally preferred self-directed projects. Participants reported that they chose to make artworks that aligned with personal goals; they considered the process to be going well if the artwork expressed their intentions for the work, and they regarded their own satisfaction as more important than the approval of others. While I support self-directed learning, I find that this study reveals some of the dangers of this approach. Highly insular processes are not open to the environment, whether discursive or material and are, therefore, not responsive to the learning *context*. This characterises the learning that occurs in these processes as top-down, or context-free. It suggests that learners bring pre-defined concepts of 'art' to the process of making and are neither aware of nor open to the material, social, and contextual relationships within which art or cultural products are received.

   This theme must be seen in conjunction with the first. In other words, while learners report low levels of awareness of the contested nature of art and/or cultural production, they have aligned themselves with the curriculum and assessment practices within Visual Arts. This suggests that the pre-conceived ideas about art they bring to their making are hegemonic notions of art represented by a European art-inspired curriculum.

3) The third theme, related to the second, is that whatever exploration learners engage in was limited to 'coming up with an idea'. Conceptualising is therefore restricted to an initial goal-setting and planning phase, after which no further elaboration of ideas is welcomed by the learners, themselves. Over my years of teaching, I had many discussions with learners in which they

expressed anxiety that while they had some thoughts that responded to the brief, they had no idea how to represent their ideas *as-image(s)*. They seemed to feel that it was necessary to translate their thoughts into a 'visual equivalent' (IEB, 2017)[78] and that the iconic[79] content of this image needed to be resolved before they began engaging with the material process of making. Making the artwork (drawing, painting, sculpture, or photography) was seen as a method of *illustrating* the fully-formed idea, not *discovering what it might be*. Consequently, while they understood that artworks had symbolic content, they appear unaware of or unmoved by the material content and its potential meanings.

4) The fourth theme to emerge is a disembodied approach to making decisions. Of particular interest is the fact that learners say they make emotional decisions, rather than drawing on rational or embodied processes. As mentioned earlier, I accept that learners may use the term, emotion, in a way that differs from its use in Damasio's (2006) writing. While the term emotion is often associated with love, joy, hate, anger, and fear, Damasio (2006:131-139) defines emotion as the automatic and unconscious approach-or-recoil responses people have to the perception of objects, events, and experiences. He goes on to say that changes in somatic states, produced by these biological reactions, are experienced as *feelings*. These include, but are more complex, variable and nuanced than the five 'emotions' listed earlier.

   While Damasio (2006) argues that the somatic system is central to our ability to make decisions in contexts where there are no right answers, participants in this SenseMaker study report a marked lack of awareness of embodied thinking. Only one participant mentioned physical sensations as having played a direct role in their process while another referred to the body in a metaphoric sense. Related to this, is the fact that participants did not consider access to materials or space to work in as significant constraints. This suggests that learners do not approach working with *material* in *embodied* ways. Further, learners accept the constrained supply of materials and space to work in as given.

[78] These are internal documents and not for public view.

[79] Based on Pierce (1902, in Atkin 2005), representation can be iconic, symbolic, or indexical. Iconic images represent something because they look like the object it represents; symbolic images represent something by convention, but may not have a correspondence of appearance; and indexical images, like footprints, represent an object through the traces they leave.

5) The fifth, and last, theme is individualism. Participants indicate that, for them, learning exists as a closed system with the learner as initiator, evaluator, and audience. This theme is closely related to the other themes I have mentioned. For example, individualism can be connected to disembodiment, if we understand that the body acts as a vehicle for connection (Hasson et al., 2012) and collectivism (Solnit, 2001:214-231). These participants were neither collectivist in the way they imagined learning nor at home with embodied ways of learning in the arts. The majority saw themselves as the primary audience for the artwork and did not consider the approval of others to be necessary to their processes. This is somewhat surprising, given the general understanding that adolescence is a time in which the approval of peers is very important. While there is a positive interpretation, which is that learners are developing self-efficacy in decision making in Visual Arts, I am also concerned that they miss the opportunities to draw on feedback from perspectives that differ from their own. Even if learners internalise the artist-viewer dialogue, imagining an audience that differs from the artist, helps them gain access to information they could otherwise be blind to.

A pre-hypothesis approach to learner decision-making behaviour does not seek to *prove* anything, but to find ways of supporting adaptive behaviour (and minimising maladaptive trends). With that in mind, the themes I identified from the study's results must be viewed through the lens of learning theory and also in relation to the context(s) which characterise learning as adaptive or otherwise. I take the view that the education system should prepare learners to navigate the worlds outside the classroom. This means that learners should be able to abstract from the particular (MacLennan, 2007) and develop a capacity to unlearn and relearn, as contexts change and information is updated. Further, learners must develop context-awareness or sensitivity (Perkins et al., 2000) so that they become aware of disjunctures between contexts in which they first learned something and the contexts in which they must practise. This is a precursor to identifying a context as an opportunity to apply particular cognitive strategies and resources as learners navigate the unknown.

While positive aspects arise from this study (learners' self-efficacy; learners' developing subjectivity; and the participants' generally positive tone), I identify two issues of concern. The first is a marked lack of awareness of the role of the body in cognition, and the second is a commitment to knowledge understood as fixed and predictable. The latter might be seen as lingering evidence of the measured curriculum (Doll, 1986:11).

A lack of awareness of embodied cognition is concerning for various reasons. One is that this is a necessary part of human perception, interpretation of experience, and decision-making (LeDoux, 1998; Norman,

2004; Damasio, 2006, 2019; Beilock, 2015). A low level of awareness of the role of the body in cognition can have a range of consequences. The decision-maker may not make full use of their decision-making apparatus, or they may not be aware of the way this system biases their decisions. Firstly, if learners are not aware of the role their bodies play in decision-making, they cannot intend (Juarrero, 2000) to draw on embodied feedback. For example, learners may not notice that their bodies register a 'tilt' in response to an 'unbalanced' artwork, or they may not be conscious that holding a pencil, lightly, changes the kind of mark they make.

Secondly, while neuroscience research demonstrates that embodied states bias decisions in favour of the personal histories and preferences of the individual decision-maker (LeDoux, 1998), these biases are not always helpful.[80] Being aware of these biases makes it possible for decision-makers to examine some of their automatic responses in the light of other evidence or perspectives. If learners do not welcome other perspectives into the evaluation of their artworks, then being blind to their own biases is even more troubling.

A further reason this is worrying, is related to the legacy of racial discrimination and entrenched race-based inequality in South Africa. Despite the rhetoric of multiculturalism that circulated after the official end of apartheid, South African society remains racially divided. As a form of Freudian suppression, many White South Africans claim not to 'see race'. This can be seen as an attempt to move beyond racial markers of value. However, in the context of there being little to no real change for the majority of Black South Africans, *not seeing race* negates Black people's lived experience and the trauma produced by continued structural racism.

From a systems-perspective, these results are cause for concern because they reveal the legacy of apartheid-style ideologies as they persist in the decision-making behaviour of learners, two decades after the education reforms introduced by the new democratically elected government. In other words, while legislation has been able to address some of the surface inequalities in the education system, it has not affected its deep structure. By this, I refer to the discipline of the body that was an explicit goal of Christian National Education (Eshak, 1987) and the consequent erasure of embodied cognition from awareness. I also recognise the suppression of the body from my own experience, growing up with a particular version of Christian doctrine in which the body was regarded as 'sinful', 'fallen', and in need of discipline. My

[80] Even though I argue we should recognise that these biases are at play, I do not believe that the bias of an educator should go unexamined, when she offers critique to a student, for example.

argument is that the erasure of the body from awareness represents one of the deep structures, which replicate inequality in our society, and therefore, should be addressed. However, as has been seen from earlier reforms, top-down approaches are not likely to work and may push the problem into a deeper and more insidious part of the system.

The second cause for concern I see in these results is participants' views of knowledge as-fixed. This is the systemic identity of a system that promotes a 'measured curriculum' (Doll, 1986:11) based on Newton's principles of the 'simplicity' of nature (and knowledge), and linear causality (Doll, 2008:198).

Despite a growing acceptance of the complex nature of the universe, and consequent growth in the field of complexity science, the education system has been slow to adjust (Doll, 2008). To survive in a rapidly changing world, it is generally accepted that people need the ability to *learn, unlearn, and relearn* (a phrase attributed to Alvin Toffler). However, the corporatisation of education has reduced learning to goal-directed activities marked by efficiency and controlled by measurement. If learners report that they do not see value in processes that *develop their ideas*, we must conclude, following Perkins and others (2000) that they either do not have the *inclination* to unlearn and relearn, or they do not *recognise opportunities* in which developing their ideas would be seen to have value. Since this fixed view of knowledge runs counter to the evolutionary processes through which complex systems adapt to change[81], I argue that intervention is both warranted and necessary.

Both of these issues can be construed as *dangerous* for individual learners and society. A lack of embodied awareness is a cognitive handicap, and a reluctance to unlearn, to learn something new, reflects low levels of learning *competency*. If this is the pattern across the majority of learners in the cohort, we must look to systemic constraints for the causes.

In the context of South African schools, the erasure of the body from awareness is part of the self-replicating structure of the hegemonic system, which locates power and privilege in the White, cis, male, heterosexual body. The suppression of embodied awareness draws a pall over this bias; constitutes its beneficiaries as innocent; and, simultaneously, guards against the disruption of the hegemonic perspective, by people outside of that circle. If the embodied experience of the other does not matter, it cannot disrupt the singular perspective.

[81] And, I argue, human curiosity and natural learning.

Similarly, knowledge understood as fixed and known to teachers who are White and English-speaking (Hunter, 2019) robs learners of access to different ways of knowing. In this case, the boundedness of knowledge constrains learners' ability to discover things for themselves; to develop their ideas; to see themselves as producers rather than consumers of knowledge;[82] and to challenge current views from the perspective of their lived experiences. This is all the more concerning in a subject, such as Visual Arts, for which certain claims have been made (Hardiman, Magsamen, McKhann & Eilber, 2009; Gaztambide-Fernández, 2013a). While there is evidence of innovation, novelty, and problem-solving in many examples of cultural practices, there is insufficient evidence that exposure to the arts in education *produces* these competencies (Gaztambide-Fernández, 2013a). While this SenseMaker study does not have results from learners in non-arts subjects with which to make a comparison, the very low number of participants that welcomed the development of their ideas in art projects is cause for concern.

I do not believe that compassion and collectivism can flourish in a culture where the body is denied. If schools teach learners to ignore signals from their bodies, they will learn to invalidate their own and others' embodied experiences. Further, if schools tell learners that their own physical (dis)comfort is unimportant, they may lose the ability to empathise with the pain people experience as embodied beings, including the pain that results from discrimination, based on having bodies that are 'other'. I also do not believe significant change (of any kind) can happen when learners' experience in schools develops a dependency on a fixed curriculum and produces low levels of curiosity. I, therefore, consider patterns in learners' decision-making behaviour, which reflect disembodiment and a lack of inquiry, as ethical issues. In the next section, I discuss a complexity-informed approach to intervening in a self-structuring system, as an ethical approach.

Making sense of patterns

Juarrero (2000) writes that a probability map can be seen as the identity of a system since valleys represent positions the system tends towards and hills those the system avoids. As this study helps describe the identity of a *learning system*, it is important to frame those attractors and separatrices

[82] While the participants in this study seem to reflect self-efficacy in the production of artworks, it is also possible to argue that the closed nature of their processes means they are passive consumers of a pre-conceived notion of art. In other words, they are not constructing new concepts of cultural practice but are replicating received ideas *as if these were their own*.

through theories of learning. A system that does not exhibit good learning behaviour as an identity, is one in which learners' intentions are unhelpfully constrained. This can be seen as a dangerous situation for an education system, which is tasked with preparing learners for life outside the classroom.

There is a serious disjunction between the identity of this system and the world young people encounter outside the classroom. Since learning is a side effect of educational experiences (Dewey, 1929 in Doll, 1993b:202), we should not believe that *what has been learned* corresponds with *what has been measured* in the assessment. The real learning is not easily measured but can be described as the effects produced by the co-evolution of the learner *with the curriculum*.

In linear conceptions of systems (and history as a system), reform is sometimes imagined as *reversing the arrow of time* (Doll, 1986:12). It is as if people imagine that reform which counters an earlier event or new legislation that repeals an old law can take a system back to a state or set of conditions that might have existed before the event or legislation in question. In complexity theory, by contrast, the initial conditions and history of a system (Prigogine, 1995 in Juarrero, 2000:37) are inextricable from its present identity. This represents one of the fundamental differences between linear models of reality and complexity theories. Where Newtonian models suggest that time can be reversed, complexity theorists argue that time *matters*. Further, where reformers believe a top-down constraint (such as legislation) can change the behaviour of a system, complexity theorists argue that such approaches are both antagonistic and unhelpful. I argue that this also makes them unethical. Just as the context-free imposition of a Eurocentric[83] curriculum on South African schools enacts a form of epistemic violence, implementing educational reform in a top-down manner has its own ethical and structural problems. This is not a way of defending the status quo; it is a recognition that, if I understand the education system as complex, I also recognise that interventions can have unintended consequences.

South African schools have experienced some efforts at education reform since the official end of apartheid, in 1994. In his book, *Race to Education*, Mark Hunter (2019) explores the systemic effect of various interventions in the South African education system, from a broadly socio-political perspective. He describes ways in which the most sought-after state-sponsored schools use elements such as English-

[83] The content and form of the South African curriculum is inherited from the English school system. The colonial mind-set regarded the knowledge English settlers were understood to have acquired as superior to anything local inhabitants knew. This is deeply dismissive of people's intelligence and completely ignores the context in which local people developed their own systems for making sense of the world, their culture, and local conditions.

language fluency, a white accent, and other markers of white culture (such as rugby) to attract fee-paying learners and families. In this marketisation of education, learners gain access to prestigious schools if they can contribute to the reputation of the school, *by bringing these attributes with them*.

Since we can observe that the system maintains White knowledge and culture, (what Hunter calls White tone) as markers of value (Hunter 2019), we can argue that curriculum reform has produced superficial results, only. When superficial interventions backfire, they may even entrench old patterns. An example is the persistence of beliefs in the superiority of European knowledge and culture.[84] While Hunter (2019) describes some of the ways this plays out in state schools in the greater Durban area, I have observed this in the hiring practices of some private schools, where the vast majority of teachers are, currently, White. In response to pressure from parents to employ more Black teachers, the executive head of a school I worked for decided to offer internships to prospective Black staff members so that they could be enculturated into the culture of the school. What is not often recognised is that, by expecting these staff members to adopt White ways of doing things, schools deepen the alienation that Black learners feel, in these contexts. Black educators, to whom Black learners might look for role models, find themselves caught up in their own struggles for inclusion in the workplace.

If interventions have the potential to exacerbate the problems they were designed to address, how might we understand the ethics of education reform and our responsibility to social justice? In keeping with complexity as a framework for viewing the system of education, I offer that the only ethical interventions are those that move the system away from (potential) danger. In an educational context, danger can be understood as trends that prevent learners from developing the capacity to negotiate an increasingly complex[85] world. These include a commitment to knowledge-as-fixed and entrenched racial-cultural views that exclude the experiences, perspectives, and knowledges of people who differ from them.

While a Newtonian view of the world imagined the knowledgeable scientist as outside of the system being observed, a complexity-informed perspective positions the would-be observer inside the system and a product of its effects. The system constrains the intentions of all agents and produces its own outcome.

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[84] Many of my erstwhile colleagues argued fiercely for representational drawing as the 'foundation of all art.'

[85] While it can be argued that the nature of the universe and life in it has always been complex, the rate at which young people need to be able to respond to that which is new, different, and interconnected has increased in recent years.

Despite the best intentions of many courageous people, the system appears bent on reproducing inequality. In this context, I acknowledge my positionality, within a system that replicates itself.

Since complex adaptive systems are self-structuring, the seeds of its potential adaptive forms already exist, as counter-narratives within the system. These narratives describe processes and relationships that can point the way to context-sensitive (Juarrero, 1998) systemic change. Although these interventions may appear insignificant, in complex systems, small perturbations can have large consequences, as expressed in the metaphor, 'a butterfly flapping its wings in Brazil causing a typhoon in Tokyo' (Hayles, 1991 in Doll, 2008:194).

Counter-narratives

A system such as the decision landscape described by this study is not homogenous. There may be large valleys and high peaks, but there are also smaller hills and hollows. While there are stable systems at the centre, there are also more volatile sub-systems at the periphery. If these peripheral systems gain energy, they can entrain with neighbouring sub-systems and produce a chain reaction of change in the system overall (Hunt & Schooler, 2019). Of course, since positive feedback loops can run away with themselves[86] it is necessary to be very circumspect about initiating such events.

Choosing to make small, safe-to-fail (Juarrero, 1999) interventions is therefore the most ethical option. Further, a context-sensitive approach requires finding adaptive narratives within the system that suggest what is both possible and within reach. The internal coherence of these counter-narratives helps us understand how to encourage more behaviour (more stories) of a particular kind (Snowden, 2013). To propose interventions in the system as I have described it in this chapter, I now return to the study. This time, I will pay specific attention to individual narratives and the wisdom they offer as part of their internal coherence.

[86] A nuclear reaction is an example of a system with a positive feedback loop. Energy released from the initial reaction causes further energy to be released. This chain reaction spirals out of control and wreaks havoc on everything in its path.

Promoting embodied decision making

The triad that recorded participants' awareness of emotions, physical sensations, and rational thinking in decision-making displays one of the most dramatic patterns (see Figure 27, below).

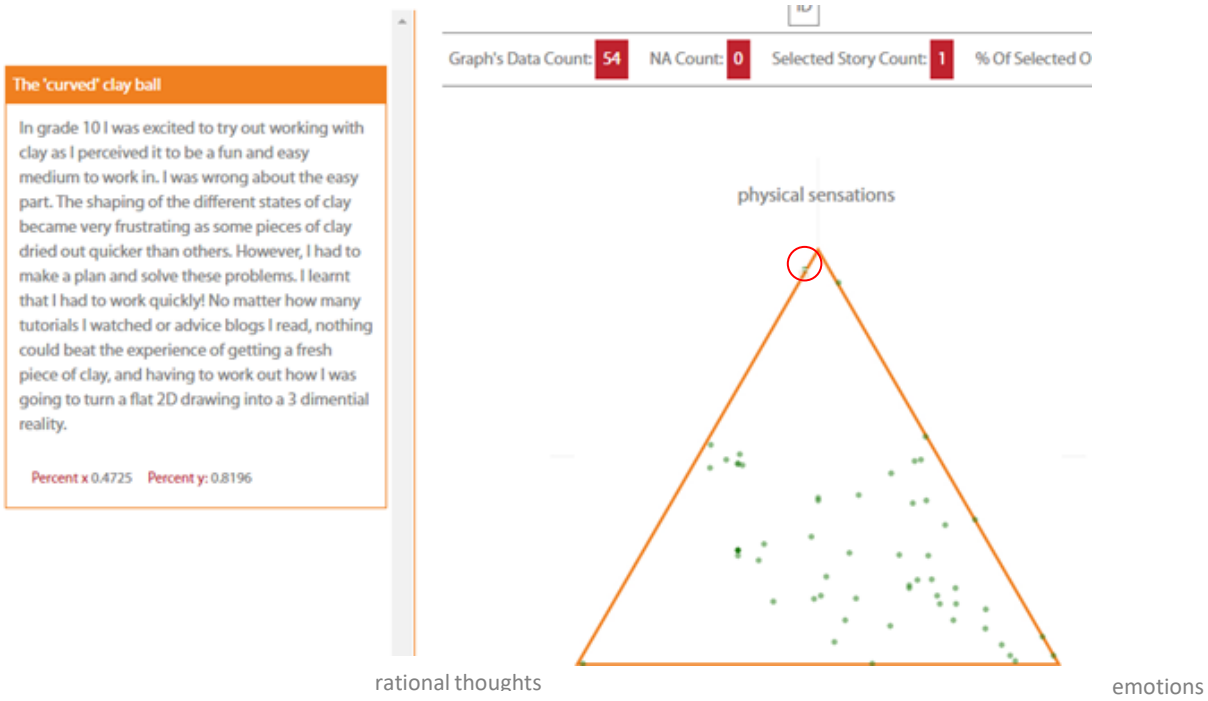

Figure 27: SenseMaker Analyst: HowArt (detail of screen) showing the Strategies triad. Note the trend towards 'emotions, away from 'rational thoughts' and from 'physical sensations.' The red circle indicates the position of the marker linked to the narrative on the left.

While many markers cluster around emotions and some tend towards the middle, only two markers are located close to the apex signifying physical sensations. I begin by discussing one of these 'apex narratives'; then a group of narratives across the centre after which I return to the second 'apex narrative'. The first apex narrative mentions learning a new discipline, working with clay.

> *In grade 10 I was excited to try out working with clay as I perceived it to be a fun and easy medium to work in. I was wrong about the easy part. The shaping of the different states of clay became very frustrating as some pieces of clay dried out quicker than others. However, I had to make a plan and solve these problems. I learnt that I had to work quickly! No matter how many tutorials I watched or advice blogs I read, nothing could beat the experience of getting a fresh piece of clay, and having to work out how I was going to turn a flat 2D drawing into a 3 [dimensional] reality.*

Several ideas can be gleaned from this entry, seen to accompany an acute awareness of the body in decision-making (which I infer from the participant's self-indexing of their narrative in the 'physical sensations' apex.) The first idea can be understood as challenge, difficulty, or disruption. The participant's words, 'I was wrong about the easy part,' and 'frustrating' reveal their state of disequilibrium. This state was not short-lived, but seemed to extend over some time, in which the participant tried many ways of acquiring the requisite knowledge and skill ('No matter how many tutorials I watched or advice blogs I read…'). Tellingly, the disequilibrium was not resolved by advice from others, but by hands-on experience in which the body's feedback acted as a guide. The participant began to associate this feedback with positive affect ('nothing could beat the experience of getting a fresh piece of clay') and a new state of equilibrium ('and having to work out how I was going to turn a flat 2D drawing into a 3 [dimensional] reality.') The latter phrase links equilibrium ('work out') with the phase change provoked by the constraints of the medium ('to turn a flat 2D drawing into a 3 [dimensional] reality.')

In this narrative, the learner was positioned outside of their comfort zone by being exposed to a new medium. In contrast to drawing (the most common form of art-making in Visual Arts, in schools), clay presents a very tactile experience and requires a spatial (three-dimensional) composition. The material properties of clay mean that atmospheric conditions (humidity) and time (clay dries with prolonged exposure to air) introduce complicating factors into learning the craft. Since dry clay cannot be worked with (in conventional clay work) the learner had to abandon dried pieces and take fresh clay, more than once. They had to learn to 'work quickly.' It is also worth adding that clay-work is one of the few three-dimensional processes learners in Visual Arts have access to, in the majority of schools. The participant mentions this in closing when they refer to the challenge of 'turn[ing] a flat 2D drawing into a 3 [dimensional] reality.' The greater degree of physicality involved in creating three-dimensional artworks appears to engage the learner's embodied response. This participant placed her marker right in the 'physical sensations' apex of the triad.

A narrative from the middle of the triad focuses on learning a new material process (see Figure 28, below). In the narrative, linocut is described as a 'challenging' new experience. The position of this marker closer to the middle of the triad means that the participant was aware of emotions, rational thoughts, and physical sensations, in equal measure. While the possibility of cutting their fingers might make learners more aware of physicality in lino work, this participant did not mention cutting fingers, pain, or blood, but saw the experience as a new, 'exciting' activity that 'challeng[ed] [their] creativity.' The use of cutting

tools, the resistance of the linoleum or rubber, and the different type of hand and arm movements required in lino cutting may account for both the idea of the challenge, broadly, and the challenge to creativity, in particular.

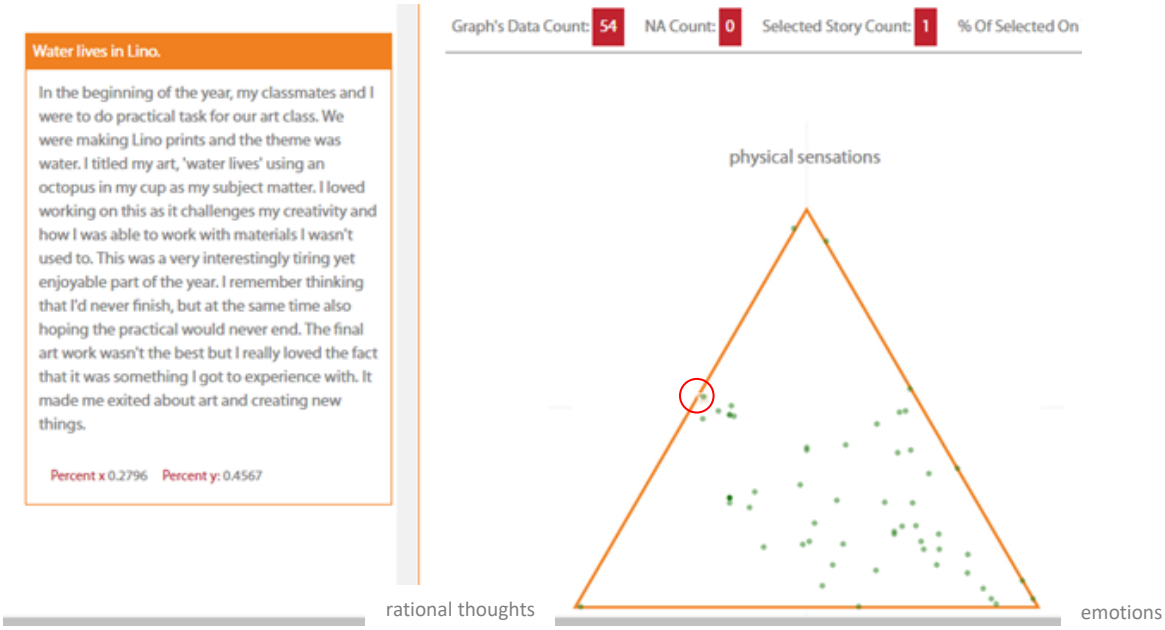

Figure 28: SenseMaker Analyst: HowArt (detail of screen) showing the Strategies triad. The red circle indicates the position of the marker linked to the narrative on the left. The participant understands the disequilibrium imposed by a new discipline as 'challenging (their) creativity.'

Three narratives which were related to markers across the middle of the triad referenced a task in which a teacher instructed learners to make portraits (see Figures 29 & 30, overleaf). Participants mentioned that they had to observe closely, worked by looking in a mirror (for self-portraits), and tried out different materials in the portrait project.

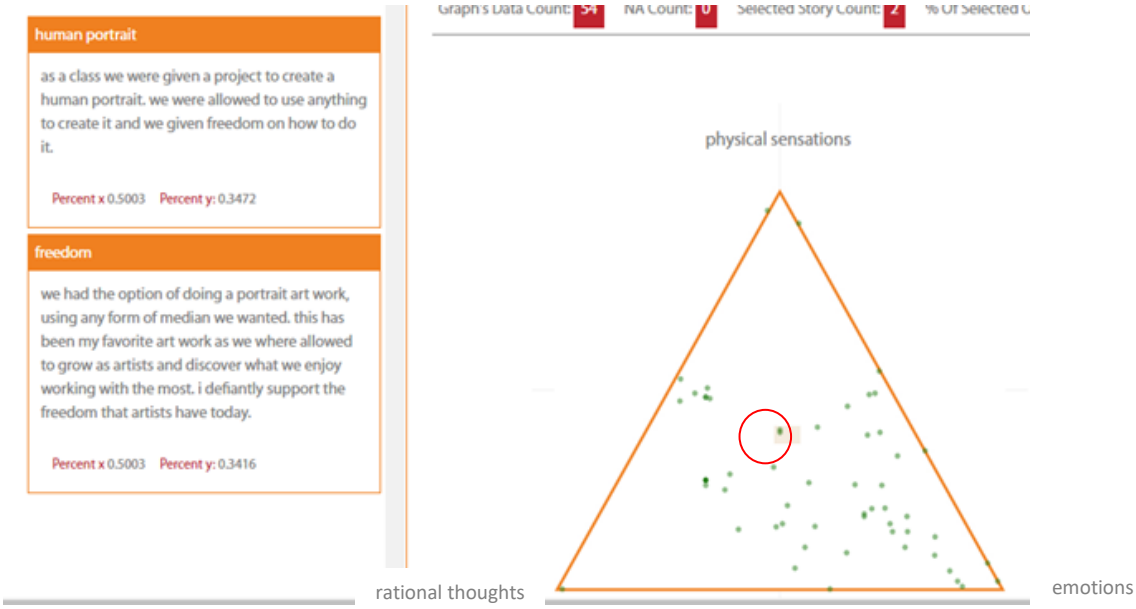

Figure 29: SenseMaker Analyst: HowArt (detail of screen) showing the Strategies triad.' The red circle indicates the position of the marker linked to the narrative on the left. This participant appreciated the absence of rules. Drawing the way 'we see ourselves' is related to emotions and physical sensations, not to rational thoughts, in this participant's self-indexing.

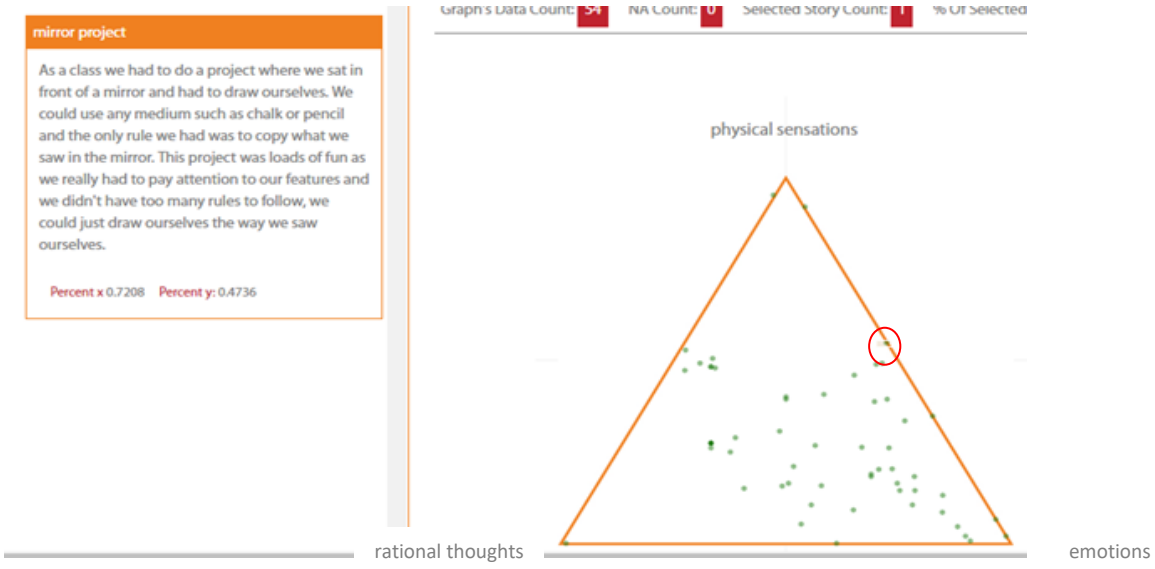

Figure 30: SenseMaker Analyst: HowArt (detail of screen) showing the Strategies triad.' The red circle indicates the position of the marker linked to the narrative on the left. This narrative makes reference to learning to use new materials. It is significant that making a portrait acts as a context-sensitive constraint that turns the relative freedom of the material exploration into a physically- emotionally- and intellectually-challenging process.

Portraiture is often understood to require a likeness or at least an iconic image of a face. From Sian Bleilock's (2015) work, I understand that the attention given to the physicality of the sitter would have activated brain systems registering the same embodied features in the artist. Further, if a learner created a self-portrait by looking in a mirror, they would have had to take note of their own features in a different way than they might usually have done. Drawing anatomically-accurate facial features requires a fairly dispassionate form of attention to shape and scale, for example.

One of these centrally-positioned narratives, related to portraiture, reveals an interesting strategy for facilitating experimentation with materials. While the IEB guidelines encourage learners to experiment with different media, this is often done purely to 'check the box' and not as a thorough investigation of the material's potential. By requiring learners to create *portraits* in different media, the material would need to be put to the service of a challenging goal. The exacting nature of this drawing task would, therefore, induce learners to discover how they might manipulate the properties of materials towards particular ends.

In this narrative, and other examples mentioned above, participants' awareness of physicality seems to be related to constraints or challenges posed by new material and, particularly, material that requires working in a distinctly three-dimensional way. While the linocut and exploration of media were associated with markers at the centre of the triad, clay-work was associated with a marker at the 'physical sensations' *apex*. As a result, one suggestion for intervening in a system, which currently dissociates learners from their bodies is to introduce embodied challenges by prescribing new materials. The need to use tools as extensions of the body's ability to act on materials, adds to this challenge. Responsive educators can use the opportunity provided by exposure to new materials to *draw attention to* the feedback provided by the body when learning.

Many practical skills are associated with tacit, rather than declarative knowledge (Polanyi, 2009). In many of these practices, the tacit can be pointed to (Baxandall, 1985) through heuristics. For example, in oil painting, heuristics such as 'start lean, end fat' refer to the amount of oil-medium and paint one 'should' load onto the brush, at different stages of the painting. Linked to this approach, some instructors advise that one should not be able to hear the sound of the bristles on the canvas, as this means that not enough paint is being used. These heuristics often imply that there is a right way to do something. While I do not wish to prescribe how much paint learners should load onto a brush, an educator might make learners aware of the sound of the bristles on canvas as an indication of the *affordance* of the paint-and-canvas

interaction. A very audible stroke accompanies a meagre application of paint, while a quiet stroke indicates a more generous load.

I acknowledge that heuristics are helpful when learning skills, but I am more concerned with the way learners incorporate embodiment into their thinking so that this can be applied in new contexts. My current concern is that learners do not appear to be accessing all the cognitive strategies that are available to them. Further, in denying their own bodies, they reflect a culture that is unable to empathise with the embodied experiences of those that differ from them.

Before concluding the discussion on embodiment in this thesis, I return to the second participant whose marker was positioned right at the apex of the 'physical sensations' signifier. This narrative did not refer to the body in direct experience but in metaphoric form. The narrative mentioned that the participant wanted their artwork to 'touch people'. This phrase is generally understood as 'moving' or 'stirring' (Damasio, 2006:129) a viewer in an emotional manner. However, the participant did not register their narrative close to the signifier for *emotion*, but rather *physical sensations.* The narrative makes a metaphoric connection between the body's capacity for touching and being touched, and affective experience. Beilock (2015:50, 118) would see this as an example of conative language in which motor regions of the brain help people make sense of the meanings. The language of the narrative, combined with its indexing, suggests a relationship between the metaphor and the gesture it draws on. This relationship points the way to a very accessible intervention that may help learners become more aware of their bodies in learning.

Metaphors involving the body, therefore, offer educators a route to promoting greater embodied awareness, without directly addressing physicality. While I have no issue with addressing physicality, I recognise that many educators and learners, embedded in cultural and social systems, are not very aware of their bodies and may even find this focus culturally awkward or inappropriate.

Promoting an open view of knowledge:

While it is possible to identify embodied knowledge and knowledge understood as fixed as specific areas for intervention, I understand them to be integrated parts of the whole system. All the component systems are related and influence the system as a whole. As a result, a limitation placed on the body as a source of feedback is related to knowledge imagined as fixed. In the section that follows, I seek out possible approaches to inviting complexity into the process of making art as well as to other areas of learning where arts-informed pedagogies can make a significant contribution.

The greater number of participants reported, through the language of their narratives and self-indexing, that they consider art-making to be an exercise in *depicting* a pre-set idea or intention. They did not draw on the potential of the medium or the process of working with material to develop their thinking about a particular topic or idea. Despite IEB guidelines (2017)[87] that encourage students to revisit 'contextual research' throughout the process of making, learners indicate that they understand ideation as constrained to an early 'research' or 'conceptualising' phase, which is distinct from 'making'.

One of the express requirements for Visual Arts, in the IEB (2017),[88] is that the learner must develop an idea or concept for the artwork. Thus, pure portraiture, object study, or other illustrative forms of art are not encouraged. This process is valuable to learners, who often use the opportunity to process their own experiences and understanding of the world. As one participant wrote, 'This project for me has helped resolve a lot of issues I have kept to myself as I have related everything in my artwork personally to myself and my family.'

However, what this study reveals, is that learners end up *illustrating* the ideas they generate. In school-based art, the material artwork often serves as a 'visual equivalent' (IEB 2017) of the idea, which was fully formed[89] before the process of making began. This suggests that these learners are not aware of the potential that exists within the material process of making. In my own practice, new ideas occurred to me, in the process of making. These were not limited to new ways of working with material, but the material properties of the artwork-in-progress allowed me to *change my mind* about the way I was thinking of the

[87] These are internal documents and not for public view.
[88] These are internal documents and not for public view.
[89] Many teachers find it preferable for learners to complete the conceptualising process before beginning to make the artwork. In earlier years, I also found it easier to guide a student's process when I knew where they were headed. In other words, having a clear goal makes it easier for learners and teachers to communicate about the learner's intentions and to support that process.

ideas I had brought to the process. I do not think that learners have this luxury in Visual Arts, and that is a pity.

Ironically, teacher-directed projects ('I had to do a portrait')[90] created contexts in which learners welcomed the development of their ideas and the task took learners into new areas. Further, cross-referencing between *Resources-advice* and *Value-develop idea* (see Figure 31, below) shows that learners acknowledge their ideas develop in contexts where they ask for advice. Yet advice was not sought in the majority of decision points (see Figure 15 on p. 111). Participants preferred self-directed tasks, as expressed in the following excerpts, '[I] defiantly support the freedom that artists have today,' and, 'I sometimes feel forced to do things in a specific way.' One participant added the following to the end of their narrative, 'I would just like to add that I think more freedom should be given to artworks in relation to the artwork ideas because art is about expression and freedom so I don't believe teachers should restrict students in terms of their ideas.'

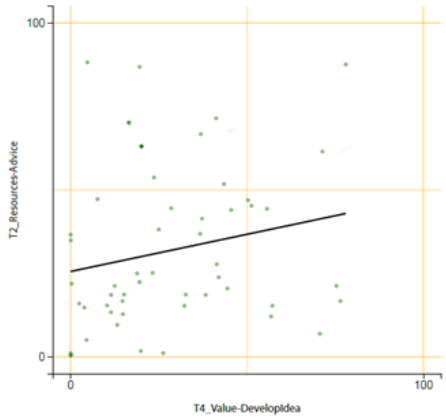

Figure 31: Cross-referencing between two signifiers, I see a correlation between interpretations of the decision-making process in which advice is sought and ideas are developed.

[90] This narrative suggests the project was at a Grade ten level. The IEB protocols for tasks in the higher grades are more open-ended than this. Learners interpret a brief, in fairly loose ways, and through any discipline or format. What this narrative suggests is that there is room for more constraints in the higher grades, too.

In the context of this rather extreme form of individualism, self-directed learning may need to be balanced with an understanding of the social nature of culture. If learners do not embrace the idea that audiences read meaning into symbols and materials, in artworks, independent of the artist's intention, they may well experience the examiner's evaluation of their artworks as a negative process. It follows that seeing oneself as the initiator, critic, and audience of an artwork produces a closed system in which the environment does not make a contribution. This is counter to the 'relational' ethic I adopt from Doll's (2008:218) writing. To some extent, it represents a poor understanding of the collaborative nature of socio-cultural meaning. This is cause for concern. While learners need to develop the ability to make final judgments about the options available to them in the process of making art, not acknowledging the presence of multiple perspectives reduces the relation, richness, and rigour (Doll, 1993a) of their thinking.

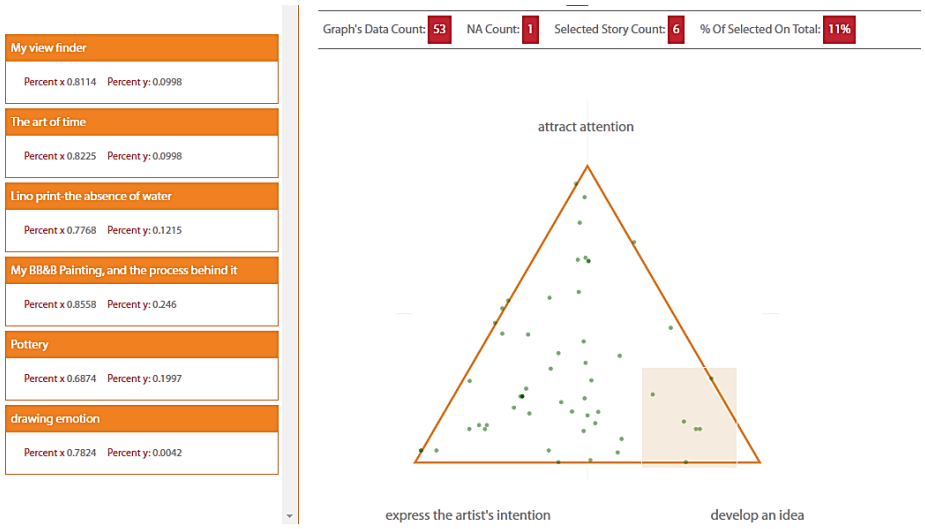

Figure 32: SenseMaker Analyst: HowArt (detail of screen) showing the 'Value triad.' On the left are titles participants gave to their narratives. These are linked to markers positioned within the coloured square.

Outlying narratives in the value triad (see Figure 32, above) offer three ideas, which help to position knowledge as something that grows and develops. They are: learners' awareness of the *time-based nature* of art-making; teacher-instituted constraints that *disrupt learners' equilibrium*; and *learning from peers*. I begin with the awareness and acceptance of art-making and learning as time-based *processes*.

One narrative that linked the development of their ideas also acknowledged time in their narrative.

> *For artworks that [I] have done the process has been slow and constant. I have gotten to choose the type of media and what canvas I can use. By making that process over a long period of time, it gives the person time to improve as they go and come up with new ideas as they go.*

The efficiency culture or Tylerism that has infiltrated schooling (Doll, 1993a) has taken its toll on the more time-intensive processes of creative practice. Many learning processes take time. This is not about linearly-conceived developmental stages, but about richness, rigour and recursion (Doll, 1993a). Through an iterative process, the individual's experiences contribute to a rich repertoire of moves (Schön, 1987) against which background they can anticipate the outcomes of their gestures with material. In my own practice, exploring many options rather than just one (seemingly superior option) gave me a greater understanding of the decision field in which I was working. In this context, moves I choose not to develop are not errors, but errant, in the sense of wandering. I argue that wandering gives me a better knowledge of the landscape while goal-directed paths teach a single way of doing things. This efficiency may pay off in the assessment context, but does not build the creative and critical thinking skills learners will need outside of the classroom.

There is enormous pressure on teachers in independent schools to simplify the process of learning so that all learners can get good grades. While school managers market the school's value in these terms (Hunter, 2019), the efficiency of this process minimises struggle as a route to deep learning in which the body and time play a role.

The second insight, gained from these outlying narratives, is that constraints imposed by teachers can create space within which learners grow. This links the two concerns of this chapter, embodied learning and unlearning as parts of the learning process. In both sets of outliers, narratives referred to teacher-directed constraints that caused participants to engage the materiality of the art process and to understand learning as a process, which moves us from preconceived ideas to new conceptions. The following extract comes from a participant narrative, titled, *My BB&B painting and the process behind it*:

> *After this research I was a bit lost in terms of what I wanted my final artwork to be, but one day my art teacher told us that if I did a wash over our canvas (which was a new technique for me and my class at the time) then I would develop some type of direction and I would be able to develop more ideas in (our) visual diaries. I did a yellow wash over my canvas and immediately after that [I]) felt like I had to have purple elements in it, so [I] decided that everything in the painting had to be done monochromatically in either yellow or purple, but with both of these [colours] still making up the whole painting. This also helped me come up with what subject matter [I] wanted to paint.*

The constraint placed on the developing artwork, in the form of a colour wash on canvas, both limited the range of ensuing options available to the learner and gave rise to new ideas. This is a perfect example of a context-sensitive constraint. What is interesting is that this participant did not resent the advice, but connected the yellow wash to later decisions, in a relational manner. The result was more than the addition of a yellow background to the painting, but a phase change produced by the initial disequilibrium. As if to prove that these insights belong to the *system*, and not to *individuals as model learners*, the author of this narrative continues, further down:

> *I didn't need to do any experiments with acrylic paint as I had had prior experience with painting. And from that point onwards [I] just worked on the painting every week for about... 3 weeks until it was done.*

What is clear from this second narrative fragment is that, following the temporary disequilibrium (Bertalanffy, 1981 in Doll, 2008: 197) introduced by the yellow wash, the learner established a new equilibrium in the artwork and completed it without further disruption. The participant seemed satisfied with their level of experience with acrylic paint and does not recognise further opportunities to disrupt their newly established equilibrium. While the learner was able to apply the teacher's instruction, we do not know if they developed sensitivity or inclination to use this strategy, independently. We also do not know if the learner was able to abstract from the experience, a rule that explains why the yellow wash worked. If, for example, the learner used yellow washes in future artworks (or even washes of another colour) they would have learned a technique and not a meta-cognitive strategy.

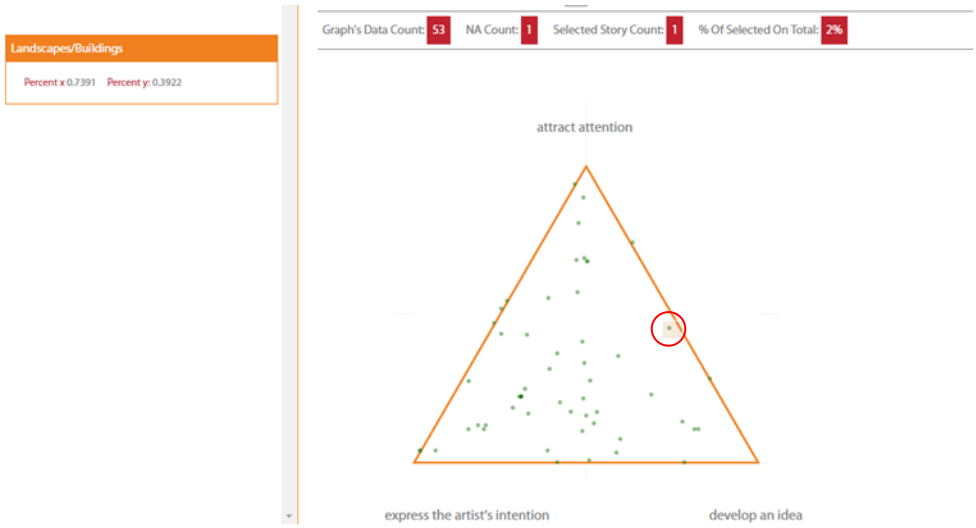

Figure 33: SenseMaker Analyst: HowArt (detail of screen) showing the 'Value triad.' The red circle indicates the position of the marker linked to the narrative, titled Landscapes/Buildings.

Further examples of disequilibrium, introduced by the teacher's instructions, can be found in the following narrative fragment (see Figure 34, above):

> *Landscapes/Buildings*
>
> *[O]ne of the projects [I] participated in was when me and my class drew landscapes I had to draw a total number of 4 from different angles to be precise they [w]ere mostly buildings, I had to complete it in the course of 4 weeks and after that date it was due strictly for marking.*

A series of artworks, in which different perspectives (literally and/or figuratively) are required, offers a very useful opportunity to initiate the 'disequilibrium' (Bertalanffy, 1981 in Doll, 2008:197) that a 'recursive' and 'rigorous' curriculum should display (Doll, 1993a:218, 220). In addition to the structured nature of the task, deadlines placed pressure on learners. This would have increased learners' discomfort but may have focused them on the making process since there was no need to come up with an idea (these were landscape studies). However, as in the previous narrative, it is not clear whether the participant would choose to make a series as a strategy in self-directed work. In both cases, it may be that the teacher-led strategies operate in the same way as examiner's instructions in tests. While learners can demonstrate their abilities in relation to the particular strategies, we have no way of knowing whether they would have either the sensitivity or the inclination to use these strategies in other contexts.

There is a further insight I glean from this participant's narrative. While I will develop this idea further, in Chapters Three and Four, it is worth mentioning here. The term, *perspective*, has a literal and a figurative meaning. The participant used the term in its literal form to refer to the physical view or angle an observer takes on an object or scene. The figurative meaning refers to the way people take up cognitive positions and view experiences, ideas, or concepts from a particular vantage point. Linked to this is the notion of inattentional blindness or cognitive bias. The perspective-taker is necessarily blind to information and insights that come from viewing the object from a different perspective. In this participant's narrative, the teacher required learners to make four drawings from four different perspectives. This task has the qualities of richness, rigour, recursion, and relation that Doll (1993a) espouses. In addition, and this is the part I will develop later, the embodied process of taking up different physical perspectives is instrumental in developing learners' understanding of perspective in a figurative sense (Tversky, 2011a:19, 32). The physical experience can develop neural networks that may be repurposed (Dehaene, 2020:121-125) for other contexts, *if these are made explicit* (Feuerstein and Jensen, 1980; Feuerstein, 2003; Schön, 1987:45, 56, 68).

As mentioned before, it is not helpful to consider any particular decision as a model for future projects. However, it is possible to argue that teacher-led projects may 1) not be what students would choose to do, but that 2) the disequilibrium these interventions produce cause the learner to find a new equilibrium, at a higher level of understanding. 3) This leads to the development of the learner's ideas in relation to the artwork. 4) At this point, I have no evidence that learners will be able to invite disruption into their own processes, without the guidance of an educator or collaborative partner and so, 5) I conclude that teacher-led disruptions have limited value because they are not internalised within the learners' repertoire of moves. Nevertheless, they point to disruption as a strategy for unlearning and learning again.

The last point in this section has to do with learners seeking advice and inspiration from peers. One participant wrote:

> *a theme like this could lead to endless possibilities to do for their artwork. (I) loved seeing all of the drawings, paintings and sculptures that came out from this topic.*

Another participant lamented the fact that their teacher discouraged conversation in the ideation stage, as if afraid that learners might influence one another. The participant critiques this attitude by claiming that they 'got lots of advice from my friends about what colours to use, etc. which really helped' and 'all the students I know enjoy bouncing ideas off of one another and this does not mean we copy one another.'

This participant's narrative suggests that an educator could *set up conditions* in which learners were encouraged to learn from their peers. Not only are learners in this narrative keen to acknowledge each other's perspectives, but the multiplicity of interpretations has the potential to produce rigour (Doll, 1993a:220). From this set of narratives, it is possible to imagine how educators might create a learning ecosystem in which learners find it beneficial when their ideas develop. These ideas include planning time for recursion, requiring more than one 'perspective' in a single project, and collaborating with peers. While it is not clear that these strategies would become part of learners' repertoire of independent decision-making strategies, they provide a starting point for making the learning process more open.

Chapter Two summary

The self-signified narratives collected in the SenseMaker study offer rich material from which I make inferences about learners' decision-making behaviour in the process of making art. Without having exhausted the meanings inherent in this study, I make the points that follow.

The decision-making map reveals the systemic effects of the interface between learners and the curriculum they are exposed to. From the narratives at the edges of the system, I propose that educators might consider various strategies for making learners more conscious of *embodiment* in decision-making. These include 1) introducing learners to new, challenging, disciplines, particularly tactile, tool-based, and three-dimensional processes; 2) using heuristics to draw learners' attention to embodied feedback as ways of monitoring progress with material processes; and 3) using metaphors which employ conative language and bring the body into awareness.

Counter-narratives suggest strategies for understanding knowledge as unstable and *constantly developing*. These include 1) teacher-directed constraints, such as requiring learners to use a particular medium; to make artworks of a particular type (such as portraits); or to consider multiple perspectives (literally and figuratively); and 2) creating an environment in which learners are encouraged to collaborate with and reflect on their peers' processes.

While these narratives point to actions that disrupt the centrist patterns in the system, is it not clear whether these strategies would apply outside of the Visual Arts classroom. To help learners include these strategies into their independent decision-making repertoire, it may be necessary for educators and

learners to discuss the choice of strategies and their effects, not on the artwork, only, but on learning *as an adaptive strategy* (see Feuerstein et al., 1980).

I regard the outcomes of interventions in complex systems as non-linear and unpredictable, like the systems themselves. In contrast to conventional writing on curriculum reform, which imagines a new curriculum *replacing the old*, I see the system as self-organising. I also acknowledge that I do not stand outside of the system. Consequently, I am implicated in its patterns. Learning is not confined to the attainment of curricular goals and outcomes but emerges from the co-evolution of learners with the curriculum. The idea that certain behaviours, like decision-making, reflect this kind of emergent learning is, I believe, a significant contribution made by this doctoral study and has implications for alternative forms of assessment. While this particular study was made possible[91] through the SenseMaker app, it is also possible to do pen-and-paper equivalents, in most contexts. This would allow the school-based educator to map learners' decision-making as a system and reflect on ways to make adjustments.

To be ethical, interventions should only move a system away from danger.[92] In the context of this thesis, dangers are systemic biases within the education system that entrench *unhelpful* approaches or *prevent* learners from developing learning strategies for unpredictable contexts outside the classroom. Further, interventions must be small-scale and safe-to-fail (Juarrero, 1999) as this allows us to respond to the system and support adaptive change as it occurs. As discussed above, the space for intervention is best identified from counter-narratives since these reveal blind variation (MacLennan, 2007:176-177) or the adaptive potential within the system, in its current form.

While I do not regard any decision-making behaviour as either 'right' or 'wrong', I do not believe that compassion and collectivism can flourish in a culture where the body is denied. I also do not believe that significant change (of any kind) can happen when learners' experience in schools develops their dependency on a fixed curriculum and produces low levels of curiosity. I, therefore, consider it ethical to disrupt the system as a whole, rather than addressing learners' individual decisions, directly. I also do not

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[91] All the schools I worked in used proprietary software to report on test results. In one school, Renée and colleagues designed a programme to report on learners' self-directed learning behaviour in project-based learning (PBL). The coding was not too challenging and was managed by one of the team. The challenge, in this area, is to know what to look for and where. I find Doll's work useful in describing the qualities a transformative curriculum should produce; I consider independent decision-making a useful area in which to observe the effects of education. There may be others and I suggest this is a fruitful area for continued research.

[92] Since human culture is self-constructing, interventions that aim to determine culture are unethical. However, alerting people to danger or moving a system away from danger can be seen as a moral obligation.

wish to prescribe how people ought to behave under given conditions, but I understand that constraints have the potential to shift the behaviour of the system, as a whole. I argue that a shift *away* from the *denial* of the body-as-a-cognitive-system and *away* from ideas understood as-*fixed*, would produce more narratives in which the lived experiences of all kinds of people are empathically acknowledged and in which learners welcome the development of their thinking.

Chapter Three

This chapter documents, describes, and discusses the creative practice-based research component of this doctoral study. It creates a space for reflection on the way my practice took the PhD project further. In particular, it considers how drawing and painting as-practice made it possible for me to test the theories I draw on in this doctoral study; explore my own understanding of the notions of *boundaries* and *boundedness*, and discover how I make decisions in the process of drawing and painting. While the above concerns reflect the interest I have in this project, as an artist and researcher, I also bring my identity as a teacher to this project. I therefore also reflect on the way my own practice compares with the advice I had been giving learners, in my teaching practice; and consider how learners and educators might work together to support the development of learners' creative practices and decision-making agency. In this sense, I read the creative practice-based research and the others' projects through each other (Barad, 2013:803).

It is important to restate, at this point, that while I identify as an artist and use phrases like artwork and art-making, I do not consider the visual objects I produced for this doctoral study as *art*. This is, firstly because I support Gaztambide-Fernández's (2013a) call to change the rhetoric used in arts education from the classificatory term, art, to something more inclusive. While I have not adopted the author's proposed term, cultural production, I believe we should conceive of the *art* in arts education much more broadly. In making visual objects that are not art, I signal that it is possible to breach some of the boundaries that currently exist in Visual Arts. I use this research component to inquire into what that could mean and to explore decision-making and value in this spacious place.

Chapter Three has seven sections. Each of these sections documents an identifiable arc of thinking-through-the visual that is visible in the drawings and paintings I made for this study. Each arc or line of thought starts with a discussion of the objects and the way I made them. After this, I use my own decision-making as a lens through which I reflect on the advice I gave learners in Visual Arts, in the past. This leads to a discussion on teaching and learning in Visual Arts and some suggestions for the arts classroom.

Writing imposes linearity on the presentation of information. Information that comes first, influences and limits the way subsequent information can be presented. As with all complex adaptive systems, this allows for bottom-up and top-down approaches. In a bottom-up narrative approach, the sequential nature of events builds towards a grand structure. This grand structure, in turn, derives meaning from the causal

relationships between components implied by the narrative. By contrast, didactic texts impose top-down structure, offering generalisations, first, and examples, second. In writing this chapter, I wish to draw attention to the specificity of the visual objects, first, and the lessons they taught me, second. However, I want to note that the linear nature of the account (the structured order of events in narrative sequence) does not mirror either the real-time sequential nature of the events or the complex nature of their causal relationships. If I extract some logic from my reflections on the making of these objects, it does not mean that the logic was visible in advance, nor does it mean that the sequence of decision-actions I describe would reproduce its logic in another context.

Since this thesis is concerned with the way we make decisions in the process of making art, that inquiry establishes the overarching intention for my creative practice, which I document here. By choosing to include creative practice as research for this study, I set up the conditions for an auto-ethnographic inquiry into my own practice-based decisions. Within the broader objective set by the doctoral study, I needed a secondary object of inquiry to focus my practice. This would come to serve as the intention or attractor space (Juarrero, 2010) in which my decisions could have meaning. Since the arguable object of all research is to push out the boundaries of current knowledge, I made those contestable or permeable boundaries the focus of my inquiry.

I, therefore, set an intention for my practice to explore the nature of *permeable boundaries*, through visual arts practice. In this domain, I was interested in the way boundaries *appear*, *how they behave*, and *what makes them permeable*. Following Barbara Tversky (2011a: 503), these are category questions that allow the inquirer to group objects (including mental objects) with like others. People do this to identify objects and create mental models. This, in turn, allows us to anticipate how such a thing might behave, and how we should, therefore, be prepared to act.

While the inquiry into boundaries only indirectly contributes to the larger PhD, using this as an intention allowed me to understand the relationship between actions made in the process of drawing and painting, and the results of these actions, *as decisions.* I did not set out to make 'art' or to create predefined kinds of visual objects, which meant that my practice did not have clear *material* goals. The objects were not required or expected to conform to particular physical standards or to have particular aesthetic or 'artistic' qualities. If an action I took contributed to either the process or the results of the inquiry into boundaries, it could be understood as intentional. Accidental happenings might contribute to my understanding of boundaries and their contested nature, but these could not be described as decisions. However, they

could inform further actions I might make in a more intentional way, including the decision to keep theses chance elements in my work.

Figure 34: digital artist's book. Video still: click to view or use the QR code on p. 30

Section 1: Veiling

There is something curious about an object or idea held at arm's length, whether literally or metaphorically. For an object to focus our attention, it needs to sit on an intersection between novelty and accessibility (Dehaene, 2020:189, 201). As a result, interest in an object differs from person to person, based on the individual's past experience (which qualifies the degree of novelty of the object) and the individual's ability to access the proffered (mental) object. Boundaries protect what is private, sacred, vulnerable, incomplete, and nascent. To the extent that they have weaknesses, the same boundaries also invite exploration. In this way, partial occlusion lends mystery to what might otherwise be ordinary.

Giorgio Morandi's artworks, especially in his late period, from 1928 to 1964, are concerned with the perception of reality. Gottfried Boehm (2011:14) writes that Morandi made metaphysical painting empirical. In other words, he changed the focus from painting an invisible reality to an inquiry about seeing. *Perceiving* reality concerned space, light, colour, and form, for Morandi (Boehm, 2011:15).

These representational elements become the means by which the artist both reveals and occludes the interpretations we attach to perception. His drawings, paintings and etchings explore the nature of what is (or how it is perceived) by representing unsurprising household objects that are not 'there' at all (Boehm, 2011:16). Things that are conventionally perceived as separate entities become merged through the elision of edges. Without boundaries, nothing is obvious or ordinary.

Figure 35: Giorgio Morandi (1961) Still life

Figure 36: Giorgio Morandi (1962) Still life

While I felt I could follow Morandi's thinking, when *viewing* his work, I could not get my mind to do the same kind of thing, independently, and with objects of my own choosing. This point has implications for the ways learners take ownership of strategies they are exposed to in educational contexts. It also has implications for the development of sensitivity (Perkins et al., 2000).

I could not make a drawing that played the same kind of hide-and-seek. In effect, I was trying to hide something from myself, which is impossible. However, it is possible to forget where we put things. This is both a function of time and inattention. So, I resorted to wrapping objects in tissue paper before drawing them. The objects were known to me and so I found myself struggling with the tendency to project the hidden object into the depiction of the wrapping. If I only represented the wrapping, the drawing was not interesting, because there is no way a viewer can excavate what lies beneath the surface. A realistic representation of a wrapped object had very little appeal, for me. I would like to add that, over time, these drawings became more interesting as I forgot what object I had wrapped.

The passing of time helped me take up the naïve perspective of a potential viewer. This illustrates the idea that to swop roles or change perspectives, we must inhibit the privileged information of the other perspective (Long et al., 2018).

I wanted to play Morandi's game. The problem was that I had to learn to select components of a future image, from my current view of an object. To 'wrap' the future image in mystery, I had to include enough clues to help the viewer believe they have access to the image. At the same time, to prevent myself from giving away too much, I had to interrupt the process by which I interpreted what I was looking at.

Figure 37: from the veiled series. Watercolour on paper

Figure 38: After Morandi. Goauche on paper

I decided to trace Morandi's thinking, by copying some of his paintings. I made a series of very small paintings, in gouache. I think I began to understand his process when I copied the blur that existed where I expected to find edges. Morandi minimised these boundaries by rendering both sides of the line in the same colour and tone. If the two sides were the same, the boundary dissolved itself in paint. While it is easy to describe this strategy, I found that the mental closure I experienced around the perception (and recognition) of objects was more powerful than I would have expected.

Since I found I could not make the leap to seeing something that was not there (or not seeing what was there), I tried to represent all the edges my mind required and then, selectively eliminate part of the drawing. I wanted the resultant image to sit on a disputed edge between strangeness and familiarity. The drawing should wrap something that a viewer *could* unveil. Just as the subjunctive case, in language, represents a potential, unrealised state, the drawing should point viewers to a possible interpretation, without making it apparent.

While I saw my making process as one in which I wrapped or veiled an object, for a viewer, the collaboration between artist and viewer is more like completing a puzzle by imagining missing pieces. Since the pieces are not supplied, the viewer has to draw on their personal experience to complete the image. The mental struggle for me as the draughts-person was always to judge whether the viewer would be able to project the form onto the visual drape that I drew over it.

Because I had to hide things from myself, there was a certain kind of pretence going on. I had to adopt an as-if position, imagining that I was seeing the drawing *I had made* for the first time. I also had to judge whether this viewing experience was sufficiently novel and yet familiar enough to engage the viewer in a mental game. I found that, while the process was set up in a very intellectual manner, I could not evaluate it in an analytical manner. The best indicator that the drawing was achieving its desired effect was if it seemed weird.

Things that do not require our attention are seldom described as weird, strange, uncanny, or surprising. When objects do not engage our attentional systems, we may not even acknowledge their existence. While some objects attract us for reasons other than curiosity (like aesthetic pleasure), a quality of strangeness or surprise accompanies the prolonged cycle of hypothesising that accompanies the perception of ambiguous or indeterminate objects (Kossler & Koenig in Gamboni, 2002:15).

If these visual objects remain strange, no matter how long I look at them, they trigger an extended state of anticipation (Schultz, 2017:2). That was what I wanted, but it is worth stating that I often did not like these drawings when I first made them. If I rejected them, it was because they lay outside my mental model for 'drawing' at the time.

Our biology primes us to create mental models and to pay selective attention to the information in our daily lives. This has a clear practical advantage and has been selected for in an evolutionary process of human development. At the same time, the strength of our existing mental models is what makes it so difficult to change the way we think. It is as if perception 'snaps' to the closest existing mental model we already have. We can elaborate on the existing models, but we find it difficult to work with something we cannot categorise.

If we can only see something that is made possible by our mental models, our ability to make drawings is subject to the same kind of constraint. This is not a way of saying we can only make representational images, that is clearly not the case. However, the non-objective drawings we can make in an intentional manner are determined by the mental models we have for drawings. When I make drawings in response to something I observe (say, a still life object), I project into the perceptual experience a generalised model of a *drawing* that would, I imagine, have some appeal as a visual experience. This is different from looking at the object itself. It is anticipating the future value of a drawing I might make in response to a current perceptual experience. To draw on Barad's (2018) notion of the collapsing of time, a *future* critical self converses with the *current* artist-self, whose perceptual model has been shaped by countless *past* experiencing selves. The onto-epistemology Barad (2013) writes of, is illustrated by questions such as how I identify the borders of an object I wish to represent, and what model of the perception of objects I want to put into the world.

If I choose to make a representational drawing, I project boundaries into the physicality in front of me that correspond with the ways I have learned to categorise things. This means, for example, that a piece of cloth is separate from the object it partly obscures. If I set out to make a pure abstraction, with observation as a starting point, I use a model of abstract relations I have generalised from many other visual experiences. These include the viewing of paintings and drawings by other artists. They also include real-world experiences for which we have no specific language.

Figure 39: From the veiled series. Goauche on paper.

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The difficulty I had with this series of drawings may arise from the relationship between intention and mental models. The question is whether it is possible to intend something for which one does not have a mental model. In choosing to explore the fragility of boundaries, I created an attractor basin (intention) that could capture results that did not fit into the bounded categories of either realism (or figuration) or (non-objective) abstraction. In other words, I set up a future space for visual objects that did not fit into my mental models, at the time. I did not want to copy Morandi's artworks; I wanted to make artworks that acted on me in the way Morandi's paintings and drawings did. I, therefore, could not use my predictive models to project a finished drawing into the perception of the object. What is more, I often struggled to recognise it when I 'saw' it.

While this series of drawings of veiled objects is important in demonstrating the process I moved through, I was not satisfied with them as answers to my questions. The majority of the drawings continued to offer depictions of arrangements that *symbolised* the veiling of objects. The drawing seemed to perform an illustrative role, not an investigative one.

When I compare my process, through this series of drawings, with the kind of guidance I gave Visual Arts learners, I see how mental models constrain what learners and educators can collaboratively imagine. It is also easy to see how school-based arts instruction makes it difficult for learners to intend to learn from their own material processes. As a teacher, I found it easiest to support a learner's process when we shared a mental model of the future artwork (often made visible in the form of source images or photographs and sketches.) When learners wanted to make images of something I had never seen or experienced, I could only stand back and watch. This sense of helplessness may explain the commitment of some educators to the models of art supplied by Europe and North America.

Many Visual Arts learners in IEB schools chose to make artworks in line with a European model of art. These learners wanted to learn how to make realistic representations and to use a conventional medium in a skilful manner. It remains my position that learners have every right to make these choices. As a result, much of my interaction with them was in relation to achieving these goals. If realistic representation was the intention, it made sense to use source images and compositional sketches to create a predictive model

of the artwork's final form. Each step in the painting process was measured against this future ideal and adjustments could be made against the set of initial intentions the learner had for the work. After that, painting or drawing was a matter of rendering the image in the most faithful manner possible.

I have not seen many artworks in a school context that do not begin with some form of source imagery to guide making. In other words, observation and representation remain central to the ways many learners make art and to the ways many educators guide their learners. If I have moved away from this practice, it is not as a way of suggesting that observation or representation are inferior or a mere starting point for abstraction. Observation and representation are central strategies for learning in all spheres of life. What am I concerned with, is the onto-epistemological (Barad, 2013) nature of 'art' as a *category* (Gaztambide-Fernández, 2013a). This has the effect of teaching learners to see in particular ways and not to be responsive to what lies beyond the appearance of things. Unfortunately, it can also show up as educators not valuing (not being able to respond to or support) the visions of learners from cultural and social groups that differ significantly from their own (Scarry, 1998). While an intentional curiosity is a necessary part of self-directed learning, the process of elaborating on mental models can be scaffolded in material ways. Perhaps my decision to wrap objects was a *question*, a way of inviting that which is not visible into the visual. Learning to look at something and not see what convention told me was there, still escaped me.

Figure 40: Tracing Morandi's thoughts. Pencil and goauche on paper.

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Section 2: Transgressing

I had a dream in which Morandi's treatment of objects was superimposed onto relationships in my life. There was an interesting blurring of boundaries between the perceptual shifts Morandi induces through his paintings and drawings and the unstable and always fluid nature of relationships between people. I became interested in the spaces between people as domains of the possible. Since I was also interested in joint attention as the resonant space of social connection and learning, I set about trying to explore how joint attention becomes visible to an observer. I drew on family photographs in which intense engagement between two people (often an adult and a child) was clearly visible. Then I carefully sketched the shape of the spaces between figures. I planned to flood these with watercolour, as a symbol of the emotional-mental charge that connected the two people in the photograph.

The spaces between people can be thought of as border territories, a kind of no-man's-land between two human beings. The shape of the separation contains a lot of information about the connection between the two parties. For example, the distance between bodies can signal emotional distance, while the edges tell us about the faces that people present to each other. I hoped that, by making it visible, I could both view and review (Tversky, 2011a; Tversky, 2011b:18) this connection. Although I was not conscious of this at the time, it strikes me now, that there is some relation to Rachel Whiteread's sculpture (from approximately 1993 to the present). Whiteread generally makes casts, often of the invisible, negative, spaces between the familiar objects in her life. These sculptures make the absent present. Despite the difference between our visual objects (Whiteread's being sculptural, mine being two-dimensional), it is possible to say that her work contributed to the mental models that helped me make mine.

If I plan to make drawings that will surprise the viewer and if, when I make them, I find that I am surprised, have I achieved my goal? By becoming shapes, the spaces of joint attention turned existing models inside out. At the same time, they focused my attention on that which I had learned not to see, even though it was always important to me. Since we most often focus on (and give names to) people, as objects, we have no mental model for the shape of the spaces between them. In these drawings, the familiar and the unfamiliar came together in very satisfying ways. Once the shapes had been flooded with colour, I could no longer see the now-negative objects (figures) that shared a border with the previously negative, now-positive, shape. I believed I should have been able to decipher them, yet I could not.

There were other surprises in store. I made multiple little drawings in this way and although each produced its own positive-negative transformation, some produced additional surprises. The watercolour did not always behave in the way I planned for it to do. In some cases, the fluid overflowed the lightly pencilled boundary lines I had put in place. In others, it refused to go into spaces I had planned for it to fill. This was a very significant moment for me and requires some discussion. No one who works with watercolour and ink is surprised that the fluid sometimes bleeds past lines or that it does not always flood an area, evenly. The issue, here, has to do with my inquiry into boundaries and boundedness. As part of this investigation, I chose to give form to certain invisible boundaries, such as the physical spaces between people. Perhaps it is because I gave these meaning, as the visualisation of joint attention, that I was so surprised by the way material challenged my planning.

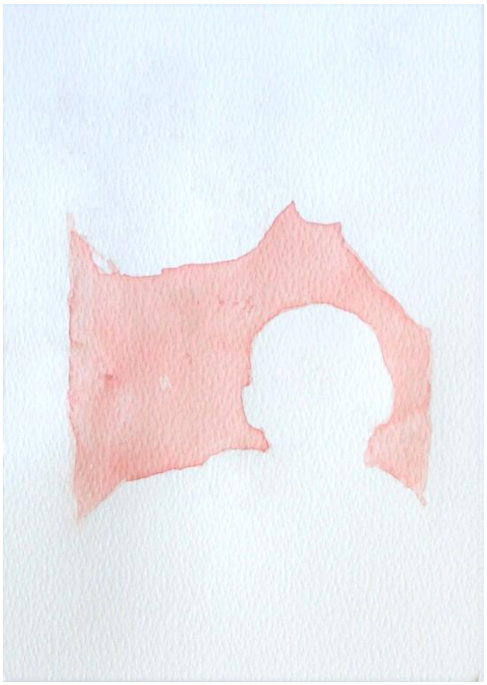

Figure 41: From the transgressing series. Watercolour on paper.

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In my MAFA research report, I wrote about the physical properties of material as active agents in the production of paintings by Penny Siopis. In that text, I was interested in the ways artists could exploit the material properties of fluids and surfaces to create marks that appear to have formed, uninfluenced by the artist's hand. I am familiar with the vagaries of material or its relations to 'skill' and the experience of the person manipulating it. What shattered my mental model, in this particular case, was the irony that no matter how sensitively I thought I was conceiving of boundary states, the materiality of the process of drawing/painting challenged, even contradicted, this carefully thought out idea. If I was asking how (permeable) boundaries behave, I was receiving some unexpected answers.

The attribution of meaning is evidence that I had created a new mental model. If I thought I was going to make a new idea visible, the material contradicted me. As in the previous series, the element of surprise indicates that my own mental models were updated through this drawing process. However, since my intention for the larger project was to explore the breaching of boundaries, I could embrace the 'chance' effects of the process as part of my strategy. By acknowledging that this material event lay within the broad valley of my intentions, I reframed a mistake as a strategy, or an incomplete gesture as complete[93].

Surprise is contingent on expectations. The properties of fluid material are nothing new but the way it defamiliarised my process was new. In paintings for my MAFA, I had used the fluidity of material to flood areas of the canvas and created seemingly spontaneous marks that nevertheless lay in the right places. In those paintings, I had set up the conditions for the material to have agency. Here, for some reason, I had not anticipated that this would happen. I was surprised that the material did not conform to my expectations. Because the results lay within my broad intention for the work, however, I accepted the material as an equal partner in the search for understanding. I argue that this made it possible for me to learn.

This has implications for the arts in education. While it is common wisdom that we learn from our mistakes, I am not sure this happens when we classify the results of our actions *as mistakes*. If the results of our actions fall outside of the attractor space of our *intentions*, we cannot embrace them. We learn to avoid those things or actions and not to internalise them as devices *for another time* or context.

[93] Learners struggle to do this because the lack of correspondence between event and the goal they set leads them to frame it as a mistake.

In my practice-based research, the intentions I had set, which were 1) to explore the nature, appearance, and behaviour of permeable boundaries; and 2) to inquire into the way I made decisions; did not construe any outcome of my practice as a *mistake*. I may not have liked certain objects, and I may not have felt that they taught me what I wanted to know, but they were part of the process of navigating the research space. Thinking of them as surprises (rather than mistakes), allowed me to respond to these experiments with others. Exploring all the 'open doors' I could see meant that I now have a greater awareness of the decision landscape I work in. This has significantly enriched my repertoire or moves from which to select, in future drawings.

If we imagine goal-directed behaviour as the process of setting a goal and then closing the gap between current performance and the anticipated outcome, then an accidental happening on the canvas or paper is seen to be either a failure or an incomplete stage in the process. To allow this event to be recognised as both complete and desirable, requires a different conception of the relationship between actions, intentions, and outcomes. Although I did not plan or predict this event, the new form took on meaning through its relationship to my intention. For the sake of clarity, my intention was to learn. This made it possible to frame the gestures that produced surprising results as a useful strategy rather than a lack of skill.

Juarrero (1998:240) writes that emergence is characterised by its *surprising* potential for signification and is accounted for by the entrainment of context-sensitive constraints. She explains that the new emergent whole can begin to constrain and *select* the lower-level components in top-down ways. The new entity formed through entrainment perpetuates itself by continuing to draw the necessary component parts into its structure. This top-down action also constrains the behaviour of the parts, such that they entrain into the new form.

In my reflection on decision-making in the process of making art, I see the future whole (that form of the drawing which causes me to recognise it as having value) as not only bringing the parts together but as selecting them, from the available options, even before the drawing has been completed. It is as if the future artwork reaches back through decision-making time to select components and order them into a resonant whole. This is the meaning of emergence in decision-making or decision-making *as emergence*.

Barad (2014; 2018) uses the notion of collapsing time to account for the wave-particle nature of atoms. In Physics, the double-slit experiment demonstrates that rubidium atoms behave both like waves and like

particles.[94] In physical terms, these two forms (waves and particles) are not compatible explanations for the same reality. In other words, the conventional understanding of the physical nature of reality does not allow for an object to be both a particle and a wave at the same time, just as an object cannot be both present and absent at the same time.

To make matters more complex, observing which slit an atom passes through changes the pattern it produces. When researchers observe which slit atoms pass through, the pattern produced is a scatter pattern. If researchers do not observe which slit it passes through the pattern observed is a refraction pattern. More curious still, if scientists set up the apparatus to view which slit the atom passed through, but then erase this information, after the fact, the atoms behave as if the researcher had not observed which slit it passed through. In other words, the patterns appear to change, not because there was real-time observation of which slit the atom passed through, but retrospectively, in relation to the retention or erasure of the information.

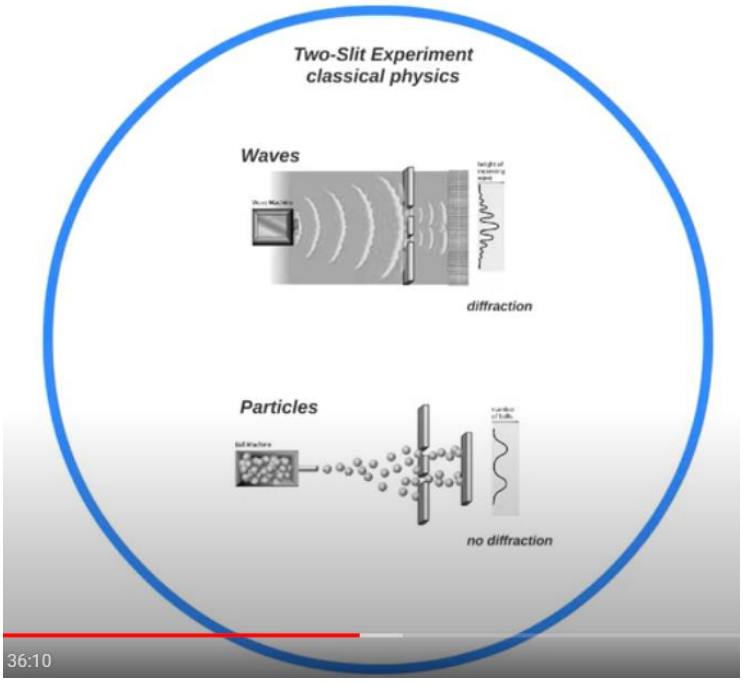

Figure 42: Double-slit experiment. film still: Barad (2016) https://www.youtube.com/watch?v=dBnOJioYNHU

[94] In the double-slit experiment, a surface with two slits is bombarded with rubidium atoms. On the far side of this barrier, the atoms can be observed to display diffraction patterns, which suggest that they are waves. If scientists adjust the apparatus to make it possible to detect which slit the atom passed through, the atoms do not make diffraction patterns, but a scatter pattern. This is evidence that the atom is a particle and not a wave. Merely observing which slit the atom passes through changes the behaviour of the atom. In other words, the atom's nature is changed by the fact that its behaviour (which slit is goes through) is either observed or not observed.

While some theorists have argued that the atom travels back in time, Barad (in Dolphijn & van der Tuin, 2012:unnumbered page) argues that this experiment should be interpreted as demonstrating 'the making of temporality'. In her view,

> *time only makes sense in the context of particular phenomena […] importantly, the original diffraction pattern doesn't return, a new one is created, one in which the diffraction (that is, entanglement effects) is a bit challenging to trace. So, the issue is not one of erasure and return* (in Dolphijn & van der Tuin, 2012:unnumbered page).

Barad (in Dolphijn & van der Tuin, 2012 compares this to the way memory constructs the past, anew, each time it is invoked. Memory is not a return to the past but a construction, in the present, of ideas related to the past (in Dolphijn & van der Tuin, 2012: unnumbered page; LeDoux, 1998:245).

In collapsed time, both realities are potentially present. However, one version is made apparent by the apparatus through which it is observed. The apparatus in this case includes the observer who chooses to view the experiment in a particular way. Barad explains that Heisenberg had claimed that the measurement of the system disturbed the system and that as a result, it was not possible to be certain of either position. However, Barad (in Dolphijn & van der Tuin, 2012) sides with Bohr, by claiming that the experiment does not produce uncertainty so much as it reveals the indeterminacy of reality (in Dolphijn & van der Tuin, 2012:unnumbered page). We can know the result of the experiment, but we can only know one of the options, at a time. The system is therefore indeterminate rather than uncertain. A choice act brings a particular onto-epistemology into being.

In thinking of a notional artwork (by which I mean a co-evolutionary arrangement of meaning and materiality) as a complex adaptive system, I understand that the future *whole* or *higher level of organisation* selects its constituents, in the present, with reference to meanings these have had in the past. To describe this in a fairly blunt manner, before it exists as a *received* artwork (Duchamp, 1961) the future potential artwork exists in many potential and parallel forms. Like the wave-particle nature of light or matter, the multiplicitous nature of possibility produces parallel predictive models. These predictive models do not exist as finished objects in the imagination of the artist but in the material-discursive process of making decisions, in the process of making art. It is as the artist's brain signals the motor systems to engage in a particular action, that the sensory system feeds back information about the consequences of the action before it has happened (Beilock, 2015:126). For example, the decision to add a gesture with ink, here, and now, is made meaningful by the way it will produce synchrony in the near

future. Beilock (2015:126) writes that the brain makes a *copy* of the instructions it gives to the motor system. If artists contemplate multiple gestures or moves with material, these may form multiple simultaneous and potential realities, in the artist's brain, or multiple copies of potential futures for the artwork.

Just as it is physically impossible for something to be both a wave and a particle at the same time, a person cannot inhabit two contrasting perspectives at the same time. Kentridge (2014) speaks of walking back and forth across the studio to describe his decision-making process. He says that decisions are not made cognitively, but physically, in the process of walking towards the drawing. It is in the process of walking, across the studio floor, that the next move suggests itself to the artist (Kentridge, 2014). This description helps us visualise the switching back and forth between two perspectives, understood as spatial constructs. In one, the artist stands at the drawing board. In the other, the critic stands back from the drawing, taking a photograph of it. Kentridge's (2014) narrative points to the physicality and embodiment that helps people understand perspective as a spatial-social concept (Tversky, 2011a). However, these two perspectives can also be seen as two roles or as two brain-systems (Dehaene, 2020:19) that synchronise in real-time (Miller & Antzoulatos, 2014).

Like electrons in the double-split experiment, the self who creates and recognises value in art has two manifestations. Which role the self occupies is a matter of attending, or, as psychologists (Long et al., 2018) argue, of inhibiting attention to the one not chosen. Using Barad's (in Dolphijn & van der Tuin, 2012:unnumbered page) notion of collapsed time, the future of the artwork and the present of its making are collapsed into the decision-making process of the self who switches between roles, of artist and viewer. The forward model Beilock (2015:126) describes, helps explain how these two identities collapse in decision-making. If the brain generates a 'copy' of the motor movement, for the purpose of predicting its outcomes before it has been executed, the feedback from the future exists with the present, in the artist's decision.

Many accidental events that occur in the making of visual objects (and other artworks) are not recognised in time to prevent their destruction. If they do not resonate with the artist's intentions, they can be seen as distractions and may be eliminated. I have often seen this in learners' processes. Learners' artworks-in-progress often had exquisite passages of material that may have been the result of chance. I would point these out to learners, but they did not 'see' these as having value if they were not part of their predictive models, so they would express their confusion, and, often, paint over the section to make it conform to the model they had for the artwork.

In the last year of my teaching practice, I worked with a highly experimental student. He was interested in working with the fluidity of ink and comfortable making many experimental drawings through which he became acquainted with some of the ways the medium behaves. My own (then) recent work with fluid media made it possible for me to introduce him to helpful tools (such as plastic pipettes) and processes, such as wetting the page, flooding, and tilting the surface to allow paint to flow. As an educator, I was able to stand back and allow the process to unfold, although I was a little anxious that his experiments seemed unconnected. By this, I mean that he did not seem to be making categories of marks or categories of categories. This made me concerned that he would not be able to formulate a set of logical rules for using these marks in his artwork. Curiously, after six months of working in this manner, the learner resorted to carefully controlled pencil drawings for his examination artwork, but the objects and symbolisms he created through this method were of a much higher order than his previous work. He had discovered an abstract logic for the visual that allowed him to create surprising artworks, in a school context.

Section 3: Playing

Following the drawings and paintings described above, I made a series of painterly drawings in which I deliberately set out to explore the tension between highly controlled forms and the disobedience of fluid material. I began by drawing a pattern of circles on paper. I was playing with a reference to Chinese lattice screens. These are wooden furniture screens with repeating geometric shapes. The permeable nature of these screens turns separation into a fascinating game in which the negative space in the screen is filled by (positive) glimpses of the world on the other side. However, in this series of drawings, I was more interested in the geometry and regularity of the screens, than their positive-negative relationship.

I took an analytical approach to these drawings. I drew circles using a pair of compasses and wet certain sections of the paper, with a brush or pipette, before dropping in some ink. I expected the ink to spread along the wet sections and leave a trail of colour. I was fascinated by the action of the fluid itself and tried different variations on this theme, sometimes wetting the interiors of the circles, and sometimes the edges. While the planning stage of this series was very calculated, the execution was playful. I enjoyed the contrast between the precise circles and the uneven flow of ink and despite my anticipation that ink would bleed, the way it did so continued to surprise me. I think the best way to account for this recursive[95] activity is that I was trying to make sense of and work out rules for the behaviour of water, ink, and the particularities of paper. I playfully followed my curiosity. Some of the drawings are more pleasing to look at than others, but all of them help me build my understanding of boundedness and permeability.

I was not consistent with the amount of water I deposited onto the paper. This affected the flow of ink so that some areas filled with dark pools, while others were barely touched by the ink. In some cases, I manipulated the flow, by adding more water or ink, but I did not try to prevent any spillages. The lack of a serious intention, other than to observe how the material behaved, allowed me to internalise a new model for working. Instead of planning to use the properties of material so that the marks appear 'natural', I could *anticipate* that material processes might introduce unplanned elaborations on my initial ideas. If I think of all the results of working with material as evidence of the way it behaves, I have a richer source of strategies to draw on, for future processes. What is unnecessary now might be useful later.

[95] It is useful to consider Doll's (1993a:218) comparison of the terms, repetition and recursion. Where repetition has a certain automaticity and is negatively correlated with reflection, recursion suggests a degree of distantiation from one's own perspective in order to reflect on it.

This understanding separates intention from goals and intended outcomes. Where a goal is generally understood to be specific and measurable, I think of an intention as much broader. I may have imagined the drawings turning out in a particular way. If I had thought of this as a goal, I would have had to regard the results as failures. When my children and their cousins played imaginative games of their own devising, they would spend hours setting up the rules of a game. Yet, if the rules they set up got in the way of play, the rules were summarily changed. This could be because it is easier to adjust the rules than to deal with the frustration it imposes in the game. It could also be because the intention of the game is *to play* and that rules are understood as subsidiary and subordinate to this intention.

While the circles I drew were inspired by lattice screens, they also represented conventions, rules, or boundaries against which the fluid was made to play. From here, I began working with other conventions. I used older drawings as points of departure and made new experiments in which ink flowed down the lines of water I piped onto the page. When these breaches happened in figure drawings, they took on an emotional significance that was not anticipated, but which I tolerated. Since my inquiry was into permeable boundaries, these breaches taught me something. Once again, it was the awkwardness these drawings produced in me, as viewer, that signalled I was challenging some of my own mental models.

Dehaene (2020:189-208) argues that the process of forming and updating mental models is synonymous with learning. This seems unexceptional when we consider updating models of the atom or world history, and if the new information is generally accepted as true. However, people seem to struggle with the discomfort that accompanies the process of changing our minds. As a result, it is easier to look for confirmation of our current beliefs or perspectives than to embrace disconfirming information. Psychologists find that people adapt their beliefs to their circumstances to avoid the cognitive dissonance that is produced by not living up to the tenets of our own philosophies (Festinger & Carlsmith, 1959).

Some of the ideas we hold are shared in social groups and help to create bonds of belonging. If people abandon beliefs of a moral, religious, or societal nature, they can be labelled as disloyal or hypocritical. Similarly, when people set out to reach a stated goal and then deviate from this path, they may be construed as lacking in moral strength or self-discipline. This may explain why some arts educators I worked with had difficulty giving credit to a student for components of their artworks that may have developed accidentally. I have been present at marking sessions where a colleague argued that a particular section of the artwork was ‘too sophisticated’ for the particular learner to have created intentionally and must have been the result of an accident. The colleague went on to suggest that the

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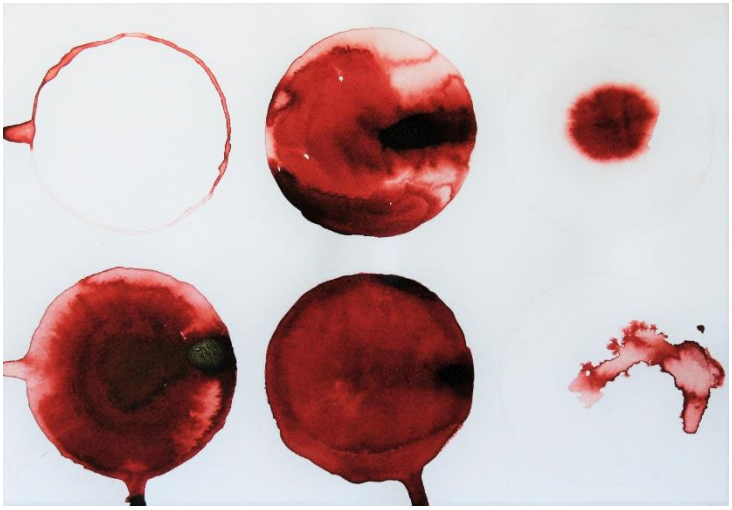

Figure 43: From the material disobedience series. Ink on paper.

learner 'probably' did not even recognise how good it was. She did not want to acknowledge the effectiveness of this component in the grade, because she felt it was not intentional.

When I participated as a member of the IEB's national examining panel for practical art, I was also present at discussions in which it was maintained that a student could only be given credit for the effectiveness of particular aspects of an artwork if they had documented the process through which this effect came into being, in a journal. The journal had to provide evidence that the learner both *intended* this outcome and *understood* why it was effective. Retrospective rationales were seen as superficial, opportunistic and to some extent, dishonest. This approach to the issue of intentionality became enshrined in a procedural approach to goal setting in which learners were schooled into planning their artworks in great detail before beginning to 'make' them. All planning had to be documented in a visual journal. Although learners were expected to document their making processes, in addition to planning, and to reflect on their processes after the artwork had been completed, examiners expected a consistent and credible intention to be made visible, from the beginning of the project, through to the end.

The issue of intentionality is complicated by the way arts education makes use of discrete projects to structure assessment. In the Grade twelve year, all of the learners' activities are focused on and curated according to the structures imposed by assessment protocols. For practical art, students must present a portfolio consisting of two distinct projects. One of these is internally set and assessed; the other is externally set and assessed. Each project must be documented through three types of artefact: a visual journal; a drawing or series of drawings; and a final artwork. In each project, the artefacts must engage with a single theme and have a demonstrable connection to each other and the theme.

While the IEB does not prescribe how teachers work with learners in Grades ten and eleven, the structure of the Grade twelve-year trickles down to earlier years. This means that students generally conceive of their art-making as a series of discrete projects and are likely to evaluate them as either successful or failed projects, depending on how these were finished and what grades they were awarded. To frame unexpected outcomes as opportunities for learning requires a shift in intention. Teachers have an opportunity to design generative assessments that keep learning in play. Rather than require learners to demonstrate that the outcomes of their projects have traceable intentions, teachers could help learners *devise intentions that allow them to learn* from what happens with material.

In school-based arts programs, learners and teachers are under pressure to demonstrate that all time and all activities are spent towards the realisation of an explicit learning goal. As a result, they are not inclined

to spend time in the playful processes that have the potential to deepen learners' practices without necessarily leading to artworks as-products. This productivity mind set constrains learning to the learning outcomes that are predicted for a particular project or activity. Written up in rubrics, these predictions are necessarily incomplete. To help learners understand how their work will be graded, teachers in school-based settings are encouraged to make their rubrics specific and descriptive. By locating value in the final artwork (resolved and professionally presented), the rubric constrains learners' ability to playfully engage with art-making processes and the ways these act on them.

A further problem with projects is the way they bring learning processes to an end (Carse, 2011). The division of time and effort into projects and end-of-term reports serves the school more than it does the learner. Especially in private educational institutions, where reporting is linked to professional assessments and the schools' marketing strategy, this structure imposes a capitalist production-oriented approach onto a human system for making sense of life. In doing this, the project nature of Visual Arts constrains the creative to that which serves the assessment process. It devalues everything that happens outside of production. In other words, the creative and cultural efforts learners engage in, which are not linked to a particular version of productivity, cannot be acknowledged.

Estés (2008) is a storyteller and Jungian psychoanalyst. In her work dealing with feminine[96] individuation, she writes that comprehending the intuitive is a *practice*.

> *It means to establish territory, to find one's pack, to be in one's body with certainty and pride regardless of the body's gifts and limitations, to speak and act in one's behalf, to be aware, alert, to draw on the innate feminine powers of intuition and sensing, to come into one's cycles, to find what one belongs to, to rise with dignity, and to retain as much consciousness as possible*
>
> (Estés 2008:10).

The seasonal, cyclical, life-death-life-cycle of the creative force in nature and the instinctual psyche are not aligned to production deadlines but respond to deeper and more natural rhythms.

[96] Estés continues in the tradition of *cantadora* (Spanish for folksinger or poet) handed down to her by older generations. These women and men were healers who used myth and story to right what was wrong. Her work focuses on healing the feminine intuitive which has suffered at the hands of patriarchy and has been run underground.

For Estés (2008), the *craft of making*, whether it be the craft of questions, art, poetry, music, or dancing, is what keeps the soul(s) of both the individual and the community healthy. In her writing, the creative is a method of connecting the 'above-ground' world to the one 'below'. I understand this to mean that creative practice helps us integrate our conscious and unconscious worlds and so resolve tensions that would otherwise impede our journeys through life. It also helps us surface and acknowledge the inner self's protest at the treatment it receives from the dominant culture. Giving voice to this anger or anguish helps to contribute to a healthy community. We hope it helps to make change but at least it begins to identify what is wrong and why.

In Estés' (2008) view, the value of the creative is not in the product, but in the psychic health it facilitates. She goes on to write that those who practice, regularly, create the conditions for others to grow into their own creative practices. This thinking was instrumental in my decision to make creative practice part of my thesis. It was a claim for creative practice as a way of making sense of the world in contrast to the creation of objects that earn me currency in a particular context. By valuing my own practice, I hoped to make it easier for others to clear space for practice, in their own lives.

Estés' (2008) view of practice has something in common with Gaztambide-Fernández's (2013a) rhetoric of cultural practice and production. Despite the presence of the word, 'production' in Gaztambide-Fernández's (2013a) rhetoric, he explains that culture is to be understood as the 'things people do' to arrange the symbolic and material contents of their lives (Gaztambide-Fernández, 2013a:226). In writing against the rhetoric of effects, the author argues for a view of cultural practice that is not measured by Western standards of productivity or classified by the Western notion of 'art'. From this perspective, the project nature of assessment tasks, along with the emphasis they place on the 'resolution' (IEB, 2017)[97] of an artwork, is unhelpful. It is also that of the greater art world, embedded in a commercial capitalist system. Similarly, the artificial time constraint imposed on practice by the assessment deadline prioritises productivity over what Estés (2008) would call the cultivation of soul.[98] Following Carse (2011), project deadlines bring play and learning to an end, while practice is learning seen as an infinite game.

[97] Internal documents, not available to the public.

[98] I understand that there may be calendar dates set for the assessment of student work and learning. This is not the same as insisting that an artwork be complete by that time or that the project ends on that date. If learners could work according to the logic of their own practice, they could present work for assessment, as part of an ongoing search or inquiry. Keeping the dates open allows learners to keep building on their learning instead of framing unfinished work as valueless.

Although the IEB curriculum accommodates both process and product, these are unhelpful distinctions. This is, first, because the division of practice into process and product locates value in the consumption of the artwork in its final form (as product) and further legitimises only those aspects of process that contribute to this consumable artwork. The logic is faulty. As a community of practice, we do not arrive at objects that facilitate connection without validating a broad base of experience as the repertoire of resources (Schön, 1987) from which artists draw. If the future state of an artwork selects components from the present, then imagining the future state in a particularly consumerist manner will restrict how decision-making strategies can be applied to creative practice. For example, if the self-as-viewer identifies as a consumer, primarily, the self-as-artist will be constrained to particular types of decisions.

Like Carse's (2011) 'infinite game', Estés' (2008) notion of practice does not signal endings, but continuous play. Carse (2011) writes that infinite games do not have boundaries, but horizons; Estés (2008) talks about the 'life-death-life cycle'. Since I have found the recursive nature of my own practice-based approach to drawing so necessary, I look back on the way assessment truncates learners' efforts with some dismay. Once an artwork has been submitted for grading, most learners (in my experience) consider the project 'over'. Even if the teacher offers detailed feedback about the work and suggests potential ways of working with it, learners very seldom apply that feedback to the work. This may be because they will not get any further points for doing the extra work after the deadline has passed. It may also be because the grade signals a closing. Carse (2011) would argue this second point. He writes that finite games are competitive and end when someone 'wins' and everyone else loses or is ranked below the winner.

I am concerned that learners lose valuable opportunities for learning when they abandon unfinished *projects*. By contrast, the word, *practice*, alludes to the continuous nature of life-death-life cycles and learning as an *infinite* game. Without resorting to a rhetoric of effects (Gaztambide-Fernández, 2013a), creative and cultural practice points to the value of learning through the arts as it applies to the whole of life and not purely for the purpose of being assessed.

Section 4: Seeing in the dark

In Morandi's paintings, certain objects offer a defined edge on one side and none where the other should be. Because it is possible to identify the object with the barest of information, I also expect to see the remainder of the object in some form. Morandi keeps this resolution at bay by dissolving the boundary in sameness. Sometimes a little smudge can be detected where a boundary should be. This anchors the viewer's search for resolution. It suggests that this is possible but forever delayed.

Penny Siopis uses low figure-ground contrast in her *Pinky Pinky* series (2002-2005). In these works a change in surface texture (thickness of paint, embedded found objects) allows the mind to register the presence of something that is not fully realised. In Siopis' work, projection references contemporary myths, which anxiety-ridden societies create to give form to their fears. The low visual contrast in the *Pinky Pinky* series suggests the figures may not be real but the visceral quality of the surface disruption is hard to deny. We 'see' boundaries where none exist, in a material sense.

My interest in Chinese lattice screen patterns resurfaced with new questions. I became interested in the way the particular windows or screens we view a scene through, constrain the sense we can make of it. My anticipatory mental models (Dehaene, 2020:25) impose a personal matrix onto everything I experience. Lattice screens serve as a useful metaphor. If I erect a screen or veil between the world and myself[99] it shelters me from view but imposes a pattern onto everything I see.

In my private journaling, I began exploring my interest in screens. I have always been drawn to windows and apertures as images and as symbols of boundary perforations. Estés (2008) writes that, in the psyche, art (the creative) projects windows and doors onto otherwise blank walls. I wondered what kinds of holes needed to be poked into the edifice of education as an institution and how I might be limited by the personal patterns I project onto these blank walls. My framing of the world said as much about me as it did about the world I tried to interpret. This is one of the problems with reform. It is tempting to break down existing structures, but we end up building new structures that match our particular view of the world. There is no external and obvious truth. Since the screen I sheltered behind shaped my view of the world, it seemed useful to explore my identity as a permeable boundary.

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[99] While I am very conscious of screening myself from overstimulation, through solitude, I also mean to refer to the attentional blindness that results from people only perceiving part of what exists. We select information from the environment that contributes to our ability to navigate physical and social space and so we do not waste mental energy on anything that the brain considers irrelevant.

I wanted to use a material process to represent some of[100] the unconscious screens I had put up. I do not claim that the objects I made here reveal my unconscious bias, but I used these processes to explore bias through the visual.

Figure 44: from the screens series. Acrylic medium, gesso and ink on raw canvas.

[100] Freud argued that the Surrealists had missed the point of his work when they tried to reveal their unconscious processes in art. He claimed that the unconscious is in accessible and that no deliberate attempt to reveal it would succeed. It would only succeed in revealing the conscious mind. In this regard, I do not claim that the objects I made, here, reveal my unconscious bias, but that I used these processes to explore bias through the visual.

Figure 45: From the white on white series. Gesso on raw canvas.

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To simulate the ways I project particular models onto the world as I view it, I experimented with laying down screen-like patterns on canvas, in a material that would alter the texture of the surface and, possibly, repel subsequent layers of paint. I imagined that when I painted over this layer, the original pattern would penetrate through the painting, to represent the way I projected bias onto the world. I began working on raw canvas with pure acrylic medium. If the acrylic medium rendered the surface impenetrable, subsequent liquid treatments would seep into the surrounding canvas, but not in places where the acrylic had been laid down.

The initial stages of this process produced low-contrast patterns that played with figure-ground distinction. Since I planned to experiment with a few approaches, I prepared a few canvasses in different ways. I painted a lattice-screen design onto one canvas and on another, I stamped a pattern with an Indian printing block. The cream-on-white pattern varied because of the different quantities of paint used. This was more about projecting a positive image onto a field than it was about screens. I drew on top of one of these canvasses and left the other as it was.

Low-contrast figurative paintings followed. The tactility of untreated raw canvas and white acrylic gesso began to replace visuality as a mode of perception. As I painted my self-image, reflected in a mirror (I am a useful and ever-present model), the creation of a likeness was of little concern. It was more about the physical build-up of material and the way I had to navigate this without recourse to tonal contrast.

In Estés' (2010) audiobook, *Seeing in the Dark*, the author focuses on not-seeing as a way of knowing. This is in stark contrast to the conventional Western preoccupation with the way things *look*. Low light has always intrigued me and inspired my practice. In an earlier night-time experiment, I had set up a collection of objects with a candle to light them and tried to represent the way forms merged into one another. What I was actually trying to do, was use a visual method to represent poor visibility. It was practically impossible. My problem was less with the vaguely perceived objects than with positioning my marks on paper. The relationship between *seeing* and *making visible* was disrupted.

I had more success placing objects in a shady box and working under normal light conditions, but I found these methods very frustrating and abandoned them soon. After seeing some of Joni Brenner's (2008-2012) black paintings, online, I tried working with black-on-black. This felt like being lost in the dark, but with a torch to light the way. I was working in normal light conditions and could look at objects, fully lit, but my drawing was constrained by barely detectable contrasts.

The dark drawings seemed like an appropriate response to global and national turbulence and personal not-knowing. 2016 was a year in which Donald Trump was elected president of the United States and citizens of the United Kingdom opted for Brexit. As earthquakes rocked Italy, the #FeesMustFall movement[101] rocked South African universities. I was deeply troubled by the way these protests implicated me, the schools I worked in, and the IEB, which offered a European-inspired curriculum for South African learners. I was confused about what this meant for education in South Africa and how we should respond.

I made the black drawings with a range of pastels and paints that had different reflective qualities. Viewing the drawings requires movement. As I shift either my body or the page, new parts of the drawing come into view, just as when I move about in the dark. These drawings are very difficult to reproduce and even an embodied viewing requires effort. They are also difficult to make sense of.

In learning to see in the dark, we have to take note of and respond to the way material acts on us (Damasio, 2006:242). This embodied response is not universal, but some responses can be understood and communicated. To say that a particular passage of paint makes me uncomfortable or that another feels like sandpaper on my solar plexus is not the kind of feedback that can be verified. What it can do, however, is point students to the ways that unconscious associations play a role in our response to artworks. This validates their own responses and makes it possible for collaborators to have conversations about the kinds of responses they hope to produce and the kinds of audiences their work is likely to engage.

In school-based arts programs, encouraging learners to make art in which depth is flattened and in which feeling has to substitute for seeing, is likely to meet with some resistance. From my experience in the IEB, skill is understood, by many learners, educators, and viewers of school-based art, as the ability to create realistic representations of objects or scenes from a single point of view. Even if an artist works in a non-realistic manner, their skill is sometimes expressed as their *ability* to work realistically, *if they wanted to*. This may be because the viewers in question depend on realism as a benchmark for the correspondence between a learner's intentions and the work they produce.

[101] For a discussion, see Gillespie, K. and Naidoo, L.A., (2019). # MustFall: The South African Student Movement and the Politics of Time. *South Atlantic Quarterly* 118(1)

Figure 46: from the seeing in the dark series. Oil and pastel on black paper.

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Some years ago, I worked with a learner who wanted to make an abstract painting. I explained that there was no visual 'map' to work from in an abstract approach and that the judgements artists make in non-objective practices may be quite challenging, for that reason. The learner was insistent and so I offered her whatever support I could. In the initial stages, the learner's work seemed to lack depth, by which I do not mean illusionistic depth, but that it failed to engage me as a viewer. I, on the other hand, found that I lacked the language to explain *why* a particular part of the painting needed something, such as more or less contrast or visual weight. It was easy enough to suggest adding a darker wash in a particular area, but the learner did not understand my reasons for making such suggestions. They appeared random to her. Without being able to understand the logic according to which someone gives advice, it is difficult to know what to do with it.

Embodied processes have been downplayed in education. As a graduate of the system, I do not feel very well equipped to help learners make better use of feeling or embodied knowing, as a decision-making strategy. However, when I have introduced the concept to learners, in recent years, they have responded well. Perhaps learners and educators can make a start by merely admitting the presence of embodied knowledge.

I would argue that embodied knowing makes use of (and develops) human systems for creating and attributing value in uncertain contexts. While I am not confident that school-based arts programs would embrace this approach, I believe it would be useful to explore, learn about, and develop the feedback systems through which we find our way or learn to 'see in the dark' (Estés, 2010). Ironically, it may be precisely because of its evocation of uncertainty, that exploration is most often eschewed.

Section 5: Responding

My teaching job did not always allow me time to practise. Sometimes, after a long absence from drawing, I would begin searching for a new starting point. In this particular case, I decided to use existing drawings as a starting point and selected a drawing I had made of my daughter, sometime before. (Choosing to make a drawing of a loved one leads to all kinds of complications in decision-making. Generally, when I have tried to create representations of people I love, I have taken an inordinate amount of time to get an acceptable result.)

The initial drawing was unremarkable. I had made it during a Saturday drawing session, a couple of months earlier. This time, I used the drawing as a source object, the way I might a cup or a potted plant. I responded to the *marks on the page* and not to the relationship it represented. By now, my practice generally involved making series. In each of the drawings, I responded to an earlier drawing or to a *drawing of a drawing*. This gave me some distance from the relationship I have with my daughter and allowed me to be present to the physicality of the drawing process.

As with the earlier series, I was able to choose a strategy, execute it, and then go back and carry out another. The strategy I used for deciding how to respond to the earlier drawings was primarily an embodied reaction. I loaded my gloved hand with drawing material and then *gestured to the drawing*. In each case, the gesture was a response to the way the drawing made me feel. It was a conversation, using drawing as a medium, between an earlier version of myself and an evolving perspective.

The more embodied my process was, the more the drawings deviated from the original, the more powerful they seem to me, now. When I reflected on this series, in my journaling, I concluded that it was during the moments when I had paid close attention to embodied feedback that I seemed to be in the 'flow'. Perhaps the physicality of the mother-daughter relationship made this possible in ways that drawing household objects did not. Distancing myself from intellectual considerations seemed to be necessary.

Sometimes my relationship to an object or idea makes it difficult for me to rework it in creative practice. Making this series of drawings has taught me to use 'theme and variations' as a strategy. I can respond to the initial perception, in any way that makes sense to me at the time. I can be as representational and prosaic as I am inclined to be; I can pay homage to the person I am making a drawing of or acknowledge ways of seeing that are part of who I am. Then, I can return to the drawing, *as a drawing*, and begin a process of unlearning so that I can learn.

I also discovered that representations I make are about the relationships I have with the referent, and that multiple representations, as in a series, make it possible for me to shift my perspective as I inhabit the range of relational positions each drawing places me in. I find it easier to change my mind when I am thinking about a *representation of* something than to change my mind about the original object or idea. Perhaps this is an example of the material-discursive that Barad (2014) writes about. As a practical strategy, this responsive approach helps to distance me from some of my attachments and helpfully complicates the mental model I have.

Figure 47: from the responding series. Charcoal on paper.

Figure 48: from the responding series. Acrylic glue and ink on paper

Some time after making the drawings of my daughter, I used the same approach to make drawings of another fraught and complex issue. I used (landscape) photographs taken on farms in the Karoo, where I grew up. My grandfather, my uncles, my aunt, and my mother all farmed. I was lucky to grow up aware of my relationship to the natural environment, the cycles of nature, seasons, growth, death, drought, and rain. There is no doubt that I have been formed by these relationships and by the hours I spent in close contact with dirt in its various forms. There is also no way to extricate myself from the social and political implications of land ownership in South Africa, or the history of landscape painting as proof of ownership.

There can be no doubt that the social and political reality of our country infuses all of our relationships to land, whether we live in the city or the countryside. The story of land ownership in South Africa is a history of (violent) dispossession. In many parts of the country, former Black occupant-owners were stripped of their right to self-determination, economic agency, and a particular identity, when their land was taken away. Representations of land in landscape generally gloss over these complexities (see Mitchell, 2002).

In drawing the land, I responded to the way my body was affected by the photograph, my memories, and our country's complicated history. The charcoal dust and water I spread on the page became a line of trees, grass in the distance, then mud in the vehicle tracks. Everything was made of carbon: my body, the soil, grass, and trees. My drawing, too.

It is not easy to give a verbal account of the way I worked in making these drawings. This is partly because the embodied process bypasses the explanatory patter that accompanies many of our actions. I can only say that making the drawings changed me in some small way. I am undeniably connected to particular places on earth, but it has more to do with having been formed by a place, with wanting to belong to it than with needing to own it.

In both series where I respond to earlier drawings, some important things happened. The first is that I found it easier to adjust mental models when they were understood as representations or *models* and not as reality. Drawing my daughter or drawing the land is fraught. Responding to a representation makes it possible to explore the ways I am positioned in relation to the issues, ideas, or objects.

The second important adjustment came from discovering that making multiple drawings allowed me more decision-making freedom. I could try an idea and discard the drawing, later, if I chose to. Linked to this, the third advantage was that I ended up making many quick sketches, instead of one, time-consuming drawing. This allowed me to test many ways of responding to the drawing and not just one. I developed

a more intimate knowledge of the decision-making terrain, which contributes to a more nuanced repertoire of potential resources for future decisions.

One of the reasons I chose to include creative practice-based research in this thesis is that I used my own practice to test the ideas that were emerging from the theoretical research. Two of those concepts can be seen to be at work in this process. One is the notion of art as an inter-personal and intra-personal conversation. The other is the related understanding that the conversation is best conducted in the language of the text.

I have previously described decision-making as an intra-personal conversation, in which the self-as-artist converses with the self-as-viewer. Here I wish to add that the artist responds to the conversation by making a gesture with material. Although this can occur within a single artwork as it develops, it is made clearer by the creation of a series of drawings. Through each new drawing or move with material the artist elaborates on the topic of conversation, by responding to earlier positions. What is more, the artist responds by using the same language as the earlier texts.

In Rancière's (1991) narrative, *The Ignorant Schoolmaster*, students were encouraged to learn a new language, French, by responding to a French text, *in the language of the text*. This injunction allowed students to learn without the mediation of the lecturer, who did not speak their home language, Flemish. Rancière argues that students have a will to learn (Rancière, 1991:9), and can do so without the mediation of the master. However, what interests me, here, is that the mediation of learning is a translation into a language that is foreign to the text. If I consider how arts educators try to comment on learners' developing artworks, in spoken language, and how little this helps[102], I think this can be understood as a case of losing the message, in translation.

In the first two chapters of this thesis, I discussed findings from neuroscience that shed light on the way people make decisions (LeDoux, 1998; Norman, 2004; Damasio, 2006, 2019; Beilock, 2015). Briefly, when people respond to an artwork, they do so through automatic and unconscious processes (emotional and somatic systems) which produce complex feelings. These are the result of the artwork acting on the viewer. The embodied response cannot be translated into language, but arguably forms the primary and

[102] In the crits I participated in, as part of in my MAFA, the comments made by lecturers were generally rather opaque. I picked up when someone approved or disapproved of my work, but what they said about it had very little to offer me, by way of guidance.

most significant part of the response. As Damasio (2019:4, 24) explains, feelings are a summary of the organism's homeostatic state, following the perception of an object.

At the same time as a homeostatic response is enacted in a viewer, they also process their perception of the artwork in the reflective part of the brain. However, since the reflective system does not have access to the unconscious processes that produced the somatic feelings, viewers must search for a plausible explanation for their response (LeDoux, 1998:280). Since the theories and frameworks of communities of practice are at hand when people try to formulate their explanations, these serve. This does not mean that these explanations are accurate accounts of the effect the artwork has on the viewer. More particularly, an explanation does not shed light on the cause of particular reactions to the artwork. Since these may be triggered by associations that stem from personal histories and have little to do with arts theories, the explanations may have little to no value.

A more helpful approach would be to respond to the artwork in an embodied way or to describe the embodied response without attempting to explain its cause. More ambitious, but very useful, would be a response in the language of the text. It may seem impractical at first, but a teacher who made a drawing as a *response* to a learner's drawing (and not a correction of the learners' drawing) would be 'speaking' the learner's 'language'. This would externalise the artist-critic relationship and the role swopping that is required to make and recognise value in art.

This is not a way of saying that educators' comments are not valid or that they have nothing important to say about learners' artworks. It is that any verbal explanation of their own response to the perceived artwork is partial, at best. This has to do with the nature of perception, itself. Viewing an artwork is not a neutral process of gathering visual data. It is always, immediately, automatically, and unconsciously an *interpretation* of the artwork, by association with experiences from the viewer's *personal history*. In the case of viewers with specialised education in the arts, personal history includes the learning interactions that helped produce their particular expertise. However, while communities of practice recognise an expert's experience as a qualifying factor, LeDoux (1998:33, 50, 52) would argue that the associations people have with objects are not available to introspection. It is in no way clear that an expert's response to an artwork is based on the experience for which they are recognised. It is just as likely that the emotional associations that experts have with art objects are entirely personal and have little to no foundation in the arts as a discourse.

Educational collaborations between learners and educators are often framed through the notion of scaffolding (Poehner & van Compernolle, 2011). In this approach, a learner can progress further, by working with a 'more knowledgeable other' (teacher or peer), than they could have done on their own (Poehner & van Compernolle, 2011). The more experienced other scaffolds by providing the components the learner could not manage, unassisted. Important in this approach is the idea of proximal development (Vygotsky, 1980). Scaffolding is only seen to be useful when the more experienced partner provides assistance with elements that are just out of the learner's current reach. This 'zone of proximal development'(ZPD) (Vygotsky 1980, in Poehner & van Compernolle, 2011) is therefore determined by the learner's current abilities, in relation to the learning objectives. It is generally understood to lie in a direct line between the learner's current position and a desired educational goal.

While the ZPD seems to direct efforts at extending a learner's ability, Perkins and others (2000) suggest that it is not a lack of ability that holds learners back, but sensitivity. In situations where learners do not solve application-type problems, it is not because they do not have *access* to knowledge, but because they do not recognise the problem context as an *opportunity* to apply the particular resources. The strategies and resources required for a task may lie *within* the learner's ability to imagine and act and not *beyond*, as understood in the notion of the ZPD.

The task of a responsive educator, then, is not to draw the learner into a zone just beyond their current capabilities, in the direction of the desired performance. Rather, it is to help the learner make connections between their current position (or the current state of the artwork-in-progress) and other possibilities. In other words, the more experienced partner does not supply the next steps in a linear process but points to all the possible next steps they can see. Also, by imagining those next steps, *in collaboration with the learner*, they act as the audience for the range of possible future states the artwork might inhabit. In this way, the collaborative viewer's *response* to the imagined future of the artwork, or forward model (Beilock, 2015:126), can help learners make connections between proposed or actual explorations and the experiences, ideas, and associations that potential audiences might bring to particular artworks.

The responsive educator's role is to collaborate with the learner by acting as the audience and, when the learner takes up the role of the viewer, by acting as the artist. Such an educator might point to a range of adjacent possible moves the learner could make next. This positions the educator as artist and the learner as viewer (of their collaborative work). As in ritualised behaviour, the learner is positioned as viewer, by the action of the educator, taking up the artist role.

Section 6: Ungrouping and regrouping

I came across a book of Rachel Whiteread's drawings (Pesenti, 2010) at a bookshop in Johannesburg. I was smitten. I had seen representations of Whiteread's sculptures before, but her drawings were new to me. Whiteread's drawings do what Morandi's artworks do, although with their own particularity. Like Morandi's work, Whiteread's drawings visualise the slippages between what is and what is not (visible). They play at the boundaries of our comprehension, reliant as we are on sight to make sense of the world. Viewing Whiteread's drawings helped me take another step towards similarly slipping free of the conventions of seeing-interpreting.

There is a bland quality to Whiteread's drawings, which makes them appear almost like diagrams. Rather than represent objects as they appear, Whiteread's lines structure her thinking about objects and space. There is a correspondence between the ways things appear and the way she diagrams them, but the emphasis is less on appearance than on her thinking about presence and absence. In a way, these drawings are about existence, or being and possibility. That is another thing they have in common with Morandi's work.

Following Tversky (Tversky et al., 2009; Tversky, 2011a:500), a diagram externalises thought. Making a diagram involves significant levels of abstraction and ordering of elements. This allows the diagram to represent *cognitive relations*, rather than proximity. Even when it corresponds to the appearance of a scene, a diagram does not represent the visual scene, but its parts, *in relation to one another*.

As with my response to Morandi's work, I tried to learn how Whiteread thinks with these drawings. I began making a drawing of my studio in outline style. Whiteread sometimes draws the negative space we learn not to pay attention to. In one of her artworks, she uses correction fluid to cover over one building in a row of houses. The correction fluid signals erasure, but it does not make the image disappear. It merely covers it. From the initial pencil sketch of my studio, I selected groups of things, merged them into a single shape and lifted them off the original and onto a new black page with a white pen. In the process of moving from one page to another, the shapes transformed into something entirely different. While Whiteread's work pointed to the erasure of a building, my transposed shape signalled the loss of meaning and context. Like Whiteread's incomplete erasure, my new drawing triggered the sensation that I had encountered this object in another life.

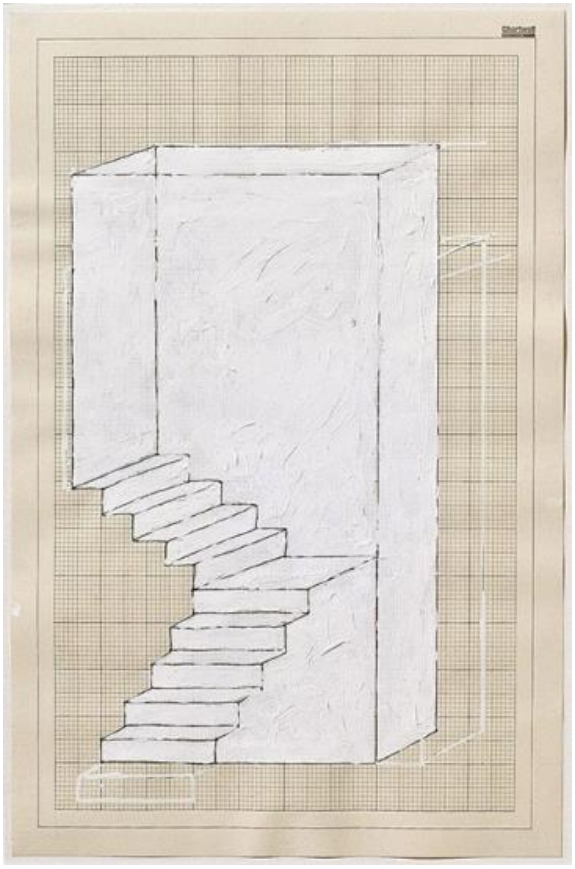

Figure 49: Rachael Whiteread (1995) *Dog, Leg Stair*, Correction fluid and ink on graph paper, 45.5 x 30 cm.
http://www.lorcanoneill.com/site/dettaglioLavoro.php?idLavoro=155

I decided to fill one of the new shapes with a repetitive pattern of white marks. Halfway through this task, a familiar *refusal* showed up. I did not fill the sections in completely, because I had become sensitive to the possibility that a boundary, once defined, could be ignored. The resultant drawings did not represent objects, nor were they the representations of absence, as in the case of many of Whiteread's drawings. They were non-things, and they were possibilities.

My response to Whiteread's drawings was analytical, even though I was moved by them in profoundly embodied ways. I paid close attention to her drawings, both for inspiration and for guidance and I regarded my own drawings as successful when they acted on me in a similar way. While I strategised, in an intellectual manner, I gauged the effectiveness of my strategies in embodied ways. I had to delink the lines from the objects they initially represented. Then, I selected shapes, such that they formed a certain irresolvable strangeness. However, they always had a recognisable element, such as the zigzag of steps or the characteristic H-shape of my studio easel.

Following Dehaene (2020:190, 208), too much novelty is counterproductive. If there is nothing even vaguely familiar about the shapes I draw, they are entirely arbitrary and do not focus my attention. They do not appear to be important. By contrast, when my familiar world is challenged, or when the unfamiliar is tinged either with a distant memory or with a promise of future resolution, my attentional systems focus my mind on solving the puzzle. In these drawings, the puzzle never resolves, which is the point I wanted to get to. I recognised the reaction I had had to Morandi's paintings. Although the setting for his puzzles is more apparent (we identify the household objects with ease), the slippages he conjured between parts of these objects never resolves.

In this series, I had moved even further from illusionistic depth into a diagrammatic flatness. I do not imagine Visual Arts examiners would be open to acknowledging value in work like these drawings I made. Yet, this series of drawings represents one of my most significant breakthroughs in which I learned to bring the lines that conventionally separate objects *into play*. It required working against the mental closure produced by predictive models in the brain, so that I could begin to see possibility where there had been none, before.

Figure 50: from the ungrouping and regrouping series. Milky pen on black paper.

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Premature mental closure may be the result of an education system in which correct answers can be identified in advance. It was very difficult for me to learn to, willingly, reject the conventions I had been used to, like respecting the edges of objects. Some learners arrive at the art class without the premature closure I had, or without a dependency on illusionism. A learner in one of my classes made drawings without any perspectival depth. His spatial organisation prioritised the page rather than the three-dimensional world he told me he was representing. Despite my expressions of delight, it was difficult to persuade him that his work had merit, perhaps because he compared it to the (developing) realism (see Lowenfeld, 1957) of other learners, or perhaps because his peers did not respond well to his work. I also know that many colleagues would argue that the particular flatness of this learner's work was 'immature' and represented a lack of perceptual depth rather than a sophisticated drawing response. An examiner I once worked with told me he thought students needed to pass through the stage of realism before attempting expressionism and abstraction. It was the old "you need to know the rules before you can break them" adage.

As a school-based subject, Visual Arts has transposed the story of European painting onto individual development in drawing and painting. The subject continues to privilege realism, reserving non-objective approaches for artists who have earned the right of passage. The history of expressionism in Europe acknowledges, at least to some degree, the debt European artists such as Picasso owe to the African sculptors whose masks inspired him, and whose work he appropriated. Yet, if a learner brings a post-realist aesthetic to Visual Arts, this is seen as immature and lacking in development. This must be recognised for the racist attitude it is.

Bagele Chilisa (2012) describes an event in the history of intelligence testing. A task known as the Porteus Maze test was abandoned as a test of intelligence when 'the most difficult mazes in the series were solved … by too many of the [African] subjects' (Oliver, 1968 in Chilisa, 2012:530). To complete the Porteus Maze test, a subject had to trace a pencil line through a maze printed on paper. If the subject chose a dead end and had to retrace their steps, they failed the test. In contrast to expectations, the African subjects who solved the puzzle took their time to visualise a path through the maze, then picked up the pencil and completed it without error.

Intelligence tests have been discredited by many scholars and this is not an argument for a particularly African form of cognition. What this example illustrates is how colonial ideology could not construe African subjects as (more) intelligent (than Europeans.) This attitude can also be seen in the way Europeans responded to the material cultures of colonised peoples. Without recognition for the spiritual

and conceptual roles cultural objects played in different cultures, European explorers used the low incidence of realism in indigenous material culture as evidence of inferiority.

Since European arts were held up as proof of European superiority (Gaztambide-Fernández et al., 2018; Vaugeoi, 2018), it is important to understand that the mental models Europeans brought to the observation of non-European art imposed inferiority onto their perception of material culture, separated from the complex practices they belonged in. This attitude persists in many unconscious and insidious ways. For example, many arts educators continue to think of representational drawing as the foundation of Visual Arts and Design. This is even though many cultures outside of Europe do not intend to create so-called 'objective' representations of reality, but spiritual or philosophical meanings.

By positioning realism as a qualifier within arts education, educators perpetuate a double-bind for learners from non-dominant cultures. On the one hand, if a learner makes an artwork that has a lot in common with the most sophisticated examples of Modernist art, the learner's status as a young person makes educators suspicious of the authenticity of the thinking demonstrated in the drawing. On the other, if learners from non-hegemonic communities choose to work in realistic ways, they are also sometimes pointed 'back' to the historic traditions associated with their cultures. In this way, arts education imposes the historical trajectory of European art onto the personal artistic development of learners, everywhere.

If arts educators are, first, educated in a system that promoted realism as a foundational skill and, second, lacking confidence in their ability to recognise value that is not linked to realistic representation, they may perpetuate race-based discriminatory practices in their classrooms, without intending to do so. In particular, if educators lack confidence in their own ability to evaluate non-realistic work, they will also struggle to guide the processes of learners whose artworks do not conform to European styles. This complex relationship between race-based supremacy and a lack of confidence turns the category, art, into a discourse that exists to keep people out. My rationale for this research comes, partly, from a desire to equip teachers and learners to talk about the ways that value is created and recognised so that learners can be supported in choosing the approaches that make the most sense to them.

I argue that arts-based decision-making agency comes from noticing how things act on us and also on others; how we and our collaborative partners feel in the presence of certain types of materiality; and

how particular arrangements of material make people either recoil or approach.[103] Therefore, if teachers and learners used their embodied states as feedback about the way artworks acted on them[104], they could begin to collaborate in decision-making about processes that were new to both parties.

[103] Following Damasio (2006, 2019), basic perceptual reactions are filtered through emotional systems that either draw us towards or cause us to avoid the perceived. While this initial reaction seems like a simplistic scale to apply to the evaluation of artworks, all evaluations occur on this basic scale. Evaluations provide the individual with valence and degree (Brown & Dissanayake, 2009).

[104] I learned to pay more attention to the learner's non-verbal communication about their developing work, than to the object itself. This was an intuitive practice, but I think it helped me identify what mattered to the learner and where, in their relation to the physicality of making and speaking about making, I could locate what it was that mattered.

Section 7: Projecting

I regard the completion of the previous series, discussed above, as a natural pause in the creative practice component of this research. I had found a way to look at objects and representations of objects and choose to see past conventions, when I wished to do so, for the purpose of drawing. I no longer needed to respect both sides of a teacup, to make a drawing with a teacup in it. I did not need to tell the whole of anybody's story. I could put a single mark on paper and let it be valid as a drawing, not because it bore any relation to anything else, but because it made a mark that held my attention. Perhaps it allowed for some kind of unconscious projection that was like seeing in the dark. In addition to seeing what was 'not there', I had learned to not-see what was 'there'. I cannot say if I have learned to see what 'is there', but I have found a way to transform some of my own mental models. I discovered that boundaries can be made permeable.

However, since practice does not end, I have made further drawings since the last series was completed. In these 'post-PhD' drawings, I am free to approach the page and mark-making tools with a greater sense of playful freedom than before. I do not make art. I make drawings. These are visual objects that allow me to explore how marks can offer us a space for projection, how the mind puts thought into the world (Tversky, 2019) and how, as I take a meta-perspective of some of my perspectives, I find more room for movement, less tightness, more play. At this point, it seems to me that my drawing practice has opened into a wide space. I do not (yet) see a particular trend of stylistic quality, but perhaps it is always like this. We need hindsight to make sense of the collective decisions we make in a particular time.

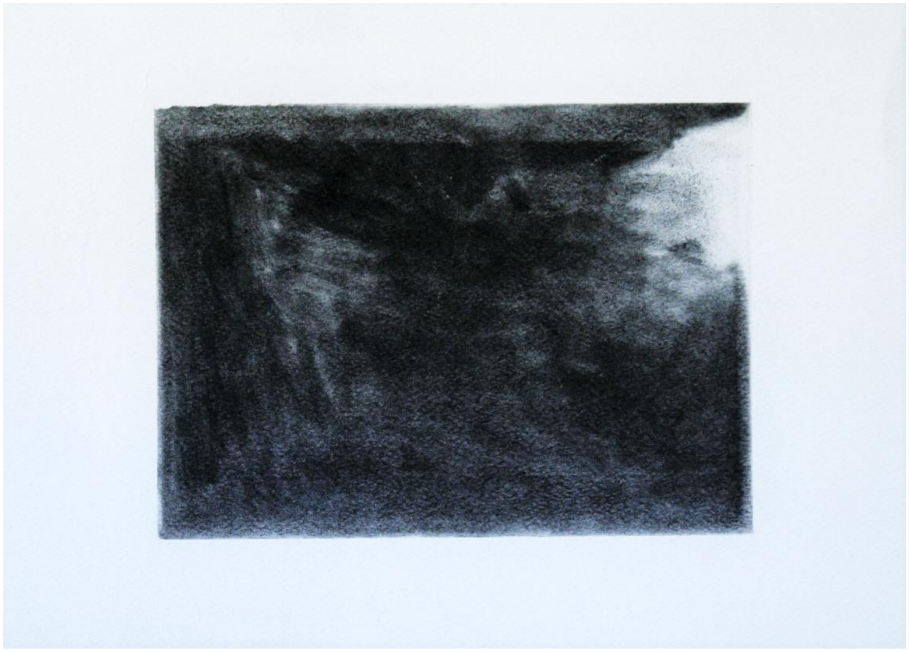

Figure 51: from the projecting series. Charcoal on paper.

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This creative practice-based research has allowed me to focus on my decision-making in the process of drawing and painting. I have a newfound comfort in my own decision-making. This is not a manual or technical skill. Rather, it is the freedom to make decisions, in response to what happens on the canvas or page, without the anxiety that accompanied my earlier processes. I am conscious of the way others might respond to the artwork. While the response of another viewer matters, anticipating this does not prevent me from trying something. I am also fairly comfortable with making visual objects that I do not call art and placing them in the context of my research.

Importantly, I see the practice of drawing *as thinking* and not as arriving at conclusions. This freedom has allowed me to start drawing from an entirely different point of departure. I can choose to dispense with the object as an observational source. The interaction of material and my manipulation of it is a source in its own right. This is not to say that I will not go back to observation to guide my gestures with material. It is just an indication of how far this process has taken me. I started by creating props to make drawings of, then worked with familiar objects from my ordinary life. After that, I found a way of not-seeing, and by the time the project ended I had come home to the primacy of material.

Some years ago, while I was teaching and working on my master's degree in Fine Art, I decided to bring some canvas and paint to school so that I could work while the learners were busy. I laid out unstretched canvas on the floor, put on gloves and took up large handfuls of gesso, which I spread on the canvas. From that year group, one student made large figure drawings with handfuls of black paint, another worked on unstretched canvas, with shoe polish, and a third made a smaller painting with gesso and diluted acrylic paint.

The fact that these learners were introduced to new methods and materials is not the only point I want to make. In the conversations that followed these students' decisions, there were difficult questions about value. How do we know when an expressive gesture is effective (what is 'effective')? As a teacher, at that time, I found it difficult to justify my embodied response to learners' artworks, without recourse to intellectual explanations. However, even more challenging, is the question of how learners and teachers collaborate in making and recognising value when this cannot be measured, objectively.

The goal of collaboration between learners and teachers must be to equip learners to develop decision-making agency in art-making. In this sense, collaboration scaffolds the learning process until learners begin to trust the feedback they get from their own perceptual systems. However, these systems should be understood to include intellectual explanations as well as the basic emotions and feelings triggered by

the perception. Moreover, learners need to internalise the role of the viewer as an identity, so that they become sensitive to the way their work might be received.

Different educational systems will create their own criteria for the assessment of school-based art. While educators try to make their rubrics both clear and fair, it could be argued that the language they are written in will always be a barrier to learners' understanding. I find it more useful to think about the way an artwork acts on me (Damasio, 2006:242). While I may not be sure if I know precisely what a good composition is, I am in touch with my own responses. Therefore, I would argue that an artwork is effective when it 1) gains my attention; 2) focuses my attention; and 3) elaborates on my mental models. This does not happen when the artwork is either too conventional or too strange. It also does not happen when the internal conversation it provokes is very brief.

The social nature of art has been foundational to this thesis. While certain art forms, such as dance, drama, and music have opportunities for real-time collaboration in shared spaces, visual arts may be perceived as an individual activity, with making and viewing as separate events. In many cases, making and viewing are separated by time and place, but I argue that each activity (making and viewing) depends on a forward model of the other activity, thus producing contrasting but complementary perspectives within an individual. Further, internal processes build on experiences of social interactions. Thus perspective-switching (usually studied in social contexts) becomes internalised as cognitive switching (usually understood as an individual process). This draws on Vygostsky's (1978) theory that external (social) conversations are internalised in social learning. However, even when internalised, this process remains embodied.

The internalisation of social engagement is mediated by behavioural systems in the brain (Norman, 2004). Our perceptual apparatus allows us to interpret what we experience by cycling inputs through our own behavioural systems (Beilock, 2015:126, Norman, 2004). While it is easy to understand that people mirror each other's embodiment (body language) when they interact socially, Norman (2004) explains that the same brain systems evaluate objects, based on the way they interact with our bodies.

If we understand an object to have a functional purpose, we try it out or imagine using it. For example, we evaluate a chair that comfortably and securely accommodates the sitter's body more highly than one that is either too fragile or uncomfortable. Since this information is perceived through our sensorimotor systems and experienced as degrees of (homeostatic) comfort (Damasio, 2019), we can say that the object *acts on our bodies.* The feelings that are produced in this way are part of the object's value. Similarly, if

an artwork exists to allow meaning to emerge from its reception, then our evaluative response to it includes noting how the material-symbolic *acts on us*.

It is not enough for a maker to be aware of the embodied processes involved in making, or for a viewer to be conscious of the embodied processes involved in viewing. For the artwork to be evaluated as a meaning-making object, it must facilitate shared affective meaning(s) or joint attention. In art and cultural production, artefacts mediate joint attention between various conversational partners, across time and space. While we sometimes have physical partners to engage with, at other times we must infer the embodiment of an absent social partner.

Thinking with Beilock (2015:126.), we mirror the embodiment of the collaborative other when we engage with an artwork (whether as artist or as viewer). In other words, an artist *infers* the behavioural response of a viewer, while a viewer *infers* the meaning-making behaviour employed by the artist. For example, when viewing another artist's painting, I examine the artwork's surface to understand how the paint was applied. Drawing on my own experience with paint and painterly substances, I infer the behaviour of the painter who produced a particular effect. This embodied reading of the materiality of the painting contributes to my interpretation of the artwork's meaning. Since I mirror the inferred embodiment, I feel, and therefore think (LeDoux, 1998:43-45), about the painting in particular ways. Consequently, the way a painting's materiality either draws or repels me, in subtle ways, will flavour my perception of it and also the explanations I create.

It is, therefore, our own experience with similar embodied states to those we perceive in others, that helps us make inferences about their mental states and the ways they are most likely to act, as a result. The systems that allow us to mirror another person's body language also help us imagine what they are thinking (Beilock, 2015:50-66). Further, these systems make it possible for us to take up the positions and perspectives of imagined others, in viewing our own work. While this thinking is not something I have come across in an arts education context, it offers a valuable way of framing decision-making and the creation and recognition of value, as a social event.

There is no perception without a degree of evaluation (Langer, 2005:43). At a basic level, this is an automatic and unconscious reaction to the perceptual event, what Damasio (2006:131) calls emotion. This response is informed by events in the individual's past and present contexts, including the social environment and formal education. While a basic evaluation of a functional object may depend on an initial attraction/repulsion response, combined with its usefulness, I argue that we evaluate artworks

based on their ability to produce joint attention. This is signalled by the synchrony achieved between the two roles of artist and viewer. As a viewer, I propose an explanation *for the way an artwork acts on me*. I also infer behavioural processes and attendant intentions of the artist that produced the particular qualities of the artwork. If my apprehension of the artwork and my internal artist-system produces similar states of embodiment, the synchrony between them suggests that I share in the artist's 'mind'.

We find it easier to infer embodied states related to experiences we have had. For example, my experience with painting helps me infer the actions a painter took, to make a painting. Similarly, an artist infers a potential viewer's response by drawing on their own experience of viewing artworks made by others and by observing how other people respond to artworks. This is why it is concerning that Visual Arts learners in my study do not consider other people as potential audiences for their artworks. Since they do not attend to real or inferred viewers' responses to their artworks, learners do not set up the conditions that allow them to attend to synchrony as a sign of value. Their decisions are one-sided, and they must either rely on the direct instructions of a teacher to help them get past decision obstacles, or live with the confusion created by an examiner's evaluation of their work.

If learning is the development of and elaboration on mental models (Dehaene, 2020:7-10), it could be argued that the function of education is to engage learners in conversations that allow them to update their thinking. I have come to view art-making as an ongoing conversation and not a final statement. This means that every drawing, painting, sculpture (or other arts-based action) is just one gesture made towards a communicative other. It also means that the gesture can be followed by elaborations on the initial gesture, so that, as the creative practitioner or cultural worker, I need not imagine myself making an independent statement but as engaging someone else in conversation, even if that person is my critical self.

Chapter Three Summary: Weaving

In trying to bring together learning from this practice, I am concerned with pulling together certain threads that connect my practice to the larger doctoral study. These argue for the place of creative practice in the thesis and link its learnings, 1) to the theories that framed this doctoral study; 2) to the disconcerting and disrupting nature of inquiry; and 3) to the particular questions that structured this research. However, what is also necessary at this stage is an abstraction of the learning, so that it can be made useful in other contexts. These threads will be drawn into the final chapter of the thesis, Chapter Four, in which I summarise the thesis and offer some suggestions.

This practice-based research allowed me to test the theories of agent-centred decision-making I found in the literature. In reflecting on my own decision-making process, while and after making these objects, I was able to use theory to make sense of my experience and use my experience to select theories that could structure my thinking and writing. This process entailed a hermeneutic cycle in which I relied on synchrony between the parts and the whole to signal fit. Similarly, while the theories discussed were drawn from a range of disciplines, they shared certain patterns at an abstract level. When I found that the same kinds of patterns governed my own decision-making, this synchrony signalled value.

Possibly the most surprising aspect of the practice-based research was the way materiality and my close attention to it froze certain learning processes in material time. This gave the project-within-a-project a fractal quality. The nature of doctoral research as inquiry presupposes the discovery of information and the consequent structuring of knowledge in areas or ways that were not available before. Creative practice-based research allowed me to register some of the moments during which my own thinking changed.

In putting my nascent thinking out into the world, through drawing and painting, I was able to view and review (Tversky, 2011a:18) the way I conceived of boundaries. Even though I framed my practice through the topic of *permeable boundaries*, the material processes of this practice dispensed with boundaries I thought mattered, and revealed the presence of boundaries I did not know existed. This has implications for the construction of knowledge, both as a component of formal educational conventions and as the result of research. Arts processes offer unique opportunities for learners to reflect on their thinking (Schön, 1987) as they engage in critical inter- and intra-personal conversations.

Finally, this practice-based research provided material on which I could reflect, as I sought to understand my own practice-based decision-making. In some cases, I became aware of particular decision-making

strategies through unstructured reflection. In other cases, the insights came from answering the same questions I had designed for the study into learners' decisions. This made it possible for me to compare my approach with those I discovered in learner's reports on their processes. While I do not hold my own decision-making as a model for learners (or anyone else), the comparison reveals how particular kinds of upstream decisions influence learning. In particular, the way artists structure their intentions, how they identify progress, and whether or not they see their prior models as fixed goals, influences the artists' ability to learn from the material process, as opposed to imposing a preconceived idea on the medium. It marks the difference between illustrative image-making and practice as a form of inquiry.

Chapter Four

In this chapter, I draw the separate findings of the doctoral study together. Here, I explain how the model of agent-centred decision-making, the SenseMaker study of learners' arts-based decision-making and the practice-based research into my own decision-making contribute to knowledge in arts education and education, more generally. I have divided this chapter into five sections. In the first section, I summarise my model of decision-making in the process of making art. In the second, I highlight findings from the study into Visual Arts learners' decisions. In the third section, I consider how differences between learners' decision-making approaches and my practice-based decisions reveal systemic constraints within arts education. In the fourth section, I make suggestions for moving the system towards a more desirable state, in which systemic constraints support learning as critical and collaborative inquiry. Finally, the fifth and last section of the chapter identifies the contribution this doctoral study makes to knowledge.

Section 1: Decision-making in the process of making art: a model

This doctoral study was motivated by a desire to understand, and be able to offer learners a way of understanding, how artists make decisions in the process of making art. For art to exist as a category (Tversky, 2011a:20), it must be different from all other social and collaborative engagements. Even if we consider Gaztambide-Fernández' (2013a:224) argument that culture is 'what people do', we are not concerned with all practices that can be considered cultural, but with those that are received as-art. (To be clear, I do not refer to European art as a model, but to the evaluative reception of cultural objects, practices, and processes that achieve joint attention between maker and audience.) Since these decisions are evaluative (Langer, 2005:43), I offer that artists' decisions involve both the *creation* and *recognition* of value in the artwork-in-progress.

In contrast with many other kinds of making,[105] an artist creates something they imagine will have a reception as art. Therefore, the artist anticipates (Beilock, 2015:126; Dehaene, 2020:25) whether the proposed artwork will have such a reception. This requires a different perceptual response than that

[105] There are many instances of making that are cultural, but which remain functional. It is not the medium, but its intent and the way this intent shapes the maker's decisions that facilitate a heightened sense of connection with another person.

which the artist employs in the process of making.[106] Since the individual must view their own artwork *as if for the first time*, they must *inhibit* (Long et al, 2018) their perspective as-artist. In particular, the self-as-viewer must inhibit privileged access to the self-as-artist's *intentions* for the work, to determine how the work acts on the self-as-viewer (Damasio, 2006:242). By deliberately *not attending* to their own explanations and motivations for making particular moves, the artist allows the artwork to *act on them*.

Since these two states are strangely contradictory (having privileged access and yet inhibiting the system that provides privileged access), the self must *shift* between them in a *to-and-fro* process. If the self-as-artist's *intentions* and the self-as-viewer's *perceptions* produce embodied responses that synchronise, the artwork achieves joint attention between the two selves. This synchrony produces positive affect and also signals the emergence of a new network in the body-brain (Antzoulatos & Miller, 2014).

To create something that has the potential to be valuable and recognise whether or not it has value, the artist must switch between the perspectives of artist and viewer. They do this by using brain systems that propose[107]a move with material, create a copy of the motor system involved in the proposal (Beilock, 2015:126), which generates feedback as if the proposal had been executed, and adjust the proposal, as necessary. The edits can happen before an action is executed, in-action as behavioural systems draw on muscle memory to predict how the proposed action will play out (Beilock, 2015:124; Dehaene, 2020:208), or after it has been executed. The editing process can involve many steps or iterations before a final decision is arrived at. This decision represents a correspondence between the self-as-artist's intention to make something that has a particular kind of value and the self-as-viewer's recognition that it has that kind of value. The decision-making process is, therefore, distinctly social and collaborative, although it can be argued that both roles (artist and viewer) can be played by the same person.

Dehaene (2020:121-125) and Tversky (Tversky et al., 2009, 2011; Tversky, 2011a, 2014, 2019) explain that the brain repurposes systems that were developed for biologically primary functions, for secondary functions. These theories support Dissanayake's (1979) observations of similarities between the principles governing ritualised behaviours, across cultures, and 'aesthetic' behaviour. Thinking with these

[106] If making does not anticipate viewing, perception may be focused on the way actions produce predetermined goals. For example, if a carpenter cuts a piece of wood to a determined length, they do not consider how a viewer will judge the piece of cut wood. By contrast, a sculptor who hopes to engage a viewer must consider what it would be like to view the sculpture.

[107] For the sake of clarity, the proposal is not a formal artefact but the process whereby the cortical system in the brain 'proposes' a move. This is modified or elaborated on in response to incoming feedback from the behavioural systems (Antzoulatos & Miller, 2014).

researchers, I argue that creative and cultural practice builds on or repurposes the systems that allow people to connect socially. It therefore, makes sense to view the particular form of social connection that art facilitates as joint attention (Tomasello, 2010). In joint attention and the evaluative perception of art, two (or more) people attend to the same (notional) object, are aware that they both attend, and experience shared affiliative affect (Brown & Dissanayake, 2009:48).

Joint attention is generally studied in the context of early childhood development and is understood to be instrumental in laying down social learning systems in the young child's brain. It also leads to social bonding between carer (often the mother) and child. Brown and Dissanayake (2009) link ritualised behaviour and aesthetic behaviour further, by explaining that they both produce *affiliative* emotions. The mechanisms that produce these positive affective states are 'moving in unison' (The Science Show, 2013) and the mediating effects of dopamine and oxytocin. However, there is evidence (Stephens et al., 2010; Hasson et al., 2012; Dikker et al., 2014) that synchrony between two brain systems produces a similar effect as physically moving in unison. This makes it possible to argue that the synchrony achieved between two brain systems which share joint attention, through the medium of an artwork, produces positive, affiliative affect, which we interpret as 'sharing the mind' of another.

The neurotransmitter reward (Brown & Dissanayake, 2018:53) produced by joint attention motivates people to seek out further engagements of this nature and internalise affiliative affect as a sign of *value*, for socio-cultural interactions, such *as art*. This means that value in art is not located in the artwork-as-object but in the joint attention, it facilitates. Further, value in art is not stable, but dependent on the evaluative perception and personal history of the evaluator. This explains why notions of *value* and *art* remain contentious. In particular, it clarifies why European art cannot justifiably be offered as a model of value for learners in non-hegemonic communities.

In addition to its collaborative nature, decision-making in the process of making art is also elaborative. In other words, the actor-critic relationship produces an iterative cycle in which early ideas are elaborated on in response to feedback. This principle can be observed at a behavioural level in adult-infant exchanges, and at a brain-systems level (Dehaene, 2020; Massi et al, 2018; Buschman & Miller, 2014; Antzoulatos & Miller, 2014). While brain-system synchrony signals that a learning goal has been achieved (Buschman & Miller, 2014), asynchrony engages the individual's learning systems in the brain (Massi et al., 2018). What this means is that while certainty brings learning to a close, uncertainty keeps it open. Moreover, while some learning processes are intent on closure, others, like playful learning, are intent on introducing

variations and producing surprise. With Gaztambide-Fernández, (2013a), I regard art-making as a process of *continual learning* rather than a support *for* or *of* learning.

Dehaene's (2020) theory of learning, Dissanayake's (1979) concept of ritualised behaviour, and the notion of joint attention come together in this model of decision-making. To this, I add the idea of in*tra*-personal joint attention. Although joint attention is generally understood as an in*ter*-personal phenomenon, between two (or more people) I argue that the actor-critic relationship that Dehaene (2020) and other neuroscientists (Buschman & Miller, 2014; Antzoulatos & Miller, 2014) write of can be understood as in*tra*-personal joint attention, between two body-brain systems within an individual.

While art may be described as an experience in which two people share 'mind', the question remains as to how one person knows the contents of another's mind. In what follows, I will argue that forward models (Beilock, 2015:126) create the illusion that one person 'knows' what another is thinking. An individual's perceptual response to the actions of others engages their own sensorimotor systems. These systems mirror the other actor's embodied states and allow the individual to infer the feelings and thoughts that accompany such embodiment. Similarly, these systems help an individual predict how their own actions will play out and therefore allow the individual to correct motor movements, mid-action.

When a viewer considers the ways an artist has manipulated material, they identify *as the artist* in order to interpret these moves with material (Baxandall, 1985). One of the ways this might happen is through mirroring the embodied states of the artist who made these moves. From Beilock's (2015:122 - 127) work, we can infer that this is likely to be more accurate if the viewer has prior experience in the motor skill being mirrored. Thus, a painter[108] who views another artist's painting is more likely to mirror the original artist's embodied states, when viewing the painting.

When an artist makes or proposes a move and imagines how they would respond to it as-a-viewer, they take up the perspective of someone who has no privileged knowledge about the intentions and processes involved in making the artwork. To do so, they must inhibit (Long et al, 2018) their perspective as-artist. The implications for this thesis are that intra-personal joint attention repurposes (Dehaene, 2020:121-125) the body-brain systems that are involved in inter-personal joint attention. This amounts to the internalisation of socially modelled perspective switching. This view is similar to Vygotsky's (1978) theory

[108] I use this word in a broad way. I would regard childhood experiences of playing with mud and clay as equally valid motor experiences, for interpreting a painter's gestures.

of socially constructed learning. I add the idea that affiliative affect indicates when the two systems synchronise and serves as the sign of value in art.

An artist's decisions are proposed as actions,[109] even if these do not all play out physically. Decision-making is, therefore, not a purely cerebral process, but a whole-person process, involving the body and the brain, located in a particular social and cultural context. This follows Damasio's (2006:70) theory that cognition and decision-making make use of the emotional, somatic, and cortical brain systems. In effect, thinking and deciding occur in the body-brain. They are whole-person processes.

Many arts commentaries focus on verbal explanations of the artwork's *meaning*. However, I argue that the belief we *know* what an artwork points to is a fiction (Barad, 2013:801)[110]and is one of the ways art acts as an exclusionary category. If experts are qualified to explain what artworks mean, learners have to accept these narratives *as knowledge*. I find it more useful to describe the experience the artwork engages us in. That produces particular interpretations that are unique to the person perceiving and makes room for multiple ways of responding.

Formal and informal educational experiences provide role models who enact responses to their perceptions. These social interactions are internalised as personal learning strategies (Vygotsky, 1978 in Jörg, 2017:40). Therefore, carer-infant (and other social) interactions scaffold and lay down the body-brain system for making decisions about matters of social and cultural concern. Whether inter-personal or intra-personal, joint attention signals a moment of connection and value. Value, therefore, lies in the effect the perception of an object has on us and not in the object itself.

Three important themes emerge from this model of decision-making. The first, is that decision-making in the process of making art is distinctly *social* and *collaborative*. Even when an individual makes a decision, they draw on neural systems that were laid down through social engagement. Further, when an artist projects a self-as-viewer, the viewer perspective is modelled on the reactions of social agents in the artist's personal history.

The second theme is that decision-making in uncertain contexts, like learning, is *elaborative*. This means that decision-making is a process (Dominguez et al, 2004:8) rather than a single event. As with learning, it

[109] They activate behavioural systems.
[110] While communities of practice share certain conventional symbols, the associations different people have with such symbols and also with the qualia of the material artwork mean that the target object is constructed differently in the mind of each individual observer.

requires the decision-maker to seek out feedback and update predictive models (Dehaene, 2020:207). It also means that wherever the category, art, is contested (Gaztambide-Fernández, 2013b; Schwab, 2020), open, or based in inquiry, its making engages learning systems in the brain (Massi et al., 2018).

The third theme concerns the *body-brain* systems that contribute to learning and decision-making. While schools generally privilege the explanatory function of cortical brain systems, perceiving, making decisions, and learning make use of emotional, somatic, and cortical systems (Damasio, 2006:70). Moreover, artists draw on embodied feedback systems when they switch perspective and imagine viewing the artwork, as if for the first time.

This model of arts-centred decision-making as a *social*, *collaborative*, and *elaborative* process involving the *whole person* (body and brain) offers learners and teachers a starting point from which to explore their own particular and situated decision-making processes. With this model in mind, I now discuss the findings of the SenseMaker study into learners' decisions in the process of making art. Thinking with Juarrero (1998:241), I argue that the patterns revealed by the study can be used to identify the particular *system* within which learners' decisions are made.

Section 2: Visual Arts Learners' decisions in the process of making art: Key Findings

Patterns in learners' decision-making

Since there are no right or wrong ways to make decisions in the process of making art, I approached the study of learners' decision-making in the process of making art as a pre-hypothesis study. In a decision-making system without constraints, we could expect to find different types of decisions distributed equally across the probability landscape (Juarrero, 1998).

By contrast, if we find patterns in the distribution of particular approaches, these patterns identify the constraints at work and by implication describe the system. Since Visual Arts learners make their artistic decisions within a school-based arts program, the patterns that emerge from a study of their decisions describe the identity and dynamics at play in arts education, in South Africa.[111] Taking complex adaptive

[111] Participants were drawn from IEB schools, but I argue the findings have implications for other education systems, too. This is because the main constraints identified were introduced to schools in the colonies from Europe and continue to affect the education system today. This also suggests that this study has application to schools in other parts of the world, where the European model of art and British-style school systems continue to hold sway.

systems theory as a framework, learners' agent-centred decisions are evidence of emergent learning produced by the larger, nested system. The many levels of this system include educational ideology, curriculum, school culture, classroom dynamics, and assessment, in addition to the learner's internal systems, and personal histories. While this appears to suggest that learners have no agency, it merely implies that agency is located within the system and bound by its constraints.

I take the view that the education system should prepare learners to navigate the world outside the classroom. As self-regulated learners, they should be able to diagnose and correct the errors in their own thinking and work (Cunliffe, 2007:10). This means that learners should be able to abstract from the particular (MacLennan, 2007) and anticipate how the resultant principles might apply in new contexts. They should be able to note the way principles endure across contexts and how new information sometimes requires the revision of principles. Further, learners need to develop a capacity to unlearn and relearn (Dehaene, 2020:21, 22), as contexts change and information is updated. This requires learners to develop context-awareness or sensitivity (Perkins et al, 2000) as a precursor to applying particular cognitive strategies and resources from their repertoires. Lastly, learners need to be able to identify how knowledge and intelligence are distributed and to collaborate with diverse partners in co-creating joint futures.

The formal process of assessing learning in Visual Arts tells us how well learners mastered the particular assessment context. By contrast, a pre-hypothesis study of learners' agent-centred decision-making tells us how learners *materialise* their learning in and through art. Since these micro-decisions are made 'when no-one is looking', patterns in learners' decision-making approaches reveal the identity of the system within which these decisions are made.

The SenseMaker study gathered a lot of rich information about learners' decision-making processes. In conventional surveys, the researcher analyses the narratives, using codes to index the contributions. In a SenseMaker study, the participants self-index their stories, using signifiers the researcher has drawn from the literature. Thereafter, analysis software represents the results in graphic form, visualising dominant trends. This makes it easy to *see* patterns before interpreting them. This is an important aspect of pre-hypothesis research. The patterns become evident as visual (spatial) information and are not the product of the researcher's projections. However, once I had acknowledged the patterns, I began making links between them and the educational structures I worked with. I discuss three main patterns and their significance in the section below.

The first pattern or trend is that learners saw value in their developing artworks when they *express the artist's intentions* and not when they *develop their ideas*. Against the background of learning theories, discussed above, I regard this as a red flag. If learners report that they do not see value in processes that *develop their ideas*, we must conclude, following Perkins and others (2000) that they either have no *inclination* to unlearn and relearn, or they do not *recognise opportunities* in which developing their ideas would be useful. Since a fixed view of knowledge runs counter to the evolutionary processes through which complex systems adapt to change,[112] I argue that this finding is cause for concern. However, there are further reasons to consider this an undesirable result.

In the context of South Africa, historically fixed knowledge is also colonial knowledge. In arts education, the knowledge that educators might think of as having 'stood the test of time'[113] corresponds to the body of knowledge that was exported from Europe as part of the colonial project (Gaztambide-Fernández et al., 2018:2). If Visual Arts learners do not invite the development of their ideas in the process of making art, they become passive recipients of ideological and historically fixed notions of knowledge in the arts and miss the opportunity to develop contextually-sensitive ways of thinking through creative and cultural practices.

This is not about the content of the syllabus, only, and it is more than a cultural issue. There is nothing wrong with learning about the cultural practices of other people. It could be argued that all arts programs, around the world, should situate what they teach in wider global cultural contexts. Further, in arts education, it is essential that equality is seen as a starting point and not the goal of learning and teaching (Rancière, 2004 in Biesta, 2010:39). Since this doctoral study is concerned with what it is we value in the arts, it is also concerned with how those values construct makers and receivers of art as valuable. Gaztambide-Fernández (2013a:226) argues that, by acting as a classificatory term, the 'art' in arts education excludes the knowledge and cultures of Black and Indigenous people from that which is valued (2013a: 2, 11). This attitude is born out of racism and perpetuates race-based grounds for attributing value. Arts educators around the world have an obligation to their learners to destabilise the structures that normalise anti-Black racism and call it culture. *Learning to learn* and to understand the temporal and contextual nature of knowledge must be identified as explicit goals of education.

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[112] And, I argue, human curiosity and natural learning.

[113] In conversations with colleagues, it was clear that they regard realistic drawing skills as foundational to art making, irrespective of the student's context.

The second trend is related. In addition to seeing value as a confirmation of prior ideas, as discussed above, participants made art for *personal reasons* and *saw themselves as the audience for their artworks*. This constructs their decision-making systems as individualistic and closed to the environment, including the social environment in the classroom and the wider South African context. As an isolated event, this would not raise cause for concern. As a trend, it reveals the ways individualism impoverishes thought.

Western ideology, the legacy of British education models, and the contemporary commercialisation of education all help to entrench individualism and competition in the private-school system. While these may have been seen as useful attributes in an earlier time, they must be recognised as handicaps when engaging with socially constructed value and with variability in the social and material environment. As discussed in the first part of this chapter, decision-making draws on neural processes that were laid down through social engagement. Furthermore, it draws on social models in the individual's personal history to create representations of the viewer role. If learners do not seek to enrich these models as their contexts change, they lose opportunities for creating connection through art.

Many educationalists have acknowledged the value of collaboration, both in constructing knowledge and in helping learners work towards common goals and shared futures. The capacity to create shared notions of value is of critical importance in the context of current global crises. Learners need to be aware of audiences and contexts outside of themselves and have a greater sensitivity to the notion that knowledge and intelligence are distributed. Since the SenseMaker study reveals a systemic inability to collaborate, I argue that intervention is an ethical imperative.

The third trend visualised by the SenseMaker study is that participants were unaware of the body or physical sensations in decision-making. This is concerning for various reasons. One is that the body plays an important[114] role in human perception, interpretation, and decision-making (Damasio, 2006). Affective responses to thoughts and perceptions are, in effect, a summary of people's personal histories with (mental) objects of that kind. As a result, paying attention to embodied feedback helps people respond to experience in personal and culturally specific ways. Further, when artists become aware of material acting on their bodies, they can recognise material agency in their decision-making processes.

[114] Damasio (2006) explains that patients who have brain lesions that sever the connectedness of these three systems are not able to function normally.

In the South African context, where we have a legacy of racial discrimination and entrenched race-based inequality, the inability to acknowledge embodied ways of being and knowing is highly troubling. A political system that subjugated people based on their embodiment had cause to erase awareness of embodiment from public and educational discourse. The suppression of embodiment in schools has limited learners' ability to bring their whole selves to learning. It also reduced learners' ability to protest their own and others' treatment in the system. As Rebecca Solnit (2001:214 - 231) writes, there is a clear link between the freedoms people have in their bodies (including the freedom to walk where they will) and political empowerment.

Making sense of patterns

The probability landscape (Juarrero, 2000:42) of learners' decision-making in the process of making art is rich with detailed information. While the specificity of these narratives is important, I do not see particular decisions as 'good' or 'bad'. It is therefore not ethical to intervene in individual learners' decision-making approaches. However, since these decisions are located within a nested system, the collective trends or patterns reveal the system's identity. If we recognise those patterns as unhealthy, because of the ways they conflict with theories of learning, and fail to prepare learners for the lives they must lead, it becomes necessary to intervene in the system.

There is a serious disjunction between the identity of the education system, revealed by the SenseMaker study, and the world young people encounter outside the classroom. Since learning is a side effect of educational experiences (Dewey, 1929 in Doll, 1993b:202), we should not believe that *what has been learned* corresponds with *what has been measured* in assessment. Real learning is not easily measured but can be described as the effects produced by the co-evolution of the learner *with the curriculum*.

While research supports a model of agent-centred decision-making that is social, collaborative, elaborative, and utilises the whole person (body and brain), the SenseMaker study reveals that learners' decisions are individualistic, based on fixed views of knowledge, and disregard the body. I do not believe a fixed view of knowledge supports the development of learning or decision-making agency. Nor do I believe that significant change (of any kind) can happen when learners' experience in schools develops their dependency on a fixed curriculum and produces low levels of curiosity. I do not see individualism as a helpful approach to navigating a shared future, and I do not believe that compassion and collectivism can flourish in a culture where the body is denied.

If schools teach learners to ignore signals from their bodies, they will learn to invalidate their own and others' embodied experiences. Further, if schools tell learners that their own physical (dis)comfort is unimportant, they may lose the ability to empathise with the pain people experience as embodied beings. Many forms of discrimination are based on normative ideas of embodiment (e.g. racism, sexism, homophobia, and ableism, among others). This reduction or erasure of difference from public awareness impoverishes all of us, by replacing the richness of life with a hollow standard. I, therefore, consider patterns in learners' decision-making behaviour, which reflect disembodiment and a lack of inquiry, as ethical issues. To address these issues, it is useful to first understand how systemic constraints produce particular patterns as emergent outcomes.

Closure and predictive models

Premature mental closure may be the result of an education system in which 'correct answers' or outcomes can be identified in advance. The OBE model of education, which was implemented in all South African schools, post-1994, was one such system. Long after this approach was officially abandoned in the South African school system, the representationalist attitude (Barad, 2013:802) that knowledge can and should be determined in advance of learning persists. What is more, standardisation is offered as a means of ensuring fairness and social justice, since it requires all learners to achieve the same outcomes. When we consider that learners bring different selves to the curriculum and that school-based assessment has little in common with life outside the classroom, these claims to social justice ring hollow. Just as important to consider is the fact that predetermining the outcomes of learning precludes inquiry.

An example of the persistent outcomes-based approach to arts education can be seen in the privileging of realism, in Visual Arts. Realism or naturalism[115] are representational styles that flourished in Europe during the Renaissance and after. Artists produced paintings with illusionary qualities, by applying various techniques, including single-point perspective. When skillfully applied, this set of rules allowed the painted or drawn picture to appear as a continuation of the space in which the viewer stood, thus reinforcing the representationalist approach to knowledge.

If we consider realism as one cultural response to representation, it should take its place as a single style among many. However, in Visual Arts, realism is generally considered as normative, while expressive,

[115] Whereas realism is generally applied to representations in which the content and appearance conform with observation, naturalism uses similar techniques, but includes artworks that depict myth or fantasy. In naturalism the focus is on the realistic *appearance* of represented objects.

abstract, and conceptual forms of art are thought of as (interesting) diversions from the norm. Many art teachers consider observational drawing as a foundational skill and see it as their duty to help learners acquire this ability. If learners mastered observational drawing, they might be permitted to work in expressive or abstract ways. However, realistic drawings in a learner's portfolio served as evidence that the choice to work in non-naturalistic ways was not based on a lack of skill or commitment.

Following Barad (2013), I argue that realism and naturalism are not just styles, but evidence of a representational*ist view of reality*. This is a metaphysical belief in which reality is seen to exist outside of the viewer who observes it. Moreover, if reality is correctly observed it can be known and represented words or pictures. In the IEB guideline document (2017),[116] learners are encouraged to find 'visual equivalents' for their ideas, as if their ideas are also fully-formed and separate from the process of representing them.

European realism or naturalism chooses a single viewpoint or perspective from which to view and represent the external world. The resultant image captures one moment or view and freezes this in painted time. However, as Barad (2013:828) writes, '"We" are not outside observers of the world. Nor are we simply located at particular places in the world; rather, we are part of the world in its ongoing intra-activity.'

As if in recognition of the 'open-ended becoming' of the world (Barad, 2013:821), many cultural practices arising from people outside of Europe or from different historical periods prefer multiple simultaneous viewpoints or multi-dimensional art forms. For example, traditional African cultural events are neither static nor confined to particular disciplines, such as pictorial arts, but may involve sculpture, costume, dance, music, and other forms of performance. In Asia, artists' 'religious, philosophical and aesthetic beliefs' meant that they were not interested in the 'static, analytic description of volume and space' evinced in European realism (Smagula, 2002:32). Denouncing the imperialism of Western art, David Hockney (Lajournade, 2012) describes the subtle, 'shifting' perspectival views contained in the Chinese scroll painting by Wang Hui (1632-17170). While a European artist might have represented the whole scene from a single vantage point, the Chinese artist used perspective to situate the viewer in different positions, as they navigate through pictorial space. For example, if the viewer imagined that they were walking along the path taken by the emperor as he moved through the city, different structures would

[116] These are internal documents and not for public view.

come into view in ways that support the sense of being 'there'. The structures are not represented from the perspective of a distant viewer, but from the various positions a traveller through the city might take up. Since the artwork is in the form of a scroll, it would not be viewed in its entirety (as shown in the figure, below), but the viewer would unroll a small section at a time, increasing the sensation that they are traversing the spaces represented in the artwork.

Figure 52: Wang Hui (1632-1717) and assistants. A day on the Grand Canal with the Emperor of China. Chinese scroll painting. Available from https://imgur.com/Ky2hx

While learners ought to be free to choose any approach to art-making, including realism, I am critical of the way realism is *presumed* to be the goal of learners' processes. Subject guidelines in the IEB accommodate non-objective forms of art (IEB, 2017) but the system I taught in continues to privilege realism and representational drawing skills as foundational to all art-making.[117] When realism (and single-point perspective) dominate the mental model of art, learners would be advised not to represent movement in the manner of 17th-century Chinese scroll painting by Wang Hui. They would be taught how to get perspective 'right'. Maintaining a fixed view of knowledge necessarily privileges a particular perspective and, consequently, infringes on learners' cultural ways of knowing. It also represents an indefensible metaphysical presupposition (Barad, 2013) concerning knowing and learning.

The privileging of realism in Visual Arts is an example of systemic identity acting in a top-down way to select and control (Juarrero, 1998:239-241) the behaviour of components. Even if educators and examiners *permit* non-objective forms of art-making, the system they work in constrains the decisions of

[117] Very detailed subject assessment guidelines make room for a wide range of approaches to art, but teachers within the system act as gatekeepers. I have had conversations with colleagues at conferences and on social media, in which they maintain that learners should first learn to draw realistically, and after that, if they choose to do so, they could try other approaches.

learners towards realism. For example, showcasing exemplary learner artworks[118] in the examiner's feedback at national teacher conferences results in teachers and learners internalising the *appearance* of a highly successful artwork.

A European model of art is part of the identity of the arts education system, and as Gaztambide-Fernández (2013a) argues, sufficient reason to replace the 'art' in arts education with a more inclusive term. As long as arts educators use a term and mental model that is directly associated with exclusionary practices, their attempts to position arts programs in emancipatory ways are unlikely to succeed (2013a:214; 2013b:640).

Part of the problem is that realism is easy to identify and therefore, easier to grade, than non-objective or expressionistic art (or art that we do not know how to categorise). If educators lack confidence in their own ability to evaluate non-realistic work, they will also struggle to guide the processes of learners whose artworks do not conform to European styles. This complex relationship between race-based supremacy (Gaztambide-Fernández et al., 2018) and a lack of confidence turns the category, art, into a discourse that continues to keep people out.

The question is whether it is possible to intend something for which one does not have a mental model. Building on that question, how do people recognise value in something they cannot categorise? Dehaene (2020:25) would argue that a mental model is a necessary part of our learning about the world. These anticipatory models or forward models (Beilock, 2015:126) project our cumulative and updated understanding of objects we encounter. They help us anticipate how objects will behave (Tversky, 2011a:20), and they help us refine our searches and narrow our attentional field in order to learn (Dehaene, 2020:21-23).

Mental models that form because of bottom-up learning processes are based on the relationship of the learners to their context. Mental models that are received from educators and cultural others are top-down impositions that limit what is possible without regard for context. All discourse is to some extent, top-down and art is no exception. However, since arts education has hijacked people's rich and diverse ways of making sense of experience and returned it to them in an institutionalised form, the discursive boundary it imposes is unethical. To work without the European model of art, outside of Europe, is not to

[118] For a brief period (roughly 2008-2013) a greater degree of exploration (particularly with respect to drawing) was encouraged in the IEB. However, during the last years of my teaching experience there was a return to conventionalism. At one Visual Arts conference, all the artworks contained in the examiner's report were realistic and made through highly controlled technical processes.

work without a mental model. It is to work with a mental model that is contextual, temporary, and subject to change.

To support processes that allow mental models to change, educators need to *build inquiry into the goal or intention for the practice*. Since my practice-based research set out to inquire about my decision-making processes, I could regard all of my decisions as material for research. Similarly, if the briefs teachers gave learners asked them to design practices and processes that would allow them to keep on learning (about something in particular), throughout the process, they might be less committed to the ideas they have at the start. Further, if teachers designed briefs that required learners to look for surprises (whether in their conceptions or in the material processes or even in the reactions of others to their developing artworks), they might attend to their peripheral vision and look out for possibility.

Section 3: Identifying constraints

Ann Pendleton-Jullian (2020) explains that when faced with a conflict of an ideological nature, it does not help to try to address the ideology, itself. Even if reformers succeeded in suppressing a particular ideology in one area, it would merely surface, elsewhere. Rather, the author says we should identify the structures that produce the ideology and work at that level.

The patterns that emerge from learners' decision-making reveal the identity of the system, as one that is influenced by neo-liberal capitalism. Learners' decisions are produced in compliance with the assessment guidelines for Visual Arts in the IEB, within a commercialised school culture. Since they do not receive any subsidies from the state, private schools use examination results to market the school and attract fee-paying learners. As schools compete for fee-paying learners, based on examination results, learning becomes a commodity that schools offer parents, in return for fees. The competitive nature of this strategy burdens the assessment of learners' work in unhelpful ways. In particular, it prioritises the measurement of learning over learning. Once results are gathered, they are used to rank both learners and schools.

The learners who participated in my SenseMaker study and I belonged to a particular community of practice (Visual Arts in the IEB). Consequently, we could be expected to have similar approaches to making art. However, after answering the same questions I put to participants in the SenseMaker study, I found that my practice-based decision-making often ran *counter* to the guidance I had been giving learners. This was surprising. On the one hand, it revealed that the wisdom I had received and, in turn, passed on to

learners did not make sense in the context of my own practice. On the other hand, it indicated that we made our decisions in different systems and that different types of constraints were at work.

In the section that follows, I compare the dynamics influencing learners' arts-based decisions with those producing my own, under three themes: the *project* nature of art in schools; *graded assessment*; and a particular approach to *discipline*. In each of these, I identify the structural constraint that produces related patterns in learners' decision-making behaviour.

Marketisation of knowledge

The first systemic constraint I discuss is the *project* nature of art in schools. Project-based learning (PBL) is regarded as an authentic form of assessment in a number of subjects and disciplines. I have supported PBL in my teaching practice,[119] particularly when learners were allowed to choose their projects. I saw this as an opportunity to engage learner subjectivity curiosity as drivers of learning. However, I found that the private-school culture constrained what counted as a successful project. While my focus was on working with learners' interests to increase motivation and self-regulated learning agency, school management often focused on the production of polished objects and artefacts that could be used to market the school. Therefore, learners were expected to set clear, achievable, time-based goals and work towards achieving them.

Similar issues dog Visual Arts. While it would appear that assessing art, as a project, is authentic because it replicates real-world processes, this view has its origins in a capitalist focus on the *production* of artworks for *consumption* (knowledge or art as a product). By further organising learning into calendar years, reporting functions to impose *efficiency* on learners' personal learning rhythms, capitalist ideology and the resultant focus on efficiency lend importance to school and assessment regulations that serve the broader system, rather than the learner. These can be understood as constraints that give the system its particular identity and produce the patterns we observe in learners' decisions.

By contrast, I had approached art-making as practice. This was performative, in that I cannot say I knew what practice was, before embarking on it. However, I took some guidance from Estés (2008) and Cecile Badenhorst (2010). In *Productive Academic Writing*, Badenhorst introduced the concept that people's relationships with writing determine their motivation. Within this, it was the writer's *identity as writer*

[119] In addition to teaching Visual Arts, I was also involved in offering PBL programs to learners across the school. The STEAM program allowed learners to choose what they wanted to learn and to work towards achieving their goals, with the support of teachers, peers, and community members.

that was one of the most powerful motivations. Writing is *what a writer does*. *What* the writer writes is secondary to *that* the writer writes. I applied this perspective to my creative practice. *Showing up in the studio and making* identified me as an artist, not what I made. Now, instead of taking its meaning from external classificatory systems, my practice took its meaning from my identity as artist. This was a deceptively powerful transition.

The shift from *project* (and its outcomes as product) to *practice* may seem like a shift away from the social nature of art and accountability to an audience. However, this does not follow, necessarily. Through my practice, I learned to value the critical collaboration of an inferred audience. However, the purpose of this collaboration was to improve connection. I was not engaged in a competitive or finite game (Carse, 2011). There were no artificial endings, nor did learning come to a close at any point. Drawings were produced, but the insights I gained from them were always available to be folded back into further inquiry.

When education is conceived of as a finite game, it becomes competitive. Moreover, learning comes to an end when someone wins. While many people think of competition as a healthy motivator, Carse (2011:46-52) points out that winning titles, in finite games, produces property. Or, property signals the owner's rights to the title of the game they won and which is no longer contested. In an education system that is already stacked in favour of certain cultural and social groups, winning ensures that certain learners continue to access the rights to be thought of as uncontested winners of the learning game.

Developing the theme of culture as property, Gaztambide-Fernández and others (2018) draw on the work of Derrick Bell and Cheryl Harris to argue that *art* functions as *White property*. Bell and Harris propose that:

> property serves a central role in structuring and justifying the hierarchical economic, social, and political relationship between Whites and non-Whites. In the United States, property is a right of full citizenship (Gaztambide-Fernández et al., 2018:9).

From these authors, I take the following ideas. First, games are finite when they are competitive and end by allocating a title to a winner. Next, education as property signals the undisputed status of the certificate-holder as a winner and also signals that the competition is forever *closed*. (This explains why projects, in school-based assessments, *end* at the assessment deadline. Learners seem to accept that they cannot gain any further credit for working on a project after a grade has been assigned. They do not appear to recognise the *learning gains* that can be made by applying feedback received to projects, after calendar deadlines.) Moreover, learners *accede to* their position in the ranked order that grades place

them in. This is a tragic form of 'self-persuasion' (Carse, 2011:46) in which learners (and graduates who later enter society as citizens) 'persuade themselves that their own particular boundaries have been imposed on them and were not freely chosen' (Carse, 2011:45). The result is that learners are produced as disciplined citizens who know their position in the various rank orders they have to navigate.

Where projects have beginnings and endings, practice has no winners or losers and play never ends (Carse, 2011). Further, projects have predetermined goals, while the only goals of practice are to keep the game in play and to make it possible for others to play. Even if I had moments of disappointment or frustration, while working on my practice-based research, I could return to the drawings already made and fold them back into new processes. I stopped thinking of particular drawings as gains or losses but was energised by the autotelic nature of play.

William Spady (2008)[120] writes about the time-based nature of assessment in South African schools in his short essay, *It's Time to End the Decade of Confusion about OBE in South Africa*. He blames the failure of the new[121] curriculum, *Curriculum 2005*, on the systemic constraints that made it impossible for learners to have more than one chance to demonstrate their learning. Assessment calendars and deadlines were more important in the system than the learners' need to learn through recursively returning to the task.

There were other problems with implementing 'pure' OBE. These had to do with the challenges teachers faced in the classroom, the lack of professional development to guide the implementation of a new curriculum, lack of resources and a lack of support. OBE probably failed for many reasons. What is worth considering, however, is the aspect of OBE that seems to have been *resilient*, despite the challenges. This aspect is the fixed nature of the educational goal or *outcome*. This measurable outcome is used to guide the backward design of the curriculum, in what is considered educational 'best practice.'

Spady offers four 'conditions of success' of OBE. I will discuss two of them, which I list, below:

1. **Clarity of Focus on Outcomes of Significance:** Having a clear focus on the ultimate learning results educators desired for students; continuously sharing, explaining, and modeling that clear focus with them from the very beginning of any learning experience; and keeping all instruction and assessment directly aligned and consistent with that desired result.

[120] Spady promoted Outcomes-Based Education (OBE) as the best approach for the new curriculum, after the first democratic elections, in 1994.
[121] Curriculum 2005 was introduced by the new democratically-elected government in South Africa.

2. **Design Down from Your Ultimate Outcomes:** Designing curriculum/learning experiences/instruction systematically BACK from that ultimate, desired end – putting in place the enabling skills that provided a clear pathway to that end, and always keeping it in sight (Spady, 2008).

Without going into too much detail, OBE supported the marketisation of learning by defining learning outcomes, in advance. While constructive alignment (Biggs & Tang, 2011) is touted as educational 'best practice', it introduces the wrong kind of certainty. It locates knowledge of what must be learned in the curriculum designer and fails to consider how the learner interacts with the curriculum. As Ajjawi and others (2019: 7) write, predetermined written standards or assessment criteria '[do] not adequately allow for notions of co-production, where students and teachers together transform practices and, thus, quality.'

Much of what is learned cannot be predicted (Doll, 1989:250). While some of the more beneficial aspects of Curriculum 2005 (such as recursion) did not find purchase in the South African education system, the notion of fixed learning goals did. This may be due to a pervasive South African view, which constructs education as property. In this model, efficiency requires that no time be wasted on 'unnecessary learning' and learners are kept productive and disciplined, at all times.

Graded assessment

The SenseMaker study identifies individualism as an emergent identity of the arts education system. While cultural practices have the potential to help learners appreciate diversity and distributed intelligence, assessment practices construe learning as an individual process. This is achieved by measuring individual learners' goal attainment and by ranking them through alphanumerical grading.

Assessment is arguably the most powerful constraint in education. All other considerations seem to take their cue from the ways learning will be measured and reported on. Further to this, graded assessments turn the process of learning into social ranking experiences. Grades reward or punish learners for (non)compliance and pit learners against each other in learning as-competition. Graded assessment promotes individualism, isolates learners from critical collaboration, and encourages them to close their decision-making processes off from the environment.

While many other forms of art in secondary schools (e.g. drama, music, and dance) require learners to collaborate, the subjects, Visual Arts, is understood as an individual practice. Learners are, generally, forbidden from working on each other's artworks, and making art that is similar to another learner's work

might be considered 'copying' or 'cheating'. As one of the participants in my study noted, learners 'got lots of advice from…friends about what colours to use, etc. which really helped' and 'all the students I know enjoy bouncing ideas off of one another and this does not mean we copy one another.'

Participants in my study reported that they made art for personal reasons, saw themselves as the audience of their work, and regarded an artwork as making good progress when it expressed the artist's intentions. In some ways, this may be an attempt to protect the self from the damage that is done through graded assessment, but the unhelpful consequence is that it closes learners' processes to the environment, including the social environment and the materiality of the developing artwork.

Yet, art requires the collaboration of a receptive audience (Duchamp, 1961) to exist as a category (Tversky, 2011a:20). This makes it inescapably social. Further to the public reception of art, the artist's personal social experiences, since birth, lay down neural systems which are repurposed (Dehaene, 2020:121 - 125) in making decisions that have social implications. Therefore, it can be argued that an artist's decision-making capabilities do not develop in isolation, but through the contributions of a collective whose history can no longer be traced.

The ability to think critically is also based on past social experiences. Dehaene (2020:19) writes that learning makes use of an intra-personal actor-critic system within the brain. One brain system proposes a mental model, while the other seeks out feedback to either confirm or challenge the model. Disconfirming feedback causes the brain to elaborate on the original model and propose a new updated version. This process continues until the feedback synchronises with the model.

When people make individual decisions, they draw on social learning systems as well as shared signs of social and cultural value. While all humans can develop these ways of thinking, like language, creative and critical thinking capabilities are dependent on social interaction to become internalised.[122] Further, social learning systems make it possible for us to take up the positions and perspectives of imagined others, in viewing our own work. Thus, decision-making is framed as a social event even if it occurs intra-personally, within an individual.

[122] Stories of children who have grown up without social interaction (so-called wild children) demonstrate that they do not develop sophisticated language capabilities (Dehaene, 2020). I would argue the same would be true for art-making.

While Western ideologies provide the rationale for individualism in learners' thinking, assessment is the active constraint that maintains particular ideological values. Two particular points about assessment drive this dynamic. One is the fact that assessments always focus on an individual's thinking and work, even in the context of group work. The other is that institutions use alphanumerical grading to report on an individual learner's progress.

Group work is promoted in schools, as opportunities for collaboration,[123] but the practice of identifying each individual's contribution within the group[124] undermines any truly collaborative learning. To allow group work to function as we desire, we must change the way assessment acts as a constraint on learning. One way to do this is to decide not to grade the artefact or product of the group work, but to consider group work to be complete when all the members of the group have achieved the task outcomes. This requires a different relationship between calendar time and learning (Spady, 2008), but it would encourage the group to find ways of sharing learning strategies, rather than making claims for the contribution each member made. Instead of learning being seen as property, to be divided within the group according to individual contributions, group work could be seen as learning to share responsibility for the group.[125]

The second point I wish to note about assessment is that grading is further constrained by the competitive nature of education as a finite game (Carse, 2011). In this system, courses end with graded assessments and certify the graduates as owners of education as property. If grades continue to act as qualifiers that admit or refuse learners entry to higher education or signal their suitability for employment, they will also prevent true collaboration. When grades matter and learners' ranking enables access to further opportunities in life, competition, and the inequality that ensues, is taken as natural. This extends to inequality outside the classroom. If people accept that competition is necessary, and that winners are entitled to the property they gain in these contests, they will blame those who are excluded for their exclusion.

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[123] Teamwork and collaboration are noted by the World Economic Forum as one of the most needed skills in the job market. It is ironic that schools try to address this, in response to its economic value, and not because of its human value. Since the structure of the school system is based on competition, group work in schools is generally fraught and is not supported by adequate guidance on how to work together as a team.

[124] Many teachers support the practice of giving an individual participation grade as well as a group grade for the project. This makes it possible to rank individuals within the group.

[125] This approach is not generally favoured by people with a Western, individualistic, mind-set.

Competition and competitiveness are part of the system within which we are all embedded. However, Damasio (2019) argues that it is not the only force driving human development. Minds did not occur 'to isolated organisms but to organisms that were part of a social setting' (Damasio, 2019:71). Humans are competitive and collaborative in equal parts. While I support ungraded assessment, I understand that 'taking the system on' is likely to produce the same identity in a different form. An example of this is the way 'white tone' replaced race as a marker of status, in South Africa's state schools (Hunter, 2019)[126].

A more useful approach would be to consider how bottom-up relationships between components in the system give grades their power and how this could be shifted. This question is outside the scope of this thesis and would be a fruitful focus for further research using the SenseMaker approach. For the present, I suggest that one way of undermining the power of grades is to draw attention to their poor ability to predict performance outside of test conditions (Perkins et al, 2000:7). If a society loses its confidence in graded assessments, they may look for other signals of value. The challenge is how we create cultural pressure for people to be seen as collaborative. As people come to terms with the complexity of the challenges that face the planet, the knowledge and skills required to address these will need to be drawn from the collective. In such a moment, collaborative skills may replace the personal quest to collect knowledge as-property.

Disciplining the body

The third and final constraint I will be discussing, here, has to do with the ways schools discipline learners' bodies. This is a consistent twelve-year project in which learners bodies are managed, as a school corpus. It begins with teaching six-year-olds to sit still and listen, and extends to controlling learners' deportment, dress, hair, and grooming. Embodied knowledge is suppressed and rationalism is used to control dissent.

Carrie Paechter (Paechter, 2011:311) writes that children's bodies have been so effaced, in schools, that it is difficult to research how children experience their own bodies. The continuous disciplining of the body by both family and school renders the child's body invisible. For example, children must behave in decorous ways, show respect to teachers, not run, and speak quietly. To stand out, physically, is to be pathologised (Paechter, 2011:311). This kind of discipline renders the body invisible.

[126] Hunter (2019) found that children who spoke good English, with a 'white accent' and who played rugby (in the case of boys) were more likely to get admission to better schools. 'Better schools' in this context are schools whose learners achieve good pass rates and who go on to find employment.

In my experience as a Visual Arts teacher, schools constrain embodiment to particular approved cultural activities. Sport is the preferential arena for the exercise of the body. It is worth noting that, in its competitiveness, it makes of physicality a finite game in which learners are made to compete[127] and to accept their rank. Performance arts in private schools generally privilege highly disciplined forms such as ballet, classical music, and drama. Juliet Hess writes,

> When music class is synonymous with the Western classical ensemble, students embedded in musical traditions beyond this conception of music do not necessarily find their physical responses to music welcomed in that context. Bodies that do not conform to such precise discipline become outliers in such music programs, relegated to periphractic space in which teachers do not validate, or worse, disapprove of students' responses to music that emerge from their own identities and experiences (Hess, 2018:331).

In a similar vein, the material processes learners are exposed to in Visual Arts are often constrained by the need to have classrooms appear ordered and tidy. In one of the schools I worked in, I invited the primary-school art teacher to use my kiln to fire learners' clay work. She turned this invitation down. She did not want learners working with clay because it made a mess and the single desks in her classroom were newly-purchased. No mess was allowed, and so, all learners' artworks were made in pencil or pastel on pre-cut sheets of A3 board.

In schools built on the British model, physicality and materiality are understood as domains to be disciplined. Further, the particular form of Christianity that was invoked in Christian National Education saw the body as ill-disciplined and likely to lead individuals into sin (see Matthew 5:29, in The Holy Bible: New International version, 1995). Nature, too, was seen as something to be dominated (see Genesis 1:28 in The Holy Bible: New International version, 1995). By encouraging learners to create predictive models of the artworks and then render these in material, Visual Arts represents material as something to be disciplined through the development of 'skill'. Education continues to privilege the explanatory power of language and cortical brain processes over affect and materiality, thus separating learners from their already-developed systems for knowing what matters. As a result, thinking is largely internalised[128] and

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[127] Unlike the arts, sport is often compulsory, at South African private schools.

[128] In the study I conducted, it became clear that learners finish thinking about the brief (the conceptualisation phase), before beginning to make the artwork. This delays the start of the making process and as a result learners struggle to complete the artwork before the project deadline. I argue it would be more useful to see making as a

invisible.[129] Following Tversky (2011b:18), this limits learners' ability to view and review their thinking and therefore limits critical thought.

The drawings that contributed to my thesis were made over a number of years and consist of parallel and overlapping series of objects. Some of the most significant developments in my practice can be attributed to working with drawings in series and responding to earlier drawings in the language of the text (Rancière, 1991). While I have worked with multiples before, in this process, the various series were not planned. They were the result of, recursively, going back to decision points and trying other options. Since I was studying decision-making, I was curious to know how decision points cause a system to bifurcate and produce outcomes in path-dependent ways. By returning to a decision point and going down another path, I created a set of drawings that mapped the decision-making terrain.

This was important for various reasons. First, it removed anxiety around decision-making that might have been linked to fear of failure. Second, it created a record of my decisions, in material form. This allowed me to view and review (Tversky, 2011:18) them at later stages and contributed to my 'repertoire' of resources (Schön, 1987) for future decisions. Third, this library of decisions showed me that my judgment was time-dependent. In some cases, I came to appreciate a particular drawing, over time, even though, initially, I did not receive it well. I attribute this to the difficulty of inhibiting my artist-perspective when viewing the work. Time and forgetting made this easier. The implication for learners is that the pressure to create single, resolved artworks, under tight time constraints, robs them of many learning moments.

The responsive and recursive approach I developed, through this study, allowed for certain breakthroughs in my thinking. I came to see each drawing as a momentary representation of my fluid relationship with the referent of the representation. The more drawings I made and the more they varied, the richer I understood this relationship to be. Rather than imagine myself as being limited to a single statement of relatedness, I began to embrace the complexity and multiplicity of my subjectivity(ies). I offer this strategy as a way of taking up alternating perspectives concerning the focus of attention. Because I made each drawing in *response* to another, I took up a viewer-perspective. However, by responding to the drawing

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way of exploring the questions posed in the brief. This might require learners to 'start again' a couple of times. However, this should be understood as process and not as failure.

[129] If learners are anxious about putting incomplete or partly-developed ideas out where others can see them (and judge them) they will hold back and try to perfect the idea before beginning the process. Unfortunately, this does not relieve working memory capacity problems.

in the language of the text, I took up an artist-perspective. This switching allowed me to act as a conversational partner for myself.

In her article discussing the role of materiality in children's play, Eva Änggård (2011) finds that, while some objects in the natural environment lend themselves to symbolic play (a stick can be used to symbolise a gun), others engage children in sensorimotor play. In the latter kind of human-non-human interaction, children might run their hands along a fence or sit astride a log. They do not act this way in response to symbolic meanings, but because the fence or log *makes it possible* for them to respond in particular ways. It is possible to say that the material *acts on* the child's body (Damasio, 2006:242).

Sometimes material resisted my intentions in ways that promoted perspective switching. I was surprised by material that *refused* to fill a space or, on other occasions *breached* drawn boundaries. To some extent, I was surprised by my surprise. I am not unfamiliar with materiality playing a role in painting or drawing. However, in these drawings, I found that the material contributed to my *thinking* about the object or idea.

Materiality is an inevitable part of art-making processes.[130] Learners are taught to discipline material and make it conform to the mental model they have or to translate the 'picture' they have in mind. If they manage to make the artwork look 'like a photograph', they are often lauded for their skill. In this context, when material flows past drawn boundaries it is *undisciplined*.

I am familiar with bleeding watercolour and the painterly qualities of paint, but I was surprised when material baulked at entering a defined space. As I attended to embodied feedback, I experienced moments when it became apparent that the artwork was complete, even though I was only half-way with my process. This material *disobedience* offered me another perspective on whatever idea I was exploring. If I had intended *to explore,* then these collaborations, with materiality, could take my thinking further. By acknowledging that this material event lay within the broad valley of my intention, which was *to discover*, I reframed a lack of 'skill' or 'poor technique' as a strategy.[131]

If learners were encouraged to respond to their own artworks, *in the language of the text* (Rancière, 1991), they would retain their decision-making agency and be able to explore alternatives that are adjacent to their current models. In other words, the alternatives would be those the learner *can imagine* in the

[130] It could be argued that conceptual artworks are immaterial, but they also require some form of communication as a way of being in the world.
[131] Learners struggle to do this because the lack of correspondence between event and the goal they set leads them to frame it as a mistake.

present. At the same time, each new response they made would open up further possibilities from which the learner could choose avenues to explore. By advocating this kind of approach, the educator allows the learner to become intimately acquainted with a field of possibilities and to make a selection by comparing the results of multiple experiences. This is not the same as encouraging a learner to try many options before committing to an approach, nor is it the same as suggesting they 'try again' or make another artwork in the same or different vein. In this approach, there is no distinction between process and product. It is all practice.

Section 4: Interventions

Intervening in a CAS

I support the perspective of Gaztambide-Fernández' (2013a) and Gaztambide-Fernández and others (2018) that the imposition of European notions of 'art' on diverse learners' processes re-produces racist epistemologies. I also find that these structures constrain independent creative and critical thinking in unintentional ways. This makes intervention an ethical obligation. However, counter-intuitively, the idea is not to push against particular practices or to prescribe replacements. It is, rather, to identify relational constraints that might produce conditions for flourishing.

While educators and learners often engage on a one-to-one basis and hold discussions in relation to particular artworks, interventions should be aimed at the system and not at individual processes, *per se*. In this study, I did not set out to find ways of improving particular artworks or teaching learners strategies that they could apply in particular contexts. I am more interested in finding ways to shift the system within which learners make decisions. If the current system produces learner decisions of a particular nature, it follows that changing the system will change the ways that decisions are made.

In complex adaptive systems theory, multi-level systems have inter-level causation. In other words, relational constraints produce new higher-level freedoms in the system. These, in turn, reproduce structural dynamics by selecting and controlling the behaviour of components in the system. I have argued that learners' agent-centred decisions are produced by the system in which they are embedded. These decisions manifest a particular ideological identity, with marketisation, individualism, and disembodiment as its cornerstones. Yet, while naming this neo-liberal capitalist ideology may be necessary, attempting to change education at the ideological level may have little effect. This is because, as Pendleton-Jullian (2020) explains, ideology will just resurface somewhere else or in another form.

Drawing on Hunter's (2019) research into state schools in the greater Durban region, it can be argued that the race-based exclusionary structures of South Africa's education system resisted top-down reform and resurfaced as 'white tone'. This may be because the internal structures that produce race-based inequalities were not addressed. In particular, the marketi~~z~~sation of education, assessment as competition, and the continued suppression of embodied experience produce a system that declares some learners winners and others losers. If the form of knowledge that the system measures is predicated on European culture, then learners from non-hegemonic cultures will be discriminated against. Further, graduates of the system who internalise the inferences made from standardised assessment, perpetuate its inequality in conscious and unconscious ways. Therefore, while I do not propose addressing learners' individual decision-making processes, I also do not believe it is useful to address the system at an ideological level.

The challenges of intervening in a complex adaptive system stem from its structural dynamics. Two aspects, in particular, the system's non-linearity and its self-organisation, make it resistant to top-down reform. The first of these, non-linearity, presents particular challenges. To begin with, emergent outcomes are abstract, while the constraints that produce them are fairly concrete. Consequently, criticality is not produced by teaching 'critical thinking', but by, among other strategies, introducing practical learning experiences that require learners to assume different spatial and social perspectives. This is partly because the brain recycles biologically older systems for more abstract thinking processes (Dehaene, 2020).

Related to this, we do not get particular emergent outcomes by 'adding' or 'subtracting' components, but by addressing the relationships between components. For example, racism is not addressed by admitting learners of Colour to formerly-white schools, without also addressing the structures that produce learners as unequal, on cultural grounds. Moreover, non-linear dynamics mean that actions can have unintended and even undesirable consequences. For example, the intention behind standardisation in assessment intention may have been to 'promote equity' (Ajjawi et al., 2019:4) but it constrains creativity and criticality, in the process. This problem is compounded by the fact the assessment measures learning against internal outcomes and therefore does not produce an image of emergent learning, seen from outside the system. Standardised assessment measures intended outcomes but misses the very important issue of unintended outcomes.

Complex adaptive systems exhibit a form of causation that differs from conventional, Newtonian, ideas of cause (Juarrero, 2000). For example, small changes can have large effects and, *vice versa*, large inputs can have marginal effects. Since it is not possible to know all of the components of an interconnected

system or how they are related, interventions need to be small-scale and safe-to-fail (Juarrero, 1999). Working with a complex system is, in many ways, like making decisions, in the process of making art.

Identifying the constraints that produce particular dynamics, is like understanding what symbolic and material processes an artist has to work with. Therefore, identifying standardised assessment (the measurement of predetermined outcomes within fixed timeframes, for all learners), grading (turning learning into a competition and education into property), and military-style discipline of embodiment as constraints that function in the current system, it is possible to imagine adjusting some of these to shift the system towards a new, more desirable state. The caveat is that any intervention may have unintended consequences, so actors must stay attuned to feedback from diverse parts of the system.

In small-scale artworks, it is generally possible to get a fairly immediate view of the consequences of our actions with material. (Although, I discovered through my own practice-based research, that my immediate evaluations do not always provide lasting insights.) Nevertheless, I found that paying attention to embodied responses offered one of the best forms of feedback about the way the drawing-in-progress would act on a notional viewer.

In larger complex systems, we need access to feedback from diverse sources and in such a form that they reveal emergent processes in the system. The narrative-based sensemaking approach enabled by SenseMaker uses micro-narratives to sense emergent dynamics in the system, in real-time. By asking how we get fewer narratives of a particular kind or more narratives of another kind (Snowden, 2013), we can focus our attention on emergent outcomes while working with practical constraints. In the context of arts education, we might ask, how can learners and teachers work together such that learners thinking becomes more social, collaborative, elaborative, and embodied and at the same less individualistic, fixed, and disembodied.

Some examples of interventions are: presenting knowledge in a contingent manner (Langer, 1989:119-124); allowing for recursion (Doll, 1993a); promoting collaborative learning and underplaying competition by practising some form of ungrading; developing models and the language to speak about embodiment in thinking, learning, and decision-making, and creating environments in which learners' bodies are respected, not erased. More specific examples that emerge from outlier participants narratives in the SenseMaker study are: helping learners embrace the time-based nature of learning; allowing learners to share ideas and learn from each other; requiring learners to take up different (physical and intellectual) perspectives; introducing new materials and tools; and using metaphors and heuristics that engage the

body. While these practical examples are given to demonstrate the relative ease with which change can be set in notion, I wish to emphasise that learners and educators need to keep a 'weather eye' on the changes these interventions produce on a wider systemic scale.

Section 5: Contribution to knowledge

This doctoral study makes a contribution to knowledge in four ways: by providing a model of agent-centred decision-making; by testing a methodology for gathering information on emergent learning; by identifying the constraints that currently produce undesirable dynamics in the system of (arts) education; and by proposing an approach to interventions, with some practical suggestions. I expand on the four contributions, in the section that follows.

First, this thesis addresses a gap in knowledge concerning artists' practice-based decision-making. It does this by offering a model of inter- and intra-personal processes through which artists create and recognise value in the process of making art. This model is not intended to be used as a formula but offers collaborators, including learners and educators, the language and dialogic tools to create and recognise value as an emergent property of cultural and creative practices. It provides learners and teachers with tools to collaborate across cultural barriers in creative practice and to work with processes for which the curriculum has no ready model. It enables a form of 'collaborative agency' through which learners and teachers can counter the epistemic violence of colonial-style curricula. While the primary site for this research is the process of making art, within arts education, I argue this model contributes to understanding about decision-making in complex systems, more broadly. While it can be used to think through the ways people might intervene to correct unhelpful tendencies within the education system, this model also has application in other uncertain and ambiguous contexts.

Second, this doctoral study tests a methodology for gathering information on emergent learning. In contrast to defined learning outcomes, which can be measured in standardised tests, emergent learning is the by-product of educational experiences (Dewey, 1929 in Doll, 1993b:202), and therefore requires a different methodology. Further, since the dynamics of complex systems are non-linear, emergent learning does not always align with espoused values or defined outcomes. The SenseMaker app I used for the study into learners' agent-centred decisions, combined with the research-informed design of questions, makes it possible to map emergent learning, graphically, and observe patterns, in a dispassionate manner. Further to the specific results, I obtained from this study, this thesis demonstrates how warm data (Bateson, 2017) helps us interpret other highly-determined measurements the system itself undertakes.

In other words, the identity of the system, described through the SenseMaker study, challenges a simplistic interpretation of in-system assessment. For example, it calls into question what a high grade for Visual Arts means if the system values conformity over creativity and criticality. I argue this methodology and method has value for the way we think of education in a broader context.

Third, this study identifies constraints that currently produce undesirable dynamics in the system of (arts) education. While the study was conducted in a specific context (Visual Arts in an IEB school, in South Africa), I argue that the identified constraints exist in a much broader educational context. Firstly, the practice of assessing learning according to pre-defined knowledge outcomes within strict calendar deadlines is a regular practice in many, if not most, schools. Secondly, graded assessment, ranking, and the competition this gives rise to, are common in many educational systems around the world, especially post the primary phase. Thirdly, many schools, especially those based on the British model, impose strict bodily discipline on learners' movements, deportment, and appearance. The practices implicated in these three constraints are common and widespread. I argue that it is possible, if not likely, that they constrain creativity, criticality, and decision-making agency in subjects other than the arts and school systems outside of the IEB, in South Africa. Confirming this, would need to be the subject of further research.

Fourth, this thesis proposes an approach to intervention, with some practical suggestions. Taking a view of learning and decision-making in arts education as a complex adaptive system, I recommend working with constraints to shift dynamics in the system. This approach maintains an awareness of the way structural constraints produce emergent outcomes and how these reproduce the system, in their turn. While ideology can be identified and critiqued, it is not amenable to reform (Pendleton-Jullian, 2020). Rather, self-structuring systems go through phase changes when internal and external change produces disequilibrium. Working at the level of constraints may help to produce useful forms of disequilibrium. However, as Prigogine warns, the effect is unpredictable. Therefore, all interventions ought to be small-scale and safe-to-fail (Juarrero, 1999).

Chapter Four Summary

To conclude, while the model of agent-centred decision-making makes a contribution, on its own, by offering learners and teachers tools for collaborating across boundaries of the known, it also informed the design of the SenseMaker study. This, in turn, revealed certain fault-lines in arts education and broader systems of education, which remain embedded in neo-liberal capitalist ideology, despite attempts at reform. Participant narratives from the same study are used to point to possible sites for intervention.

Next, the practice-based research into my own decision-making sheds light on the differences between the constraints acting on learners' decisions and my own. Finally, some suggestions for intervention at the level of constraints are offered. The caveat is that anyone wishing to intervene in this way should not become focused on actions in instrumental ways, but must pay attention to the quality of emergent learning it produces *in the system*. In this sense, intervening in the system requires an artist's sensibility (Andrew, 2011) and decision-making capacities that are not dependent on fixed mental models, but can work with uncertainty and ambiguity.

(In)conclusion

I write this epilogue at a time when educational institutions around the world are grappling with the move to emergency remote learning, as a result of the need to maintain social distancing during the COVID-19 pandemic. The rapid and dramatic change the pandemic wrought on our ways of life is a tangible example of the kinds of unpredictable change that characterises complex systems. Adapting to these changes has required and still demands that we draw on decision-making capacities that are sensitive to context (Perkins et al, 2000).

One of the things we have lost, in moving online, is the range of meanings and communicative possibilities that form alongside and outside of the strictures of language, those elements of embodied knowledge that knowers unconsciously bring into shared spaces. While online spaces have their own materiality, it is read in different ways to the physicality normally associated with making and viewing in Visual Arts.

I do not want to minimise this loss or pretend that we can find digital equivalents. But, I am curious about the ways people learn to adapt and adjust to changes in the environment. I wonder whether artworks – in the broadest sense of the word – can allow us to achieve joint attention across digital platforms, as they do across time and space. If so, what are the qualities of the artworks that make this possible?

When faced with feedback from the environment that disrupts our mental models, we need to go 'up a level'. This means that we need to find higher-level, more abstract, rules to account for the conflict between the models we have, currently, and the information we gain from being in the world. In this doctoral study, I have addressed the conflict between the generative and classificatory meanings of the term, art, by proposing a model of evaluative or agent-centred decision-making. This allows me to account for the ways different individuals and communities of practice make work that matters, in context.

While the term, art, continues to offer emancipatory experiences for makers and viewers, its association with education, in the phrase, 'arts education', or 'the arts in education', remains conflicted. On the one hand, *art* is a process through which people discover what matters, in the contexts of their lives. On the other hand, *education* is a system that perpetuates what mattered to a particular group of people in the past, as if meaning was independent of context. To reconcile learning in and through the arts with inquiry, I have drawn on the notion of perspective-shifting, modelled through ritualised behaviour in a child's early years. It seems clear, from the literature, that embodiment and mirroring play an important role in

creating the illusion that we know what someone else thinks. It also seems evident that materiality mediates mirroring when the body is absent.

The examination theme for the Grade twelves, in that year, was (e/im)migration. In discussing this theme, Misha[132] told me that her ancestors had come to South Africa, from India, as indentured workers. While the indentured labourers were of the Hindu faith, their employers put pressure on them to convert to Christianity. Many did, but Misha's family remained faithful to their own gods. In her discussions with me and drawing on her family narrative, Misha came to see the kneeling pose as powerfully paradoxical. Kneeling in prayer constituted both an act of submission to Hindu deities and, simultaneously, an act of political resistance.

Misha planned to make a body cast of her own kneeling body for the artwork component of the IEB examination project. She also needed to make a drawing component, but she was not confident about drawing figures. Through a series of conversations, I encouraged Misha to explore the way indexical images represent an object without showing what it looks like. For example, a shadow of a figure evokes the figure which casts the shadow but does not look like it. Similarly, footsteps evoke a walking figure. After some discussion, Misha decided to make a body print in a kneeling position.[133] When she showed it to me, one Monday morning, I was profoundly affected.

Beilock (2015) tells us that when we observe the behaviour of another actor, our motor systems mimic the embodiment of the observed person. We do this, mostly, without producing visible movement. By mirroring the same embodied states as the other person, we identify with them and use our own updated somatic state (Damasio, 2006, 2019) to intuit the other's state of 'mind'.

[132] Not her real name.

[133] I find it deeply ironic that a work like this would not qualify as a 'drawing' in an IEB Visual Arts examination. Since the rubric requires learners to demonstrate technical skill in mark-making and evidence of engagement for approximately one month, this artwork would have been seen as too quick and easy to make.

Different images[134] of people produce different forms of embodied identification. I am not sure how I would have responded to a sculpted kneeling figure. Maybe I would have identified superior to the figure. (Misha never made the sculpture. Her process took her in another direction.)

An indexical image is not explanatory, but inferential. For example, part of the power of Misha's artwork comes from the realisation that the print was made by a ***real*** *body,* ***positioned in a particular way****. The print is visual, but interpreting the image relies on embodiment. As a result, recognition is delayed.*

When I look at this image, I do not see the body the marks represent. I feel it. I relate to what is represented because I take up the same embodied position, in my mind.

Viewing this artwork produces a profound form of perspective-switching and consequently, joint attention. The artwork connects me, as viewer, with the maker, whose body made those marks. It also connects me with her forebears who knelt both to submit and to resist, at the same time. This is not a symbol of someone kneeling. It is an image that makes me kneel.

Figure 53: (Opposite)
Untitled. (2015) Student artwork made by Nishka Pillay. Block printing ink on paper. (Life-size).
(Reproduced with the permission of the artist, who is now over the age of eighteen.)

[134] My use of the word, *images*, includes all kinds of representational images and the material conditions of their forming. For example, the sound of someone coughing in a room next door, the imprint someone leaves on a bed they were lying in, or a photograph of a person are all images that we are able to identify with.

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