A Cognitive Investigation of a Material led Art process

Fiona O’Hara
University College Dublin, Stillorgan Road, Belfield, Dublin 4
fiona.o-hara@ucdconnect.ie

Abstract. There is a wealth of research investigating the cognitive engagement of tool users and much debate about whether our cognition can extend to the tool tip or incorporate the tool into our body schema. I contend that an expert materials led artist, can cognitively extend beyond the tool in use to the material that they engage during art making. I interviewed three expert artists, a painter, a potter and a sculptor about their tool use, materiality, environment and expertise. Their insights confirm a tacit knowledge that extends into the materials they engage and informs their actions. The experience of these artists’ forming an expertise with their chosen material offers the Enactivist approach incite into a higher-order form of Sense-making, rather than merely ‘maintaining a meaningful environment’.

Keywords: materiality, art process, Enaction, extended cognition, Sense-making, tool use, and expert artists’

1 Introduction

There is a wealth of research investigating the cognitive processes of tool use but a deficit of enquiry into the cognitive processes of engaging beyond the tool with materials. I contend that an expert artist can cognitively extend or incorporate the material that they engage during art making, creating an loop, which informs the artist’s practice and emergent work. To investigate this contention I will interview three expert artists, who have specialised in working with one material (clay, paint or metal) for a minimum of thirty years. I will follow the active loop of, skilled artist, the tools being used, the materials they are engaging and the environment the artist creates, which forms a highly focused engagement. I will consider how the experience of these experts informs the discussion of extended mind theory [1] that will incorporate research on tool use and the experience of materiality. I propose adfa, p. 1, 2011.

© Springer-Verlag Berlin Heidelberg 2011
this process of actively engaging material offers the Enactivist approach to cognitive science an account of higher-level cognition, which has been proposed as lacking by McGann [2].

2. The Art Process Loop

A materials led artist’s practice is one of a myriad of other art practices, which may engage a multitude of cognitive processes. I am selecting a material led artist’s practice as it offers an opportunity to research a direct physical engagement with a tangible material. The level of focused engagement the artist attains with their material varies, depending on the artists’ approach to the material and their level of skill and expertise. The three expert artists I have interviewed are: Brian Keogh, a potter who has specialised in working with clay for 37 years, Patrick Graham, a painter who has been painting for c58 years and John Coll, a sculptor who has specialised in metals, mainly steel and bronze through the processes of welding and sculpting clay for bronze casting for 32 years. As an artist develops expertise, they develop their skills to cognitively engage in an open flow or focus among artist, tool and material that inform their practice. Each artist’s process is unique and each of these experts has a different experience to offer. As Noë [3] eloquently relates, “Art isn’t a phenomenon to be explained. It is rather, a mode or activity of trying to explain”. The experience of these artists’ forming an expertise with their chosen material offers insight into a higher-order form of Sense-making, rather than merely ‘maintaining a meaningful environment’ [4] they have created an expert art practice. This process begins with the artist setting up their immediate working environment, and beginning to work through the stages of engagement; haptically preparing the materials, which begins a looping feedback that informs the next step.

2.1 Perceptive focus

As an art student I was trained with the maxim, to control ‘the thinking’ involved in perceiving and drawing my subject, to define my focus on a more active seeing. In teaching drawing the still life is a typical teaching aid. In the majority of cases a novice will draw what they ‘think’ or ‘know’ is in front of
them instead of what they actually ‘see’. A novice will draw the whole wine bottle, including the base, in a line up, beside the fruit and cube, whereas in fact, the fruit and cube obscure the base of wine bottle. Art training is in effect recalibrating the artists’ perceptions, to overwrite what Zeki [5] calls the active process of vision, searching for ‘constants’¹ that “makes the brain independent of continual change, and servility to it”. Clark [6] in a surprising congruence would describe our everyday perceptions, as the brains attempt to ‘predict’ what it will perceive, as a method of “neural frugality” of cognitive resources. O’Regan and Noë [7] propose in their theory of ‘sensorimotor contingencies’ that this quick perception is an active skill. The artist is attempting to get past this quick mode of perception in what Gibson [8] would call an “education of attention” and engage in a deeper perception, which of course is also happening haptically.

2.3 The Hand

The hand plays a crucial part in our engagement with our environment. Our hands are highly adapted to give us tactile knowledge, with what Prinz [9] illustrates as, 3,000 receptors in each fingertip, proprioceptive feedback about our hands position and kinesthetic information about the tension in our muscles. Our hands are central to our activities and function so consistently that they become seemingly invisible. For Thompson and Stapleton [10] this transparency of the hand, body and tools, while we are in engagement with our environment distinguishes between resources used “instrumentally and resources that come to constitute the cognitive system over some stretch of time”.

There are situations where a person can lose some of the function of their hand, such as patients who suffer from with ideomotor apraxia; they have lost their “normal unconscious, implicit but learned skills in tool use” [11], which is caused by parietal lobe damage. Although we can show clearly that damage to the brain can reduce our ability to use our hands, the implications

¹ An example of a constant, such as seeing a tail on one side of a tree & a snout and whiskers on the other, to perceive “TIGER!”
of our hand use on our mind (should we have one) is still in open debate. As Howard [12] writes, “When the skilled hand is executing technique, it is mind itself probing material, mind creating viable, functional form in and through the hand”. This idea of the mind extending beyond the body’s physical boundaries is an interesting one, one that caused much debate in the field of cognitive science.

2.4 Tool use and Extension of Cognition

Clark and Chalmers [1] propose in their ‘Extended Mind’ theory, that we can extend our minds into our environment. Taking for example Merleau Ponty’s [13] blind man’s cane, Clark and Chalmers propose the blind man can perceive the tip of his cane because he can extend his mind to the tip of the cane. Experiments on tool use, adds insight to Clarks ‘Extended Mind’ [1] and ‘Supersizing the Mind’ [14] hypothesis. Patients with brain damage such as visual neglect\(^2\) respond differently to peripersonal space (within arm’s reach) and extrapersonal space\(^3\) [15]. This was further clarified in the literature reviewed, [15,16,17,18,19] which showed that when the tool used was a stick (solid not a laser pointer), “far space became re-mapped as near space”. This may be further expanded by research done by Holmes et al [20] who designed an experiment in an fMRI scanner using a tool (60cm long wooden stick) to perceive vibrotactile stimuli and ignore visual stimuli. This resulted in a shift of attention to the functional end of the tool and “clusters of deactivation ipsilateral [same side of the body] to the visual stimuli”. These results seemed to suggest that the participant was fine tuning their attention by deactivation of unnecessary stimuli and being attentive to the abundance of receptive information available from their hands and the tool in use. This deactivation of brain areas was also noted by Solso [21] in a skilled artist drawing in an fMRI study but was not evident in a novice artist. Congruently, Milton et al [22] found a decrease in overall brain activation in trained expert

\(^2\) Visual neglect; can be caused by lesions on one side of the brain, which can cause the patient not to perceive anything on the opposing side of their body, even though their eyesight is not impaired

\(^3\) Halligan et al (2003 p126) describes extrapersonal space as, beyond arms reach unless we move or use a tool to access it
musicians and athletics compared to beginners in these fields. However as Roepstorff [23] said, “being in an fMRI scanner feels like being a brain in a vat”, hence is unsuitable to account for the vital relationship of subject in their environment.

These experiments with varying tool lengths offer evidence to the extended mind theory but further experiments sought to clarify if subjects were ‘extending’ our perception through the tool or ‘incorporating’ the tool into our body schema. Cardinali et al [18] designed experiments to investigate tool-use effects in healthy subjects. They asked subjects to use a 40cm mechanical grabber as a tool to reach for a cube. After tool use the subjects were blindfolded and asked to point at positions on their arm. Subjects touched positions (on their tool using hand) indicating that they perceived their arms as longer. Witt, Proffitt, & Epstein, [24] found that after reaching for an object beyond arm’s reach with a stick, observers estimate its distance to be shorter than they do if they reach for it without the stick. Canzoneri et al [25] congruently found “subjects perceived their forearm narrower and longer compared to before tool-use, a shape more similar to the one of the tool”, which indicates a perceived incorporation into the subject’s body schema.

De Preester and Tsakiris [26] investigated these divergent proposals; they distinguish tool use as being an extension of body capacities rather than an incorporated aspect of body schema. They discuss results found by Botvinick and Cohen [27] who found subjects incorporated a rubber hand into their body schema although it was not touching their body (it was being stroked at the same time as their actual hidden hand). This caveat brings an exception to the importance of the perceiver actively using a tool or rubber hand to incorporate it as theirs; it suggests belief has a role to play in our sense of embodiment. De Preester and Tsakiris [26] also found that some people adapted better than others to their prosthetic limbs due to how they believed they fit their body.

Following these findings of belief factoring into our perception of tool use, I asked our three artists if they have a favourite tool and how they respond to using a new tool. All three artists were immediate in their response that they had clear favourites among their many tools.
Brian described a bamboo turning tool “that fits in my hand perfectly” and elaborating on why it is his favourite tool he said, “it’s something that I work with spontaneously without deliberating and it carries out the task without too much thinking” [28]. In describing his favourite brush Paddy says,

> It is an extension, it really is an extension of myself and it is battered and bruised and it takes on character over the years of struggling to make the mark... and you get familiar with everything, there’s a little hair sticking out...you know it has funny little characteristics you get really fond of because you know and trust it implicitly whereas adapting to a new brush,

> it’s just going to give you this awful kind of ... controlled line... ‘I’m so neat and I’m so white and clean, look at the top of me is bristling white here’. Ah, all that stuff and your conscious of all that, you see the white, you know... the paint at the end of it but actually the white is a big intrusion [29].

He describes his favourite pencil, “I have two or three hundred pencils. I just reach for this one all the time. I hate when it gets (gesturing a small pencil)... I hate pairing it” and when it’s gone, “I have to go and breed another one...seriously, I hate new pencils and I hate new brushes” [29].

John for clay sculpture picked out two stainless steel tools that are double ended and fit within the parameters of his hand and when I asked what he would do if they broke he said immediately that he would weld them, no discussion of buying new replacements [30].

With a wealth of research concurring about our ability to perceive the tip of even a reasonably long tool, I asked the three artists’ I interviewed about the extended mind theory. Each of the artists’ talked about ‘extension’ through their tools but one artist John also mentioned incorporation, he related his welder as “like an extra finger on my hand” [30]. De Preester et al’s [26] conclusions about the perceived ‘fit’ of a prosthesis making it a more successful adaptation into the body schema of the recipient may point to an explan-
This may suggest that John perceives his TIG\(^4\) welder as a sixth finger because of its fit in his hand. John compared his present TIG welder with his previous experience with stick welders (where the rod is c20cm), which he found was “more difficult to control” [30]. Although John listed a multitude of reasons, why the stick welder was more difficult to control I suggest the length was a contributing factor.

Interestingly all artists talked about their favourite tools to use in relation to their hands and how they afford a lack of interruption. New tools are perceived as just that, an intrusion, as illustrated by Paddy in relation to adapting to a new brush. All three artists had their favourite tools for a long time; Brian had his bamboo tool for c20 years. This suggests time using these implements contribute to the tool becoming transparent and non intrusive in the active engagement between artist and material.

Paddy described the importance of becoming familiar with a tool as, “it becomes intrusive, you have to get rid of that notion of this thing is between you and this because otherwise you don’t feel the medium” [29]. It is the importance of an artist being able to feel the material or medium that I shall extend to next.

2.5 Materiality

Materiality is an area of research that I contend has been largely under-researched. Malafouris [31] has also found the research in embodied cognitive science, lacking a “theory of material engagement”, a sentiment echoed by Ingold et al [32, 33] from the field of anthropology. He suggests that because from infancy, we actively build our knowledge of objects and materials through interaction, it becomes a process of “phenomenological osmosis” [34] that is so integrated it becomes unnoticed. The student and the expert alike may begin with ideas of what they wish the material to express but this can change in the process of making. Hayles [35] defines materiality as requiring active, attentive focus on physical properties and yet “materiality is un-

\(^4\) Tunsten Inert gas welder
like physicality in being an emergent property, it cannot be specified in advance”. It is as Brian describes it a “tacit knowledge” and, “that’s something you can’t teach people” [28], it is understood through interactive experience. I asked the three expert artists about their experience of engagement with the materials they have specialised in and all of them talked about extending into the material. I asked Brian while making pottery, if he found the idea of extending into the material credible and he replied,

You must feel in tune with the...first of all the tool in your hand, also the machine that you’re working on and the material that you are directing the tool towards. So there has to be a unity of connection between all those things so that makes perfect sense to me, there’s no...I don’t have to think about that, that to me is the way it is ... not that we reflect on that every day of the week. It’s a given. It’s part of that tacit knowledge [28].

I asked John about welding, and could the material become part of the extension, being aware of the temperature of the material and he replied, “I would agree...when you’re doing it, part of you is definitely out there (pointing to a space in front of him)... you are removed, certainly” [30]. John further explained his responsiveness to the material as he is working,

But you know you have your end result in your mind and... all of a sudden you decide, Ah No, I’ll do this. It’s very much working with the material and being open to its limitations and its possibilities [30].

This remaining ‘open’ maxim that John mentions, where an artist will ‘keep their mind open’ to possibilities is congruent with Clark [14] he describes sensing as, “the opening of a channel, with successful whole-system behaviour emerging when activity in this channel is kept within a certain range”.

It is perhaps to an artist an obvious question to ask about the importance of understanding their material; it is the aim ultimately, to understand your material or medium so well so that you can get beyond the technical to reach further potentials. Brian replied, “Knowledge of material is a fundamental” [28]. John responded congruently, “It’s absolutely crucial, the knowledge of the material and the way it’s going to work is vital, vital to any half
decent production” [30]. Both John and Brian talked about preparations of their materials before their work can begin. John discussed making a mould, annealing sheet bronze and beating it to make it much softer and then chopping it into bits, before he can begin welding. This process is taking advantage of John’s knowledge of how Bronze will respond to the welder. Whereas Brian described putting the clay through processes that will bring it to the ideal state to create the type of object he wishes to throw on the wheel,

So there’s a big amount of preparation of material and there’s a lot of forward planning to make sure the material is in the right...state. Well aged, that is clay that has been recycled and slaked down in water and sometimes left over a period of months. To break down and be re constituted with new clay...which produces a well...mixed and plastic body for throwing that won’t crack in the making or won’t be stressed by the making [28].

Whereas the oil based clay that John sculpts with is formulated so as not to dry out; which affords John the opportunity to work on a portrait head over long periods of time with no drying out issues. The environment also influences this tacit knowledge of materials and how they are best worked, in the most immediate case the artists’ studio.

2.7 Constructing an adaptive environment

I asked all three artists’ when they approached working directly with materials how they set up their working space. Brian when he was in pottery production set up his studio space, as “it required a degree of order, cleanliness ...so that the flow of production could continue uninterrupted” [28].

Paddy more passionately described this process the begin painting as,

It’s war! Get all your troops ready, this is a[n] ... assault course. Ah yeah, it’s all there. It has to be there because the immediacy of something, you know what I mean? I’ve never lost it but I’m always afraid. I’m on the verge of something here and I’ll...lose it, if I can’t get the brush (gesturing reaching for a brush). It’s a terror, you know the way when you’re right on the edge of something and ... I’m on
the of something, if I stop I’m… if I reach for a brush I’m doomed. So it’s, it’s yeah, there’s an awful lot of precipice stuff, really [29].

I mentioned the example of Francis Bacon and using the chaos of his studio environment to incorporate random images and debris onto his canvas, to which Paddy replied, “as I said I lived on the edge of kind of losing stuff all the time, so I had to have what I needed, you know, ready, I had to have it there” [29]. Paddy’s experience eloquently illustrates Heidegger’s [36] hypothesis of tools being “ready to hand” with the dread of the brush becoming “present at hand” or out of reach for use. I would have John’s welding mask as a barrier to focusing on the puddle of weld as it is forming. John however relates it thus,

because you’re in the mask, because you’re focused on this (pointed to imaginary point in front of him), you’re actually, you cut out, an awful lot of… its easier to concentrate within that environment [30].

Another aspect of environment is the culture and environment outside of the studio and how this influences the artists’ practice. Csikszentmihalyi [37] has researched at length the importance the receptive field of culture has on an artist’s success and survival, such as the artist agent, galleries etc that support them. Sterelny [38] more particularly challenges Clarks [1] Extended mind hypothesis and proposes that an individual relies on the scaffolded environment more than their individual mind. Sterelny proposes that we engineer our environments, which she calls “niche construction” [38] and that this environment is an important external influence on humans. The artist’s studio seems a good example of such a niche created by the artist to suit their needs within a wider community. While Sterelny concurs that the extended mind thesis is plausible with resources that are trusted, individualized, and entrenched for particular individuals she suggests it cannot be applied generally [38]. I concur; hence it is individual experts that I have interviewed in a very specialized field.

Menary [39] refers to the “aesthetic niche” which he suggests begins with the niche construction model of a person modifying “cultural artifacts, practices” and their environments, while these actions redevelop their neural circuitry
through neuroplasticity; artist and practice co-creating together to evolve the individual artist and their cultural environment. A similar proposal is detailed by Iverson and Thelen [40] who propose, “neural processes coordinate with and can be entrained by hand movements, forming a single integrated cognitive system”. Hutchins [41] theory of Embedded Cognition congruently relates the notion of environment as essential scaffolding to our cognition. Gibson’s environment rich with affordances [8] offers the artists’ open mind vast opportunities as John puts it, “to have your antennae up” for ideas, as you walk around your everyday environment.

As for what the scaffolded environment offers an expert artist, John spoke concisely about how welding tools have evolved from larger more unwieldy models to the more controllable “gorgeous” welds he can now achieve with a hand-sized TIG welder. However John still wears a pigskin apron to protect himself from sparks, which has not changed over time, as it is still the best protection. All three artists spoke of how they have actively engaged with new advances in technologies as they arise but these technologies may not be incorporated into their art practice. Paddy discussed his interest in computers but he has not incorporated this interest into his arts practice. The oil based clay John uses is imported from the US where it was created to be suitable for a Texan climate, and indeed the wider network of technologies allows John to source and adapt it into his practice in Ireland. All of these endeavours, from creating a working space, to developing skills with tools and materials is toward a particular aim, to enable a high level of engagement or focus, a smooth looping among artist, tool and material.

3. Levels of engagement / Optimal Engagement

During a focused engagement the artist and the material form a flow of action and reaction that is not a top-down or bottom-up process but more of a looping progression. All three artists’ were very assured and eloquent about how this extreme focus presents for them. Brian explains it as, “optimally it becomes an area where you find a kind of creative space” [28]. When I asked about how central the material is in this looping, Brian replied,
that’s the experience of a lot of skilled crafts people that they become attuned to working with material to such an extent that they’re not really thinking of the material when they’re making. They are in a zone that is...quite hard to describe and it’s that flow state...that becomes a more frequent feature of the making. You’re not struggling with technique but you’re actually making in a kind of a zone but you’re not at the same time being tardy or unconscious of the way you’re...you’re attending to the task but that the struggle is not with the material...it’s just working in a state of flow which produces a pot [28].

Csikszentmihalyi defines flow as, “the subjective feeling we have when we perform at our best” [42]. He defines this state of flow as requiring, the idea of immediate feedback to one’s actions, a merging of action and awareness, a blocking out of distractions and a balance between challenge and skills [43]. Kaufer and Chemero’s [4] description of phenomenological Cognitive science coupled with the flow theory I propose have some similarities; the idea of immediate feedback to one’s actions -“a special purpose dynamical system”, a merging of action and awareness - a “bringing forth” as posited by Varela et al [44], a blocking out of distractions –‘a closed system’, and a balance between challenge and skills -creating a meaningful environment.

There is a limit to how long this level of flow, or cognitive extension can be sustained, our attention is a limited resource. As the three artists’ related even at their level of experience, the flow of full engagement is not a given. McGann [2] proposes the distinction between “achievement and error”, the risk of not always succeeding, shows the interest and the value of autonomy in this action. Brian explains the inconsistencies of the flow state,

that level of focus is not always there and sometimes you struggle to achieve it, and then at other times it feels like it’s flowing effortlessly, and then at other times it feels like it’s coming and going and then at other times it’s there for a sustained period and then you’ve just in...you have no more energy for it. So it varies” [28].

John describes this level of engagement as “a very highly focused interaction”. When I asked how long he can sustain this focused interaction, John
explained, “I would rarely end up doing a full day of welding ... It’s just that level of concentration” [30].

While modelling a portrait with the sitter present, John said half an hour to forty minutes was the limit after that, “I just stop... stop seeing” [30]. John went on to explain that after welding he would turn to a different mode of working that he found less demanding, which for him is working with clay, which he described “as soft” [30]. Interestingly Paddy described painting as the challenge for him whereas drawing is a natural gift he has always found easier [29]. For all three artists’ particular working methods were more demanding and challenging and the type of engagement they afford is different. Brian said he found throwing on a wheel came more naturally to him than other potter’s he knows, so he has been challenging the scope of his abilities, by increasing the scale of the work he has been throwing.

In Ruspoli’s [45] film discussing expertise many of those interviewed mentioned how their mood can impinge on their ability to engage fully with their work. Brian described how he threw a production line of pots to make a living,

So no, that mood is not always there but the objects get made and sometimes they get made very well so maybe despite the distractions...you can draw yourself towards the making and push those distractions away. If you’re skilled enough and if you’re doing those actions often enough yes you could probably push away the extraneous anxieties and things that are trying to take away from the moment but it’s not always a Zen experience [29].

The finished pot created in this state of flow, “has optimally got certain characteristics about it that an experienced potter will say is full of life and tension at the same time” [29]. This idea of the quality of the finished work which was created during full focus or flow was also mentioned by Paddy, when discussing having his favourite brush within reach and being on the precipice of keeping the flow, “Otherwise, if I stopped I’d lose it, I felt I’d miss it and of course what I lost or missed... nobody would see but I would know, I knew”. It raises an interesting question, a work created during the artist’s most en-
gaged and fluent looping is an individual experience, that may not be necessarily discernible as better by a viewer, except perhaps as Brian suggests another expert potter. This aspect of being an expert was related well by De Waal [46] who wrote about his research of porcelain. He could discern why fragments of discarded pots were rejected centuries before on a Chinese mountainside because of their misfiring in the kiln and could admire how expertly thin the porcelain had been thrown.

3.1 The influence of Expertise

During the three interviews we discussed learning skills and expertise. Brian who has taught pottery for years explains the progression from novice to expert as,

the skill that accumulates in your body, in your hands, in your eyes and that co ordination of hand and eye, that becomes intuitive and natural and available all the time, they’re the things that are really important but it’s learning the fundamentals well and then repeating them endlessly to a point where you’re working not from a deliberation but from a disciplined spontaneity [29].

Dreyfus also describes the progression from novice to expert as involving the novice learning “procedures by drill and practice” [47]. Brian elaborates,

whereas an apprentice is struggling all the time with materials, techniques and a certain level of confusion and stress that kind of recedes a bit into the background. ...it’s like a series of boxes and you jump through those boxes into a place where you can make at will but at the same time you have to be thinking as you’re making your critical sense can never take a rest [28].

Brian’s series of boxes is concurrent with Dreyfus who lists five stages from novice to expert as; novice, the advanced beginner, competence, proficient and expertise [48] Dreyfus discusses the final stage where the expert has accumulated experience, which he brings to his next engagement with the material, which solicits a more refined response from the artist, what Brian describes as an alert “critical sense”[28].
Conclusion

I have investigated a material’s led art process as a cognitive process. I propose this investigation offers the Enactivist approach to cognitive science an account of higher-level cognition, informed by the experience of three expert artists. The enactive approach has encompassed the majority of animal and environment engagements or interactions including examples of single cell autoposeis, this “bareness of autopoesis as a norm”, concerns Mc Gann [2] who also enlists similar concerns from Di Paolo et al [49]. He relates his argument for research into goal-directed engagement within his discussion on Enactive research,

If meaning and value are structured not by the world alone, nor by the agent alone, but in the higher level task dynamics of goal-directed interaction between the two, then the account of human-level, person-level meaning must be scaffolded within a framework of goals that encompass such high level activity. [2]

I have found it surprising that the premise of the enactive approach, action and agency have been approached so theoretically, (computational modeling, dynamical systems models etc). I am biased by my immersion in the field of art-based practice that is in itself a fundamental research of experience and engagement. Merritt [50] has approached these same criteria through the engagement of dance, which she relates as “kinetic intelligence” which is an interesting comparison to the “tacit knowledge” described by Brian in his interview. For Merritt ‘thinking-is-moving” [50], the dancer evolves their movements as they move, which is a different preface than materiality where the cognitive extension into the material offers this ‘thinking’ or informing. Merritt does discuss the interaction among interpretive dancers responding to each other offering a valuable insight into this form of artistic cognition. From a comparison of just two fields of expertise (art and dance) a wide range of cognitive engagement is revealed. There is still much to learn from expert specialists in their individual practices of engagement.

I have examined the art engagement loop from the embodied artist, tool use, materiality and the constructed environment by engaging the experience of experts in a variety of media. Interviewing three expert artists’ about their subjective experience, of their art practice may be questioned by some as not very scientific. I disagree, and I am not alone, Csikszentmihalyi [43] advocated that we have learned much from brain damaged patients and comparisons with healthy functioning subjects but we have underutilized
researching exceptional people. As phenomenological and Enactivist concerns overlap and their researchers align their research methods I imagine will also be shared. Creswell [51] proposes interviews as phenomenological research method.

There have been valuable insights into visual perception through new fields of study such as Neuroaesthetics that tends to rely heavily on fMRI data, which to my perception, as the technology stands at present, offers a blurry picture particularly when investigating the wider activity of human engagement. As I have shown in the stages of engagement through this paper, and in particular in the perceptive focus section, perception is a fractional aspect of the cognitive process. However I claim that a matrix of all of these research formats neuroscience, case studies of brain injuries, experiments incorporating healthy subjects and interviews and research with expert practitioners as I have used in this paper do prove a valuable resource to the overall field of study.

I have considered Clark’s theory of ‘extended mind’ [1] through the experience of three expert artists’ and a wealth of research encompassing, case studies, practical lab experiments and fMRI experiments offering a wide set of approaches that offer strong evidence that a sense of ‘extension’ and incorporation is experienced by tool users. I am reticent to adopt the concept of extension of ‘mind’ however as it brings to bear a plethora of ambiguous meanings and definitions. I prefer to incorporate the term, Extended cognition as defined by Chemero [52] to define the actively engaged artist who is closely coordinating perception and action.

The three artists’ I interviewed all discussed ‘extension’ into their medium or material that they all agree is a fundamental aspect of their art engagement. Brian related the relationship among potter, tool, wheel and clay as “a unity of connection” [29]. Thompson and Stapleton [10] reflecting on the differences between the extended mind theory and the Enactive theory of Sense-making, postulate that the tools and materials of the artists’ should be considered part of the cognition system if they function transparently. I would also propose that the experiments on the length of the tool used and perspective of space might also offer a contributing factor. John explained clearly how using his hand sized TIG welder creates “beautiful welds” [30], Brian described his favorite bamboo tool “that fits in my hand perfectly” [29] and Paddy relayed is hatred of the intrusion of the white new brush. The transparency of their tools offers an uninterrupted attentive engagement which may be referred to as ‘flow’, described by each artist, as a state when
the artist, tool and material become a looping cognitive system. However the engaged art material doesn’t become transparent it becomes the ultimate locus of the extension of cognition. This raises an interesting caveat to Thompson and Stapleton [10] who ascertained that transparency signifies inclusion in a cognitive system. I am stretching the loop to the crucial active materiality of engagement without which the artist is miming.

The emotion with which each of the artists’ discussed their tools and practice is an element to be considered, as Thompson and Stapleton [10] state emotion and cognition are integral aspects of Sense-making. They reprimand the Extended mind theorists for not acknowledging emotion as a vital component of cognition. They suggest emotion attributes “salience and value for the system” [10], which contribute to autonomy, an essential factor in an Enactive system. I asked each artist, why they continue to engage their specialist material, John about Bronze said, “I think it’s to do with an inherent luminosity in Bronze that comes through... It makes clay look...it brings clay alive” [30]. Paddy said, “the ecstasy of being lost in a creative nothingness and having to stagger your way out of it, that’s the journey” [29]. Brian about clay said, “it will also give back responses that sometimes are unpredictable, surprising, sometimes disappionting but sometimes exhilarating” [28]. I conclude that there is no shortage of emotion and value for these artists in their chosen engagement. Thompson and Stapleton [10] cite Clark’s “information-processing models as limited”, as they fail to explain autonomy and therefore cognition, there is no such limitation in the expert engagement of an active individual.

The environment each artist has created in their studio allows for the best engagement it can afford. John particularly sought a studio that had high ceilings, wide doors and light. Brian described the ritual of setting up his tools around the wheel for ease of comfort and use. Paddy illustrated his aligning of his troop like tools to wage war. The artists’ studio is an age-old phenomenon that has stood the test of time and so it must still fulfill its requirements of offering an artist what they need to actively work. Sterelny [38] and Menary [39] have written about the constructed niche and the scaffolding of the environment that rings through for the experience of the three artists’ I interviewed.

The artist picks out which aspects of the world he “structurally couples with” [4] which is an Enactive “co-emergence of self and world ‘sense-making’”, a utilization of affordances to meet their needs. Cognition is relational, it is an active state not bound to a cluster of neurons, muscles, or the like but active
engagement. These expert artists’ assert that knowing your material is “essential”, “fundamental”, and coupling or looping with this material at a new level every time is their research, their Sense-making, and this research continues to challenge them and inform us all.

Acknowledgements I wish to thank Dr. Fred Cummins for his ‘open mind’ and generosity of time in supporting my research interests. I also wish to thank artists’; John Coll, Patrick Graham and Brian Keogh for giving their time and knowledge to this research, it is much appreciated.

References

6. Clark, A (2016) Interview with Dr. Andy Clark, Author of Surfing Uncertainty:


29. Interview with potter Brian Keogh on 27.7.2016

30. Interview with painter Patrick Graham on 25.7.2016


34. Ingold, Tim (2007) Materials against Materiality Archaeological dialogues 14 (1) 1-16 Cambridge University press


38. Csikszentmihalyi, M (2014) The Systems Model of Creativity The Collected works of Mihaly Csikszentmihalyi Springer Claremont, CA USA


46. Ruspoli, Tao (2010) Film Being in the World


48. Dreyfus and Dreyfus (2005) Expertise in Real World contexts Organisation studies 26(5);779-792 Sage Publications p782


