

Exploring the idea of affordance in an ecology for learning and practice: Notes inspired by a 'rich landscape of affordances'⁽¹⁾

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Introduction

Gibson's concept of affordances (2) is generally understood as *possibilities for action provided to an animal by [its] environment*. "The affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or for ill" (2 p. 127). Affordance is clearly central to any concept of an ecology for learning and practice and it features prominently in the model I developed (3,4) and applied to the practice of a geologist making a geological map (5). In their article, 'A Rich Landscape of Affordances,'⁽¹⁾ Eric Rietveld & Julian Kiverstein develop a much richer concept of affordance than I have hitherto appreciated, revealing how affordance is related to particular individuals with particular capabilities, motivated by their concerns, engaging with their environment in particular social-cultural settings and practices. Subsequently I discovered other interesting work by Eric and his colleagues on his website <https://erikrietveld.com/all-publications/>. These notes attempt to capture some of the ideas from this body of work (and other related works) in order to develop understanding of how affordance features in an ecology for learning and practice.

In the context of my exploration into the way people learn, develop and practice, the idea of ecology is being drawn upon to frame the way we perceive, explore, inquire into, make use of, experience and make sense of the world and create new meaning. "By 'ecology' we mean the whole science of the relations of the organism to the environment including, in the broad sense, all the 'conditions of existence'." (6 quoting 7). Fundamentally, ecology is about connections, relationships, interactions and processes involving organisms and their resourceful environments for the purpose of living. By environment we mean, "the world as it exists and takes on meaning in relation to [the organism/person], and in that sense it [comes] into existence and undergoes development with [the organism/person]" (8 p.20).

When people are the dominant organism in an ecological system (ecosystem), living involves much more than sustaining life. Although all organisms learn to live with, and when necessary adapt to, their environment, 'learning'—understood as the making and sharing of new meanings—becomes a force for significant activity and change in human eco-social systems (9). In developing a model of an ecology for learning and practice we are concerned with the way people comprehend, relate to, and interact with their resourceful environments for the purpose of learning, performing and achieving things that are of value to them in specific social cultural settings.

Furthermore, when we talk about a person's ecology for learning and practice we are not concerned with the environment that many people experience as they are trying to learn and accomplish something. We are concerned with the environment of an individual as it is experienced and modified by them as they encounter and create it during their learning project: what Baggs and Chemero (10) term *umwelt* (the world as it is experienced by a particular organism).

The new environmental proposition contained in the idea of an ecology for learning and practice is that the construction of such an ecology creates a new environment for learning and practice within the *umwelt*: an environment that selectively engages and draws upon a particular field of affordances: affordances that are not just resources but which are resources in a relationship with the creator (10).

Ecological theories of learning and practice are founded on the enactive theory of cognition (enactivism). Varela, Thompson, and Rosch (11) introduced the concept of enaction to present and develop a framework that places strong emphasis on the idea that the experienced world is portrayed and determined by mutual interactions between the physiology of the organism, its sensorimotor circuit and the environment. Their emphasis on the structural coupling of brain-body-world lies at the core of their concept of embodied cognition and situated learning- enactment involves not only neural processing but also things an organism does in the situations it encounters or creates.

Enactivism argues that cognition arises through a dynamic interaction between an acting organism and its environment[12] and claims that the environment is one which an organism selectively creates, through its perceptions and capacities to interact with the world.[13] In their interactions with the world a person's cognition creates meaning, transforming perceptual information into meaning: they enact a world." [14] Kiverstein and Rietveld (15 p155) argue that the process of meaning- or sense-making is best understood as referring to the affective significance the environment has for an individual, best understood in relational terms as arising in the individual's coupling with relevant affordances in its environment. The individual agent has a perspective on its environment relative to which it encounters affordances as presenting an opportunity or threat to the sustaining of its micro-identities: identities that it seeks to maintain and sustain through its learning and other practices. In the enactive world view knowledge is constructed by individuals through their sensorimotor interactions with their material and social environment, and co-constructed between people through their meaningful interaction with each other.

Niches and ways and forms of life

Rietveld & Julian Kiverstein (1) argue that the affordances the environment offers are dependent on the abilities available in a particular ecological niche. "Exercising an ability can be better or worse, adequate or inadequate, correct or incorrect in the context of a particular situation, hence there is a normative dimension to the abilities for picking up affordances" (1 p326).

The idea of niche is important here. According to Gibson (2) each species of animal has its own distinctive *way of life* i.e. how animals of that species conduct their lives everyday as they search for food, avoid predators, procreate and fulfil other essential needs in order to sustain their life. An ecological niche is formed and transformed by members of the species through the ways in which the 'species' typically acts in and interacts with its environment. All animals actively modify their niches, tailoring the places they inhabit to fit their needs (1 p328). Gibson's concept of *a way of life* helps us to make sense of the variety of affordances that are recognised, accessed and utilised by different species because of differences in how they live within a particular environment (ecological niche).

Humans differ from other species in the way they develop, adapt and transfer behaviours and practices in social-cultural settings as well as physical-material environments. Rietveld and Kiverstein argue (1) that to understand the variety of practices within the human way of life we need to draw on Wittgenstein's concept of *forms of life* (16). The form of life of a kind of animal consists of patterns in its behaviour, i.e., relatively stable and regular ways of doing things. Each animal is unique in the way it conducts its life in its particular environment i.e. it has a unique ecology for living.

In the case of humans, these regular patterns are manifest in the normative behaviours and customs of communities and domains of social practices – for example people performing a particular role or making a particular thing (1 p.328-9). People are not machines simply replicating a programme, they

sense information flows from the world around them, create meaning and respond in ways that make sense to them, learning as they experience their effects on the world and how the world responds. So there is variety in the practices humans perform, and therefore corresponding variety in the forms of life between individuals i.e. each individual has a unique ecology for performing their roles.

Ingold (8) argued that the central difference between these human forms of life can be attributed to the embodied skills of people situated in their structured surroundings and their unique experiential histories:

“Much if not all of what we are accustomed to call cultural variation in fact consists of variations of skills. By skills I do not mean techniques of the body, but the capabilities of action and perception of the whole organic being (indissolubly mind and body) situated in a richly structured environment.” (8 p.5).

This reasoning led Rietveld and Kiverstein to suggest that the standard definition of affordances can be improved by situating affordances in the context of a form of life. *Affordances are possibilities for action the environment offers to a form of life, and an ecological niche is a network of interrelated affordances available in a particular form of life on the basis of the abilities manifested in its practices—its stable ways of doing things. An individual affordance is an aspect of such a niche.* (1 p. 335).

But accessing possibilities for action are not just dependent on those possibilities being there. They are dependent on an organism being not only able to perceive the possibility for action but having the capability and empowerment to act on the possibility. Situating affordances in the context of a form of life allows us to deal with normativity at the level of sociocultural practices in the human form of life. (1 p.330).

Chemero (17) argued that we should think of individual affordances as relations between “features” of the environment and the abilities of organisms to act on those features. In the case of humans, their ability to act is situated in the ‘form of life’ they inhabit as they engage in sociocultural activity, hence the abilities that are acquired by participating in skilled practices are abilities to act adequately according to the norms of the practice in particular contexts, social-cultural settings and circumstances (1 p.330).

Landscapes and fields of affordance(s)

Bruineberg and Rietveld (18) and Rietveld et al. (19) make a distinction between the *field of relevant affordances* available to a concerned individual with appropriate dispositions and capabilities and the landscape of affordances in which the field is situated.

“The landscape of affordances is our term for an animal’s ecological niche understood as a set of affordances (2 p. 128). We’ve suggested that affordances should be understood in relation to the abilities available in a form of life, and not in relation to the abilities of an individual agent (1)” (19 p.11).

“The landscape of affordances is pragmatic in the sense that it is organized and structured at the spatial and temporal scale of the patterns of regular activity available in a form of life. It is the public environment an individual shares with the other members of the forms of life to which the individual belongs. But within the landscape ‘fields’ of relevant affordances are discoverable and useable by individuals. These are made up of affordances that vary over time in their soliciting power.” (19 p.11)

Skilled intentionality

Skills are essential for knowledgeable action in a situation that requires such action, but in order to act on one or more affordances, the will must also be engaged and this relates to dispositions that are influenced by emotions that are themselves related to concerns, contexts and situations, opportunities to act and self-efficacy. Rietveld, Denys and Van Westen (19) develop the concept of *skilled intentionality*.

“The Skilled Intentionality Framework (SIF) is a philosophical approach to understanding the situated and affective embodied mind. It.....focuses on skilled action and builds upon an enriched notion of affordances (1). We define skilled intentionality as *the selective engagement with multiple affordances simultaneously in a concrete situation....*” (19 p. 1)

“Skilled intentionality is skilled responsiveness to the rich landscape of affordances” (19 p.10)

“Skilled intentionality, [can be] understood as the tendency towards optimal grip on a field of relevant affordances” (19 p. 21)

“Skilled Intentionality as we encounter it in our real-life practices implies responsiveness to multiple affordances simultaneously. The situated individual responds in an integrated way to what we call a field of relevant affordances” (19 p.15)

“The concept of skilled intentionality as multiple simultaneous states of action readiness for engagement with affordances entails orientation towards and preparation for possibilities for future action, which is a situated form of anticipation” (19 p.2)

The concept of skilled intentionality can be applied at three levels (20 p.3-4):

The *ecological level* is the ecological niche that forms the context in which skilled individuals are situated and immersed in a rich landscape of affordances that is shared with the other individuals inhabiting the same ecological niche.

The *phenomenological level* reveals how a skilled individual with interests and concerns in this rich landscape of affordances perceives the landscape in a highly selective way, responding only to the ‘field’ of affordances that are most relevant to evolving situations. An individual can be solicited or drawn to act on relevant affordances and doing so may change their environment and their perception of it and their concerns.

At the *embodied neurodynamic level* skilled Intentionality is understood as expressing [through thought and action?] a process of self-organization of multiple affordance-related states of action-readiness.

Note 1 Is the embodied level at which such matters as self-efficacy and will, persistence and determination manifest?

Note 2 Skilled intentionality must also relate to the making of meaning presumably what an affordance means or might mean in terms of possible actions takes place at all levels but is the significance of the meaning different at different levels?

Learning to perceive and act on affordances in a particular form of life

A key question is how do human beings develop their ‘form(s) of life’? Specifically, how do they acquire the knowledge and skills to work and perform in complex ways with their social cultural and material world? In terms of affordance - how do they learn to recognise, create and utilise affordances in order to learn, achieve, perform and *create*.

Learning, through structured education and personal experience, are fundamental to the many forms of life humans develop. In acquiring a skill we learn the places in the environment where we are more likely to find affordances that are relevant to our concerns and what aspects of

environment we need to attend to. The acquisition of a skill by a learner involves what Gibson has called an “*education of attention*” (2 p. 254, cited in Ingold 8 p.354). Educating for attention involves the novice being brought to a selected aspect of the world that is of significance to the given practice and shown landmarks that orient his or her activities. In this way the novice learns what possibilities for action an aspect of the environment provides. This process crucially involves other practitioners who selectively introduce the novice to the right aspects of the environment and their affordances and reveal to the novice how the particular aspects might be acted upon in their practice (1 p 331).

Here we connect with the educational ideas of learners participating in some form of apprenticeship – both cognitive and practical. Baker calls this ‘collaborative form of life’ ‘guided participation’ (21) through which learners are introduced and immersed in the problems and environments of the field.

“a theory of ecological learning emphasizes the value of meaningful co-participation in communal tasks, mutual respect from supervisors and peers, and responsiveness from the entire social environment. It suggests that students are capable of being relatively independent and self-directed learners; when they are given freedom and sufficient guidance to participate meaningfully in the authentic activities of a practice, they do not necessarily need to be controlled by an educator” (21 p.83).

Such apprenticeships are the means by which novices in a domain learn how to create their own ecologies for learning and practice in environments and situations that are authentic to what they will eventually encounter when they practice as an expert (5).

Normativity - norms are social affordances

Normativity is an embodied and situated skill. Norms are dynamic and negotiable, and are understood in practice by engaging with others. “Norms are context-dependent and negotiable, i.e., in constant change both ...as a function of interactions taking place within the practices with which they are associated, and over time as a function of the patterns of social interaction that constitute normative behaviour.” (22 p.8)

Norms regulate interaction between and among agents and groups of agents; they are implicit and assumed in sociocultural practices which means that they are not obvious to people who are new to such practices. “Norms can be modelled as dynamic affordances, understood as relations among members of social groups and their shared environment. Embodied and situated understanding of normativity is the capacity of agents in the concrete context of a niche to adapt to and directly understand, in social interaction, what behaviour is normative” (22 p. 10).

Understanding the norms of behaviour and performance in a particular social practice is something that all newcomers to a domain of practice must master. As the novice engages with particular aspects of their social and material environment, so his or her performance is subject to normative assessment as better or worse, as more or less correct given the specific demands of the situation (1 p.332). The notion of normativity that we take to be applicable to a skilled individual’s engagement with affordances comes from the individual’s ability to distinguish correct from incorrect, better from worse, optimal from suboptimal, or adequate from inadequate activities in a specific, concrete material setting. Rietveld (23) calls this ‘situated normativity’ because it is the concrete situation, broadly understood, that makes an individual’s performance in an activity, adequate or not. The adequacy of some activity does depend in part on agreement with what the members of a sociocultural practice do. However, social-cultural practices are dynamic, the patterns of behaviour that are found within a practice in turn derive from the continuous adjustment and adaptation of behaviour to the affordances of things as they are found in concrete material settings (1 p.334).

Normativity, creativity and affordance

Judgements of what a group of peers deem to be normative when viewing an individual's skilled engagement with affordances, influences not only criticisms of practice and the outcomes that are below the norm but also judgements on what is deemed to be practice and outcomes that exceed normative expectations. In such circumstances individuals may be considered 'creative.'

The perception and discovery of affordances is a process in which the body actively explores the possibilities in their environment for a particular purpose (1). Through the process of intentional (purpose-driven) inquiry and exploration of their environment the skilled person discovers and makes use of the affordances they find. Many of these will be what might be termed conventional affordances that others would also find and make use of, if they were motivated by similar purposes and intentions and had similar skills. But sometimes a person with a particular mind and skillset may and discover and act upon what might, from a normative perspective, be considered unconventional (24,25). Indeed, Withagen and van der Kamp offer a definition of *creativity as 'the discovery and creation of unconventional affordances (action possibilities) of objects and materials'* (25 p.1).

We might ask ourselves, when does this process of searching for unconventional affordances begin in the history of a person as they develop the perceptual awareness and skills to recognise and work with a particular affordance in their environment in ways that others cannot or choose not to. Lässig (26) provides useful evidence here. In developing a grounded theory of 16 and 17 year old adolescents' creativity Lässig she identified a core category which she labelled *perceiving and pursuing novelty: not the norm*, which connected the main categories of her research findings, including the Sub-Processes of Creativity and strategies for Managing Constraints and Challenges, Approaches to Creativity, Types of Creativity, and Contexts for Creativity. Perceiving and pursuing novelty involves having and enacting ideas, harnessing particular dispositional qualities, using particular processes and activities and achieving outcomes that are not the norm compared to what other do or have accomplished. It stands to reason that in order to perceive novelty a person must first appreciate what is normative in their social practices and the outcomes from such practices in the environment in which they are enacted.

Why we chose/select one affordance rather than another

The realisation that the normative standards are involved when judging a person's engagement with affordances to assess their performance as better or worse come from practices or customs belonging to a form of life, led Rietveld and Kiverstein to refine further their concept of affordances. *Affordances are relations between aspects of a material environment and abilities available in a form of life* (1 p335). In their concept of a form of life they make the distinction between a) the form of life and the patterns of behaviour that make it up (a form of life in which individuals have the potential to engage with affordances skilfully); and b) a particular individual's actual skilled engagement with an affordance within a particular form of life. Thus, the variety of abilities within a form of life means that what shows up as an affordance for one skilled agent may not do so for another agent belonging to the same form of life but lacking the relevant ability and perceptual awareness. They pose the question, '*What makes it the case then that a skilled individual is solicited by one affordance rather than another in a way that fits with the individual's concerns on a given occasion?*' (1 p.340).

Experts working in particular situations, problems and circumstances bring all their capabilities with them as they encounter an environment overflowing with affordances. In attending to this resource-full environment they identify and attend to particular affordances from those that are relevant to their interests, preferences, and needs (which we might collectively term "concerns"). They do not need to select reflectively from the possible actions they can perform, the specific sequence of actions that is adequate to the specific situation. They perceive what action the specific situation

demands. More generally, as an individual acquires a skill, he or she becomes increasingly able to adjust his or her actions to the specific demands of a given situation. What the skilled person learns to do through the experience of trying to do something feeds back into the way the meaningful world appears to them (1 p.341) and to their self-theories of how their world works. The distinction between affordances and solicitations is important because from the multitude of affordances available to us in a particular place at a particular moment, most will be irrelevant. The affordances we are drawn to act upon are the ones that are most relevant to our concerns.

Rietveld and Kiverstein (1) suggest that it is our current abilities and concerns that make it the case that we are solicited by one affordance rather than another. Moreover, once we have available the notion of a solicitation, we can also recognize *how sometimes the world can motivate us to act in certain ways*. When we experience a particular tendency or impulse to act in a certain way, this is because we have been solicited by one of the many possibilities for action available in our situation and our concerns, senses and meaning making have been engaged by it.

Dings asks (27), how do we experience an affordance? agreeing with Rietveld and Kiverstein that whether an affordance solicits action or not depends on its relevance to the agent's concerns. He also suggests that the experiential character of how an affordance solicits action depends on the character of the concern to which it is relevant. Concerns were conceived of as bodily forms as responsiveness, and solicitations are taken to be experienced through this responsiveness. Hence, it was argued that an understanding of experiential differences in solicitations has to be based on a phenomenological appreciation of how we experience our responsiveness to those solicitations.

“in order to gain a full understanding of the experiential differences in how affordances may solicit action, we need to take into account all of the ways in which things can appear significant to us, which implies incorporating as many different concerns as possible, that is, to account for the full complexity of ‘who we are’. As a result, affordances have a much broader self-referential character. An important consequence of this broadening of self-referentiality is that it does justice to the dynamics of an agents responsiveness profile, because it allows us to include the reflective capacities of human beings, such as their narrative deliberations, which is an important variable of understanding human-world-interaction” (27 p. 17).

Affordance in Dewey's interactive model of creativity and the contexts in which creativity emerges

The American philosopher, educator, and social critic John Dewey suggested that acts of creativity are driven by an 'impulse,' 'a sudden strong and unreflective urge or desire to act'. An impulse is an emotional response to a concern that is sufficiently strong as to motivate us to do something. In the light of the discussion above we might connect the idea of impulse to the recognition of affordance(s) that connects deeply to an individual's concerns in a dynamic situation. In this way, the concern is both an opportunity and a stimulus for action – an affordance that solicits and provides a motivational force.

Dewey believed that action and creativity are brought together through human experience, defined precisely by the interaction between a person and their environment: “When we experience something, we act upon it, we do something with it; then we suffer or undergo the consequences. We do something to the thing and then it does something to us in return”(28 p.46). Dewey developed his argument into a model to describe what happens when a person interacts with their environment to create new value. This model is described by Glaveanu et al (29) below and summarised in Figure 1.

Figure 1 Summary of Dewey's model of human experience within which human creativity emerges. Adapted from (29) and using Ingold's concept of environment (8)



“For Dewey, what brings action and creativity together is human experience, defined precisely by the interaction between person and environment and intrinsically related to human activity in and with the world. ...Action starts....with an impulsion and is directed toward fulfilment. In order for action to constitute experience though, obstacles or constraints are needed. Faced with these challenges, the person experiences emotion and gains awareness (of self, of the aim, and path of action). Most importantly, action is structured as a continuous cycle of “doing” (actions directed at the environment) and “undergoing” (taking in the reaction of the environment). Undergoing always precedes doing and, at the same time, is continued by it. It is through these interconnected processes that action can be taken forward and become a “full” experience.” (29 p2-3)

Rogers captures the ecological dynamics of how an individual’s creativity emerges as they recognise and work with the affordances they choose to act upon in both normative and non-normative ways as they engage with their concerns and interact with their environment. In his view a process involving creativity is “the emergence in action of a novel relational product growing out of the uniqueness of the individual on the one hand, and the materials, events, or circumstances of their life” (30 p.350). This is a situated concept of creativity in which an individual’s agency is stimulated or inspired by the affordances (directly perceived or imagined opportunities for action) they discover as they try to achieve something they value that relates to their concerns in particular contexts and situations in their particular environment. Indeed, Rietveld and Kiverstein define context ‘as the rich landscape of affordances in which skilful action unfolds’ (1 p.346).

My recent example of discovering affordances in the landscape

Feelings and impulses to act, triggered by our presence in our environment and our circumstances are important when it comes to creativity which we might view as one of our concerns. These relationships recently come together for me during an early spring holiday with my wife in the highlands and islands of western Scotland where the land- and sea-scapes are quite stunning. Not surprising for the time of year (early March) the weather was mixed but in wandering through the unfolding landscapes and vistas I felt an impulse to leave my mark. I began to look at the landscape differently, rather than taking in the spectacular vistas I searched for ways in which I could leave a mark. Driving past one boulder strewn beach on the island of Arran, the idea of building a tower of small boulders struck me so we stopped the car and I went onto the beach with the specific intention of making a small tower. I spent time searching for stones that I could stack and I took care in balancing the stones until I thought I had reached a point where I was happy with the structure and adding more stones would not have enhanced my sense of achievement. I then spent a while photographing my tower and its surroundings discovering good angles to capture good images. For the next six days I repeated this process in a different location.

The six rock towers I constructed in the Scottish landscape



I was once practised as a geologist so it was natural for me to identify the types of rocks I was using in my tower and to think about the geology of the landscape in which I was ‘working’. Furthermore, I had recently looked at a geological map of the island so I knew roughly what to expect in the rocks I was using to make my tower and the landscape around me. I recognise that I was utilising what might be termed specialist knowledge in thinking about the landscape and materials I was using but this added to the meaning of what I was doing and it seemed natural to ascribe geological meaning to my structures. I decided these ‘mini monuments’ honoured the geology of the particular landscapes I had chosen from all the other landscapes that were available to me.

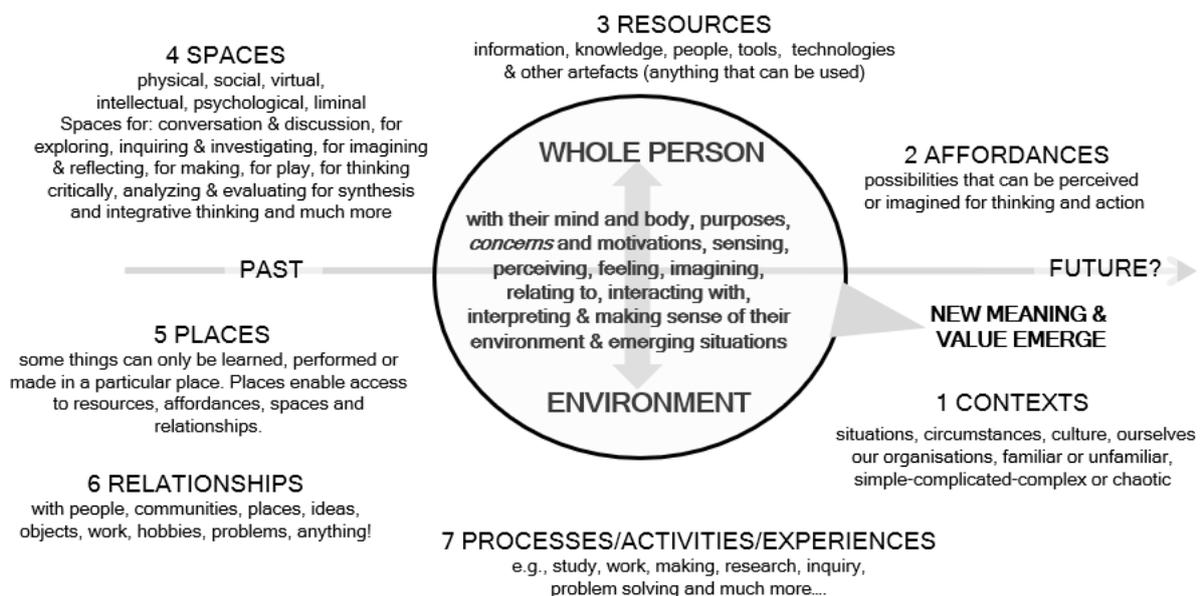
In building of the towers I created an artefact that was both transient in the landscape (they will fall or be knocked down fairly quickly), and transient in my experience (for the few moments I was involved in making them). By photographing and filming them (affordance in the technologies of my mobile phone) I was creating further artefacts that sustained the presence of the rock towers (albeit in a different medium). I could have left it there happy in the knowledge that I could see my towers whenever I wanted to. However, such is the impulse to create, I decided to preserve the memory of my experience and the things I had made by weaving the scenes I had photographed or filmed into a short movie - using windows movie maker (technological affordance). I often make such movies of my garden so I was familiar with the technique (I could act on the technological affordance). While I was making my movie I searched on YouTube (further technological affordance that I could access and make use of) and found some beautiful Celtic uilleann pipe music to accompany the scenes in my movie and create a richer experience and deeper emotional engagement with the images. I then uploaded my movie to YouTube (affordance for sharing my creation) and shared it with family and friends. When we care about something sufficiently to want to act, we search for and discover affordances in our environment that will enable us to act with 'skilled intentionality': *a practitioner situated in a landscape of affordances, selects and responds in a purposeful and skilful way to a field of relevant affordances* (19). In acting upon our concerns through the affordances we discover we are maintaining and developing our core beliefs and identities – of which creativity is an important part. On reflection, I think my act of tower building was embedded in my everlasting geological identity.

Applying these ideas about affordance to an ecology for learning and practice

‘organism plus environment’ should denote not a compound of two things, but one indivisible totality” (8 p.19), “this totality is not a bounded entity but a process in real time: a process, that is, of growth or development” (8 p.20).

The goal for an ecology for learning and practice is to reveal how this ‘indivisible totality’ is accomplished. An ecological view of learning and practice requires a model to show how the abstract idea of an ecology for learning and practice, is being used in a specific case. Models are necessary to translate any general concept into usable tools so that the parts, interactions, activities, and scope of the system of interest can be specified and understood (31). Figure 2 offers one model of an ecology for learning and practice (3,4). The heuristic relates a whole thinking, feeling, acting, caring person with needs, desires, interests and purposes (i.e. their concerns) to the contexts and situations they are immersed in.

Figure 2 Heuristic to describe the characteristics of an ecology for learning and practice (3,4,5)



When someone encounters a new situation, problem, challenge or opportunity, they use their senses and mind to perceive and comprehend the situation and act in ways that are appropriate for the context. Effectively, they create and inhabit an ecology that enables them to perceive, comprehend and interact with their environment in order to accomplish the things that matter to them, and learning and achievement emerge from this process. In this way the person with their concerns, their environment and the affordances in it are related. The ecology unifies the embodied cognition of the person, thinking and acting up on their concerns, with the environment that provides them with the opportunities to do what they have to do.

Ecologies for learning and practice enable the maker to create new spaces, places, resources, contexts, situations, relationships, activities and to modify themselves in ways that they find meaningful, and through which they can effect transformations (personal, social-cultural, material and virtual). They enable the maker to connect and integrate past and present experiences and imagined futures, and connect thoughts and actions experienced in a moment and organise them into more significant experiences of thinking and action through which new patterns of

understanding emerge. They are the means by which the maker weaves their moments into the fabric of a meaningful life: a life they feel is worth living.

The components of an ecology for learning (Figure 2) are woven together by the maker in a part deliberate, part opportunistic act of trying to achieve something and learning in the process. They do not stand in isolation: they can and do connect, interfere and become incorporated into other learning ecologies. An ecology for learning and practice enables the maker to think and act in an ecological (connected, relational and integrated) way, to perceive (observe, sense and comprehend the information flows), to imagine (conceptualise and modify what has been observed in order to create possible meanings and new interpretations), to reason (analyse and critically evaluate observations and make judgements), to reflect on what has been seen and experienced to make better sense of it and learn from the experience.

The heuristic signals that affordance is an essential component of the substance and dynamic of an ecology for learning and practice (Figure 2) but the richer concept of affordances developed by Rietveld and Julian Kiverstein (1) suggests that such an ecology is both the means of recognising, accessing and utilising affordance and of creating new affordance in order to learn and practise.

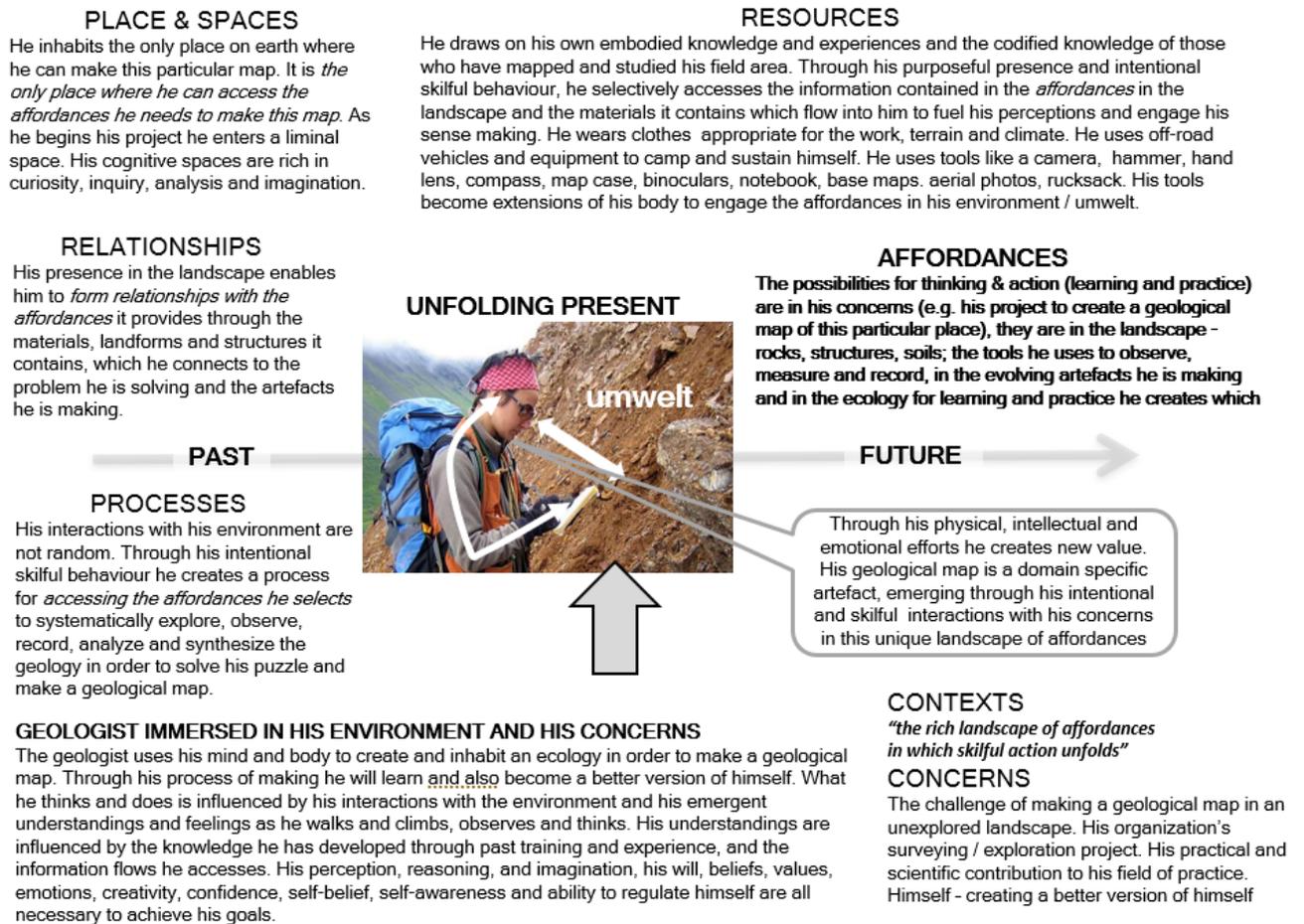
Affordance is both a property of the environment in which the creator of an ecology for learning and practice is situated and attending to, and with an evolving awareness with imaginative potential in the mind of the creator as they engage with the affordances as situations unfold (33). As Rietveld and Kiverstein show the affordances an individual discovers and utilises as they engage in their work are deeply connected to their *concerns* and related *dispositions* and their *capabilities*, i.e. what individual persons care enough about to want to act upon and what they bring to situations that enable them to think, interact and perform in ways that are more likely to enable them to accomplish the things they value (32). What individuals bring to situations are skills, knowledge, experience, understanding, imagination, self-belief and energy that derives from their will to engage, perform and accomplish something that they value. In fact we might view the whole ecology for learning and practice as a time-and space-bounded, self-created multidimensional affordance to enable a person to engage with their concerns using the capabilities they have in order to achieve something of value that relates to their concerns. In fact, 'concerns' (the things that people care enough about to want to do something to address them) are themselves a type of motivational affordance.

The idea of 'skilled intentionality' whereby a knowledgeable and skilful practitioner situated in a landscape of affordances, selects and responds in a purposeful, integrated and meaning finding way to a field of relevant affordances (19), is consistent with the model of an ecology for learning and practice. For example, Figure 3 provides a snapshot of an unfolding ecology of practice, in which learning is a significant project, created by a geologist making a geological map. A geological map can only be produced in that particular place. The geologist must immerse himself in a landscape of affordances. Every rock surface he can see and access is an affordance for learning but from this infinite number of opportunities he must select a much smaller number of exposures to study. The nature of his expertise (skilfulness) is in the strategy he



develops and implements for accessing, observing, measuring and recording in an effective and efficient way to enable his map and report to be constructed (his intentional skilfulness). To achieve this goal he creates an ecology for learning and practice (Figure 3). Each of the components of the heuristic are annotated to reveal the affordances that are being recognised, accessed, utilised and created as the performance unfolds (see reference 5 for a full description).

Figure 3 A field geologist's ecology for learning and practice for making a geological map (5)



Such a representation reveals that more or less everything that is identified in this ecology can be construed as an affordance or potential affordance. For example, Rietveld and Kiverstein define context 'as the rich landscape of affordances in which skilful action unfolds' (1 p. 346). Affordance is a resource to be worked with but everything that is considered to be a resource in an ecology for learning and practice affords action be it thinking – new ideas and understanding or the stimulation of new imaginings or direct action in the form of doing something and learning from the experience.

Physical spaces and places afford the opportunity for action to everyone who engages in particular 'ways and forms of life'. Indeed, some forms of action can only be undertaken in a particular place i.e. they provide the rich landscape of affordances in which skilful action unfolds. The football field as an environment in which the social-cultural practice of football is played as a sport is a complex aspect of the landscape of affordances, but it is also a field of relevant affordances for the players taking part in the match (20 p.11). It is the field of relevant affordances that motivated and skilful players access and utilise as they read the game and spot new affordance in transient situations as the game unfolds.

As for the spaces of the mind, within an ecology for learning and practice, the creator develops new spaces within which mental process of inquiry, analysis and synthesis can be undertaken and new things can be imagined. Such cognitive spaces create affordance for learning as they relate to and interact with the opportunities for action in the outer world. All ecologies for learning and practice where complexity is involved contain liminal spaces of uncertainty and perplexity and the need to understand is an important driver for actions that contain possibilities for learning. The ecology for learning is the means by which a person is able to discover and utilise the affordances for learning in a particular environment, context and situation.

An ecology for learning and practice is full of relationships e.g. between the creator and their concerns, emotions, people, ideas and other resources, places and spaces and their practices as they are lived and experienced in the unfolding processes and activities. Such relationships, processes and activities in themselves contain affordance for learning and other actions relating to practice.

The place of affordance within an ecology for learning and practice

The implications of this exploration of affordance, inspired by Rietveld and Kiverstein's rich landscape of affordances, is that an ecology for learning and practice is the means by which a person, with concerns (e.g. interests, problems, projects, ambitions,) attends to their environment in order to learn, perform, achieve – including acts of creation. It is the dynamic process by which a person recognises, engages, utilises and weaves together in a skilful, meaningful way, a multitude of affordances in their external and internal environments, in order to learn, act and accomplish things that are relevant and valuable to their concerns. The motivational force to act stems from their concerns which are themselves a type of affordance. The ecology they create to address these concerns is itself a transient, complex and dynamic affordance for learning and practising relating to the concerns that are being attended to.

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