A semiotic and design-oriented approach to affordance

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Drawing a dinosaur

A three-year-old boy is working on a drawing of a dinosaur (see Figure 3.1). The drawing is made with thick felt-tip pens on white paper. He invests his interest, knowledge, and skills as he shapes the various details that he sees as significant for the type of creature he intends to represent. At the time the typical back plates (scutes)—which he refers to as “the zigzag”—are important details to him. While the title of his drawing, “The coolest dinosaur in the world,” does not give any specific details on the type of dinosaur portrayed, these scutes suggest a stegosaurus-like animal. The shape and angle of the body, the four legs, and the size of the head, in comparison with the rest of the body, all point in the same direction.

Figure 3.1 Drawing titled “The coolest dinosaur in the world.”

Source: Photographed by Fredrik Lindstrand

Since dinosaurs were of great interest to him and as he liked to draw, he produced many drawings on the topic during this period. The drawings were made with a number of different technologies for inscription (see Kress & van Leeuwen, 2001), including crayons, felt-tip pens, paint, and watercolour. However, despite this range of technologies, his drawings from this time strongly resemble each other thematically, aesthetically, and in terms of how he talked about them. Then, ten months later, a change occurred from one drawing to the next. The image below (Figure 3.2) was the first of a new way of representing dinosaurs visually. This was also accompanied by a new way of talking about the drawings. The boy (now four years old) describes the depicted situation in the following way: “It’s a Triceratops attacking a Tyrannosaurus rex (!)” The exclamation mark in parentheses is there to indicate that there is something unusual and even humorous about the situation he has presented, which he indicates by smiling, lifting his shoulders a little, and raising his eyebrows while describing it.

In contrast to the previous drawing, this image represents two visually and verbally specified types of dinosaurs. The visual specification is based on some of their characteristic features such as posture, the shape of their heads, and the short arms of the T-Rex. The two dinosaurs are also set in a situation where they interact with each other, as signified by how they are placed in relation to each other and through their eye contact. This contributes to construing a social and socially dynamic scene. The visual representation of this dynamic is based on the difference in size between the two, the fact that the T-Rex is bipedal, and that it has larger and sharper teeth. The humorous aspect of the situation, apart from the differences between the two already mentioned, is

Figure 3.2 Drawing titled “Triceratops attacks Tyrannosaurus rex (!)”

Source: Photographed by Fredrik Lindstrand

based on the boy's knowledge of the fact that the Triceratops was a peaceful herbivore, while the T-Rex was a carnivore that has often been represented as an aggressive monster. The thought of a peaceful vegetarian attacking a larger predator may indeed be seen as humorous.

Apart from the knowledge represented in the different types of dinosaurs and their relationships, we can also note differences in terms of how the drawing is constructed. It is more detailed than previous drawings, and the details are clearer and more specific. The boy has also worked from a certain perspective, but has still managed to capture the characteristics of the dinosaurs, such as the horns on the head of the Triceratops. We can also note the addition of a stylistic ingredient in the way the tails are curled.

The differences between these two representations (Figures 3.1 and 3.2) could be said to indicate that a learning process has occurred during the time that had passed between the two drawings, involving dinosaurs and drawing (among other things). However, there is also another aspect to consider regarding the difference between these two knowledge representations: The change in drawing occurred immediately after the boy was allowed to use a fine-tipped pen intended for professional drawing for the first time. The resources available for drawing thus had an important impact in terms of what knowledge could be represented and how. Different resources positioned the boy differently in relation to the subject matter, with effects on what he could draw and, in turn, what seemed possible to talk about. This points to the importance of considering the role of resources, both in Designs For Learning and in research about learning and education.

A focus on resources

Needless to say, the use of resources for various purposes is a constantly recurring feature in all kinds of processes. For researchers within the fields of education, design, and communication (to name but a few) this has become an important aspect to deal with analytically (cf. Laurillard et al., 2000; Norman, 1988). In similar ways it is important for teachers to have analytical tools for considering what the different resources could contribute in their Designs For Learning. What learners use as resources in their productive work to make meaning, and how these resources are used, also give an indication of how they (the learners) orient themselves in relation to a subject area, how they interpret the social context of their education, and so on, providing valuable insights for teachers who wish to understand their students' learning endeavours.

For us, as researchers within the Designs for Learning (DFL) perspective, the notion of *affordance* helps us to investigate various aspects regarding how resources are brought into play in situated meaning-making. Some of the questions that guide us are: What becomes a resource in a specific situation, to whom, how, with what social and epistemological consequences, and why? Relating to what was presented as *cultures of recognition* in Chapter 1 by Selander

in this volume, we also ask what resources are *recognized* as valid within these situations. Our interest here is, in other words, directed towards questions about resources in relation to materiality, meaning-making, agency, and power in education, learning, and meaning-making.

The aim of this chapter is to introduce the notion of affordance as it is interpreted and applied within the DFL perspective, and to show how it is productive in the analysis of situations of learning and meaning-making in various contexts. In order to make the idea of resources and their affordances as widely applicable as possible for readers from different fields and practices, my examples stem from a number of different contexts out of school. Other chapters in this book will touch more directly upon the use of resources in educational settings.

Affordance

The notion of affordances was originally introduced by James J. Gibson as part of his theory on the ecology of visual perception (e.g., Gibson, 1950, 1966, 1977, 1979). With an interest in “agent-situation interaction,” Gibson used the concept to grasp “all action possibilities latent in an environment, where the potential uses of a given object arise from its perceivable properties and always in relation to the actor’s capabilities and interests” (MODE, 2012).

What the environment offers

In Gibson’s own words the “*affordances* of the environment are what it *offers* the animal, what it *provides* or *furnishes*, either for good or ill” (Gibson, 1979, p. 127). In this sense—as with resources in general—there is no inherent or general value embedded in the term, as it does not say anything about the means for which it is used or the consequences of its use. It merely concludes that a certain aspect of our environment, due to its layout, lends itself to certain actions. Within the DFL perspective the notion of “environment” is extended to encompass all aspects that are part of a certain context.

The following example, which stems from a previous research project focusing on the museum as a site for learning and communication (cf. Diamantopoulou et al., 2012; Lindstrand & Insulander, 2012), illustrates the aforementioned aspect of resources and their affordances.¹ In the project we used a number of methodological approaches to investigate visitors’ meaning-making in relation to three exhibitions, in Stockholm and London. One approach was to use cameras and invite visitors to take photographs of whatever they wanted to document during their engagement with the exhibition. Afterwards we used the photographs as material for discussion, in a form of photo elicitation. Apart from allowing the user to take photographs without having to make any adjustments in terms of shutter speed, aperture, and so on, the digital camera also allowed the user to scroll between the images shown on the display.

The scrolling function worked in a circular way, as the last picture taken was followed by the first and vice versa, depending on whether the user scrolled backwards or forwards among the images. Many things could of course be said about affordances in relation to the various functions of the camera, but here I want to focus on one occasion when a participant's interaction with the scrolling function contributed to a specific meaning being made. The participant showed each image as they appeared when he scrolled, and accompanied each image with detailed verbal descriptions of what the image depicted, why he took the image, how his trajectory through the exhibition progressed, and so on. When he came to the end he realized that the scrolling function was circular and that he had scrolled his way backwards through the entire exhibition. He had made up his account of the progression through the exhibition—construed as a meaningful account of his experiences performatively and instantly in relation to the images that were screened, instead of retelling how he had actually interacted with the exhibition. In that sense, the scrolling function—as one aspect of the media specificity of the camera—had tricked him into another form of meaning-making than we had planned for. Again, “*affordances* of the environment are what it *offers* the animal, what it *provides* or *furnishes*, either for good or ill” (Gibson, 1979, p. 127). The example also indicates how resources and their affordances can play a part in framing and structuring our understanding of a subject area.

Affordance as a relational notion

To hold on to the quote from Gibson a little longer, central to the idea of affordance is that various aspects of the surrounding world lend themselves to certain actions. In the example above, the possibility to scroll between the images enables the user to find, view, and share a specific image, or to access images one by one in a certain order. However, even though most digital cameras provide a similar function, this affordance is not commonly available and attainable for all living creatures. Gibson (1979) explains that affordances:

have to be measured *relative to the animal*. They are unique for that animal. They are not just abstract physical properties. They have unity relative to the posture and behavior of the animal being considered. So an affordance cannot be measured as we measure in physics.

(pp. 127–128)

In this sense, affordances can be seen as pointing towards a specific and unique relationship between a being and its surroundings, based on how they both are constituted. The specific affordances of the camera referred to above relies on a user with a specific constitution—for example, a finger (or equivalent) of a certain size that can be used for pushing buttons and scrolling. The notion is thus relational, building on the specific dyad between the actual interactants.

Agency and acts of distinction

In order to become resources for action, the potential qualities of the environment also need to be recognized by the agent *as* a potential for a certain action. Since recognition is an action where the agent perceives, interprets, and makes distinctions, affordances enable—and are the result of—actions. This act of making distinctions relies on the perceivable properties of the object and the agent's capabilities and interests in the situation. In line with the unique character of the relationship between a being and its surroundings, we observe differently and thus recognize different properties of the environment as possible resources. As van Leeuwen (2005) notes:

different observers might notice different affordances, depending on their needs and interests and on the specifics of the situation at hand. Perception is selective. And yet the other affordances are objectively there. Thus the meanings we find in the world, says Gibson, are both objective and subjective.

(pp. 4–5)

This is interesting from a learning perspective, since what a person recognizes as possible resources in a specific situation also says something about how that person orients herself/himself in the world and understands the issue being dealt with. These acts of making distinctions tell us something about the social and material circumstances of the interaction (the specifics of the situation at hand in the quote above). What is possible to distinguish depends on these contextual aspects, as the properties of our surroundings appear differently under different circumstances. Materially, the availability of light, for example, may have an influence on what is possible to distinguish as a resource for a certain purpose. Socially these actions point towards the social framing of the situation—what is possible to distinguish as a resource from the social position one has in a certain context. To exemplify the latter, we could think of the types of metaphors drawn on (or not drawn on) by students in their accounts of a phenomenon of some kind in class. In the process of choosing a metaphor to explain the phenomenon, some metaphors will probably seem more apt than others (for various reasons). The ones chosen may, for example, appear to be more precise in relation to some aspects of the phenomenon. There may also be other possible, and even more precise, metaphors that are not even considered. The reasons could be that they are too far away from the knowledge domain in focus, or too closely related to the students' personal realms, for example. The line between the possible and the impossible is, in this case, based on the individual's interpretation of what is appropriate or correct within the social and epistemological context of the classroom. Even if a possible resource could be perceived, we may not be able to recognize it *as* a possible resource due to how we are positioned socially in a certain situation. In other

words, affordances manifest the unique relationship between an agent and its surroundings under specific contextual circumstances.

Methodologically, this calls for an approach that considers affordances *in situ*, rather than merely theoretically ascribing them to something based on the properties that *could* enable action in one form or another. As Gibson (1979, p. 129) observes: “[a]n affordance points both ways, to the environment and to the observer.”

Semiotic potential and meaning potential

Theo van Leeuwen (2005) relates affordance to another notion, *semiotic potential* (originally from Voloshinov and later elaborated by Hodge & Kress, 1988, as part of their social semiotic perspective). van Leeuwen (2005) explains that semiotic resources (i.e., resources for communication and meaning-making)

have a *theoretical* semiotic potential constituted by all their past uses and all their potential uses and an *actual* semiotic potential constituted by those past uses that are known to and considered relevant by the users of the resource and by such potential uses as might be uncovered by the users on the basis of their specific needs and interests.

(p. 4)

Similar to the semiotic potentials mentioned in this quote, the notion of affordance also includes both the theoretical (the possible) potentials and the potentials that are actually brought into action. Some researchers who use the notion of affordance focus, more or less, on the theoretical affordances of, for example, certain educational technologies (cf. Kirschner et al., 2004). A manifestation of this approach is seen in the endeavour to establish taxonomies of affordances, as exemplified by Conole and Dyke (2004) who suggest a taxonomy of information and communication technology (ICT) affordances based on the aspects they see digital media contributing to in an educational context. There is a value in mapping theoretical possibilities and hindrances in a certain design, in order to see which of those possibilities users *activate* in their work. However, a potential problem with this type of approach is that it treats affordances as something provided by the environment regardless of whom is interacting with it. The *activation part* is missing, so to speak, with the consequence that the agency of learners is at risk of being left out. This, in turn, could affect the validity of the research since affordances other than those foreseen in a theoretical mapping may appear as a result of learners’ performative work. While all possible affordances that *could* be activated in interaction with all possible agents could be included in the *theoretical* affordances of a certain object, it is often more interesting to look at the *actual* affordances that are manifested in actual encounters.

Instead of this division between theoretical and actual affordances, the former may perhaps be substituted with the term *meaning potential* from Halliday's sociolinguistic theory (Halliday, 1994). Theo van Leeuwen (2005) explains that

the term 'meaning potential' focuses on meanings that have already been introduced into society, whether explicitly recognized or not, whereas 'affordance' also brings in meanings that have not yet been recognized, that lie, as it were, latent in the object, waiting to be discovered.

(pp. 4–5)

A combination of the two notions, *affordance* and *meaning potential*, contribute to the possibility of grasping the social dynamics of meaning-making. The difference between the two notions can be discerned in the following example from a preschool in the Swedish countryside.

Parents had engaged in building an outdoor environment for their children, based on their assumptions about what children like to do and play with outdoors. One of the things they built for their children was a modified shooting tower, which is a very common thing in the neighbouring forests and a symbol for the locally esteemed elk hunt (see Figure 3.3). This can be understood as the meaning potential of this building: It was built as a resource for playing elk hunting at the preschool, based on the idea that elk hunting is something interesting for children. However, once the children occupied the building it was transformed into something completely different: an outdoor

Figure 3.3 Shooting tower/outdoor kitchen.

Source: Photographed by Fredrik Lindstrand

kitchen. They found other affordances based on their needs, interests, and perceptions. The children's interpretation and transformation of the building shows how agency is put to work.

Affordance here becomes more closely related to the specific and situated actions of the children who engage in meaningful ways as they transform the shooting tower into something that corresponds more closely to their own interests. In my interpretation, the value of identifying affordances in learners' recognition of resources, while engaging with aspects of the world, is also part of Gibson's original account above, regarding affordances as indexical of a specific and unique relationship between a being and its surroundings, based on how they both are constituted.

Beyond things: semiotic and modal affordances

Mentioning *semiotic potential* and *meaning* in my references to van Leeuwen (2005) above hints at an expansion of the reach of the term affordance, from the observable surroundings of an animal towards the somewhat more abstract qualities of the social world. This has also been commented upon by some researchers who have expressed reluctance to accept what they see as stretching Gibson's original notion too far (cf. Oliver, 2005). Thus, we need to deal with the question of what we can apply the term to.

Looking at some of the scholars who have used the notion of affordance in their research, there has been a tendency to focus on material objects and their properties (cf. Norman, 1988; Solomon, 1993). In Norman's (1988) interpretation, for example, affordance "refers to the perceived and actual properties of the thing, primarily those fundamental properties that determine just how the thing could possibly be used" (p. 9). While Gibson (1979) speaks specifically of surfaces and objects, other people (which he places within the category "detached objects") are described as providing the richest and most elaborate affordances of the environment:

The other animals afford, above all, a rich and complex set of interactions, sexual, predatory, nurturing, fighting, playing, cooperating, and communicating. What other persons afford, comprises the whole realm of social significance for human beings.

(p. 128)

By opening the door to interactions with other human beings and to the realm of social significance that they both construe and are governed by, what van Leeuwen (2005) refers to as "semiotic resources" are already included in Gibson's approach. People, the bonds between people, and the ways in which people do things to, with, and for each other are thus included in the original account of affordances. The means for doing these things can be regarded as resources. Within the frame of a broader notion of

text, all cultural artefacts (i.e., “things”) can be regarded as text. Similarly, all texts can be approached as cultural artefacts and, as such, they have a specific materiality and material properties that, in an agent’s interaction with them, can be regarded as affordances—enabling social and transformative action (cf. Björkvall & Karlsson, 2011; Ledin & Machin, 2018; Mosbæk Johannessen & van Leeuwen, 2018).

As explained in Chapter 1 by Selander in this volume, DFL builds closely upon multimodal social semiotics in a number of important ways. For example, it starts with similar assumptions about communication as processes of motivated sign-making, guided by the sign-maker’s interests in a given situation, and dependent on the available resources (material, modal, cognitive, and so on). Consequently, our approach to affordance stems most directly from the work of Gunther Kress (cf. Bezemer & Kress, 2016; Kress, 2010) and Theo van Leeuwen (2005), who broadened the notion to encompass modal and semiotic affordances, and thus attend to how various modes (and the combination of modes) lend themselves to action in the form of meaning-making (see also Machin, 2016).

Kress (cf. 2010) also uses the term *epistemological commitments* (borrowed from Jon Ogborn²) in order to point out that, due to the logics of how different modes operate (e.g., composition in image and syntax in language), they lend themselves differently to us when we use them in meaning-making processes. Due to their different ways of operating, different modes provide different kinds of access to the world as they construe the world differently when used in representations. Semiotic resources are the social and cultural tools we use for communicating and making meaning. According to Bezemer and Kress (2016):

The history of semiotic use of a specific materiality produces *semiotic affordances*: what a sign-maker does is shaped by what other sign-makers have done before her or him, in response to similar social and semiotic needs. That prior, socially shaped, semiotic work produces socially organized sets of (material and conceptual) semiotic resources, making distinct semiotic organizational entities for meaning-making available to individual sign-makers. As with material affordances, semiotic affordances are *changeable* and *changing*: sign-makers constantly expand and transform modes and their resources by making new signs.

(p. 31)

As mentioned above, there is a strong connection between affordance and agency, in the sense that affordances both are the result of, and enable, actions. Since they are not fixed, but point towards both the agent and the environment, affordances are also in constant flux. As Bezemer and Kress (2016) point out:

Semiotic affordances are not only shaped by a social history; they are also constantly re-shaped by and in a social present of use, and furthermore

they shape new sign-making. The units and principles of arrangement that each mode provides offer sign-makers both *potentials* and *limitations*, as well as *prompts* to engage with and so to see the world in certain ways—that is, to see the world through a lens shaped in specific ways (elsewhere we refer to this as ‘epistemological commitment’; see Kress, 2010).

(p. 31)

By referring to the interactional aspects of affordance we bring attention to the fact that affordances are phenomena recognized as lending themselves to our actions. In that sense they become resources for us to *do* something specific—when we use a book as a tray for carrying a mug of coffee or as a racquet in a game of table tennis, or when we use images found online to explain something in a lecture. This act of distinction and recognition of what can be used as a resource for our specific intentions is also an action that points to creativity, interpretation, and learning. This is also what we refer to as (the verb) “to design” within the theoretical framework of DFL.

The social affordances of discourses

Starting from semiotic and modal affordances, the step to discourse seems logical. Similar to how different modes contribute with different takes on the world through their epistemological commitments, discourses frame knowledge in certain ways, and are articulated by means of semiotic resources. I use the term discourse here in the way Foucault (1969/1972) defined the notion, as “practices which form the objects of which they speak” (p. 49). This definition points towards the assumption that we take part in the construction of the (social) world through the ways we use semiotic and modal affordances in representations. In other words, discourse here refers to social aspects of communication and representation, in the sense that discourses affect things in the interactions between people by construing the world in a specific way. In doing so they position people in certain ways and with certain social consequences in terms of who is allowed to do what, and so on. This implies that there are always social—and ideological—aspects of representations, regardless of context. In this sense, design (here understood as the act of combining form and content) always has both epistemological and social consequences, since we cannot communicate and make representations outside of discourses (Foucault, 1969/1972). Discourses serve as resources for doing things socially—to perform social action. A certain discourse not only presupposes a certain epistemological frame but also shapes and frames representations in certain ways that affect how we understand a certain topic and, in that respect, discourses can be seen as resources for social action. As with other resources, they afford certain possibilities depending on the context and interest.

During a train journey I eavesdropped on a conversation between a two-year-old child and her mother. The journey was long, but the mother had

prepared a number of activities for herself and the child: They read books, watched films, made drawings, had snacks, looked at the landscape, and so on. Suddenly the atmosphere changed for a moment, as the mother raised her voice at the child: “But *Lisa*! Did you *swallow* the chewing gum?!” The girl didn’t seem affected by her mother’s tone at all, but answered calmly: “No, I *ate* it.”³

By choosing to use a discourse around eating that her parents (and others with more power than her) use as imperatives in situations where eating is on the agenda (e.g., “eat your vegetables!”), Lisa challenges both the way her mother positions her and how she defines the act of swallowing the chewing gum. She uses this specific discourse as a resource and in doing so she performs a social action, thus claiming agency. The discourse she introduces has social affordances that enable her to make a certain claim. In the same way, the discourse her mother uses has other affordances that do other things socially. Lisa’s response indicates an awareness of the social mechanisms of discourses.

Another level—institutions and their rituals

Before concluding this chapter, I would like to briefly mention that affordances can also be identified at other levels of analysis than the examples of meaning-making at a micro-level in this chapter have shown. I mentioned the contextual aspects in relation to how individuals’ actions of making distinctions also reflect social and material circumstances, but we could also look more directly at the institutions that shape the social and material conditions for learning. Whether we talk about institutions in daily life such as “the family,” or more elaborately and deliberately developed organizations such as “the school,” institutions frame certain events and relations in specific ways through rituals that fulfil certain purposes and maintain certain structures (cf. Douglas, 1986/2011; see also Insulander & Öhman, this volume). The organization of social life as manifested in institutions provides certain possibilities and restraints, depending on what is at stake and for whom. What I am trying to say is that the technologies for organizing social life within the frames of institutions could also be analyzed in terms of affordances, to see what they contribute (for good or ill), both in relation to learners and to the institution itself. We could, for example, ask how the timetable imposes social control by structuring the school day, in terms of what to focus on and when (lessons), and how pupils’ agency is distributed differently over time (e.g., lesson vs. recess). Similarly, viewed as a design for learning, we could ask how the specific combination of subjects included in the timetable and allocated in a certain pattern over the week has certain epistemological consequences. This view would also imply that the timetable is an articulation by the educational institution of what is seen as important for the children to learn.

Conclusion

To conclude this chapter, I would like to briefly summarize the various points about affordances made above. To begin, affordances have to do with materiality (in a broad sense, including the materiality of semiotic modes such as image, language, etc.) and how materials lend themselves to actions of various kinds. *How* they lend themselves to action depends on the qualities of these materials and how the materials are shaped and organized—how they are designed or brought in as elements in a design for a certain purpose. While affordances are action possibilities, for good or ill, latent in an environment, yet not commonly available to all living creatures, they appear in the meeting between a specific agent and its surroundings. What becomes an affordance and for whom is based on the constitution of both the environment and the agent, and the affordance can thus be seen as a manifestation of the unique relationship between an agent and its surroundings. In order to become resources for action, the potential qualities of the environment also need to be distinguished by the agent *as* a potential. This act of distinction relies on the perceivable properties of “the object” (again, in a broad sense) and the agent’s capabilities and interests in the situation. While enabling action, affordances are, in other words, also the result of actions. These actions of distinguishing are performed with agency, which also says something about the social framing (what is possible to distinguish as a resource from the social position one has in a certain context) and how the individual actor orients her/himself in the world. In other words, affordances manifest the unique relationship between an agent and its surroundings under specific contextual circumstances. In this sense, affordances can work as keyholes for observing how power structures are construed, for example, through the use of different discourses. Affordances make visible how agency is expressed through the activation of different resources and through the introduction of different discourses in negotiations. This points towards the social aspects of teaching, learning, and meaning-making. The resources available at a given point contribute to framing a knowledge area and what is possible to be represented in relation to this. Thereby, they also affect what can be distinguished as signs of learning/knowing.

Methodologically, the various aspects regarding affordances presented in this chapter lead me to suggest that investigations concerning resources and their affordances should be oriented towards meaning-making processes *in situ*, rather than theoretical mappings of potential affordances in situations of learning and meaning-making. Only then can the creative and agentic work of meaning-makers be made visible, and only then can the influence of social dynamics be presented.

The notion of affordance is valuable to a design-oriented perspective on learning, since it provides a way to grasp the qualities that resources of various kinds offer in learning (as well as other) situations. This is also typically why it

has been used extensively in research within the more general field of design—to say something about the possibilities and hindrances produced through certain ways of shaping something—as a means for mapping what a resource as a design (noun) contributes, or how it lends itself to certain modes of use. At the same time, and more importantly in relation to the DFL perspective, “affordance” also points towards the performative and transformative actions that *make them* resources in a specific situation. These transformative actions are what we refer to as the verb “to design.” We thereby emphasize that affordance is always related to the agent that interacts with it. As Gibson (1979) notes:

affordance[s] . . . have to be measured *relative to the animal*. They are unique for that animal. They are not just abstract physical properties. They have unity relative to the posture and behavior of the animal being considered. So an affordance cannot be measured as we measure in physics.
(pp. 127–128)

In relation to learning, this suggests a few different directions: aspects regarding the usefulness (and perils) of resources; *what* learners distinguish *as* a resource for something that is meaningful to them; and *how* it is made useful by them.

Notes

- 1 The studies mentioned were part of a larger research project, *The museum, the exhibition and the visitors. Meaning-making in a new arena for learning and communication*, funded by the Swedish Research Council 2007–2010.
- 2 Gunther Kress, personal communication, 2005.
- 3 This example is also described in Elm Fristorp and Lindstrand (2012).

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