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What every body knows: Embodied information in serious leisure

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What every body knows: Embodied information in serious leisure

Abstract

Purpose: The aim of this conceptual paper is to reconsider the role of the body in information in serious leisure by reviewing ~~the potential to theorise the role of the body in information behaviour within serious leisure by drawing on practice theory, phenomenology, sensory studies and embodied cognition~~existing work in information behaviour that theorises the role of the body, and by drawing selectively on literature from beyond information studies to extend our understanding.

Approach: After finding a lack of attention to the body in most influential works on information behaviour, the paper identifies ~~two~~ a number of important authors who do offer ~~an initial~~ theorisations. It then explores what can be learnt by examining ~~some~~ studies of embodied information in the hobbies of running, music, and the liberal arts, ~~largely from~~published outside the discipline.

Findings: Auto-ethnographic studies influenced by phenomenology show that embodied information is central to the hobby of running, both through the diverse sensory information the runner uses and through the dissemination of information by the body as a sign. Studies of music drawing on the theory of embodied cognition, similarly suggest that it is a key part of amateur music information behaviour. Even when considering the liberal arts hobby the core activity, reading, ~~is itself in~~ has been shown to be in significant ways embodied. The examples reveal how it is not only in more obviously embodied leisure activities such as sports, in which the body must be considered.

Research implications: ~~There is a significant gap in the theorisation of information behaviour around the role of the body~~ Embodied information refers to how we receive information from the senses and the way the body is a sign that can be read by others. To fully understand this more empirical and theoretical work is needed to reconcile in~~fluence~~sights from practice theory, phenomenology, embodied cognition and sensory studies.

Originality/value: The paper demonstrates how and why the body has been neglected in information behaviour research, reviews current work and identifies perspectives from other disciplines that can begin to fill the~~is~~ gap.

1. Introduction

The growing corpus of work on information in serious leisure (Case, 2009; Chang, 2009; Cox et al., 2008; Cox and Blake, 2011; Fulton, 2009; Hartel, 2003, 2014; Prigoda and McKenzie, 2007; Stebbins, 2009) has typically drawn on existing theories of information behaviour and information practice [i] developed in work or educational contexts. ~~Aware of the ongoing debates around the terms information behaviour and information practice (see Wilson and Savolainen, 2009) we use the term information behaviour to mean "the many ways in which human beings interact with information, in particular, the ways in which people seek and utilize information" (Bates, 2010, p. 2381). We also use the phrase to refer to the research specialty in information science dedicated to the same topic.~~ These theories are primarily concerned with seeking and using written sources of information and to

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some degree sharing information through spoken interaction. A focus on written sources reflects the origins of information studies in the provision of information through libraries and digital repositories. Yet activities involving the body – *embodied* activities – are very important in serious leisure, "the systematic pursuit of an amateur, hobbyist or volunteer activity that participants find so substantial and interesting that, in the typical case, they launch themselves on a career centred on acquiring and expressing its special skills, knowledge, and experience" (Stebbins, 1992, p. 3). This is most obvious in sports, where the central activity is carried out with the body and experienced through the senses. But it equally applies to the performing arts, like music and acting, which revolve around the performing body, and crafts and collecting, which revolve around material objects being produced and organised. Indeed, the centrality of embodied experience to all aspects of human life make the relative neglect of the body in information behaviour studies surprising and potentially problematic.

It seems that the evolution of research in the specialty of information behaviour has led to a focus on information in written texts, an emphasis ~~stress~~ on cognition and a relative neglect of the role of the body. As we try and develop a fuller account of information in leisure especially sports and the performing arts, this starts to seem inadequate. Some work has begun to explore the importance of the body in information behaviour (~~Keilty, 2012, 2016;~~ Lueg, 2012, 2014; Olsson, 2010~~6~~, 2016~~0~~). In particular, Lloyd (2009, 2010, 2014) in a number of works in the adjacent field of information literacy has started to theorise the "corporeal modality" of information. Yet in many other disciplines, such as history, geography and sociology, the body and materiality have been of central interest for several decades (Nettleton and Watson, 1998; Pink, 2015). A corresponding methodological debate about how to study embodied experience has also occurred outside information studies (Pink, 2015). This offers a very rich body of work to draw inspiration from. Often such work comments directly on informational concerns or is capable of "translation" to information studies (Palmer and Neumann, 2002). This paper argues that there is a similar need to incorporate a concern with the body into information behaviour research.

The aim of this conceptual paper is thus to review existing work that theorises the role of the body in information behaviour, and draw selectively on literature from beyond information studies to extend our understanding.~~the theorisation of the role of the body in information behaviour in serious leisure and to examine how to extend this theorisation~~. We seek to summarise the contribution of the most important authors on this topic from information behaviour. From the rich vein of literature beyond our field, we have purposively selected works which directly relate to three contrasting leisure activities. Following a meta-ethnographic approach (Noblit and Hare, 1988) we chose literature that is both relevant and translatable to information behaviour research. ~~To do~~In doing so we draw ~~heavily on bodies of work from the literature beyond information studies, some~~on work influenced by phenomenology and some based on the theory of embodied cognition. Other strands of thought from the history of the senses are also referenced. We try to make clear how the work reviewed sits within these traditions, but s~~S~~uch eclecticism is needed to demonstrate the potential role of the body in information behaviour, though we will go on to acknowledge the need to resolve the underlying philosophical differences in these traditions through further theoretical and empirical work. As well as shifting eclectically across a number of theoretical resources, inevitably we have to reflect their varied terminology (the senses, sensory information, the lived body, the haptic, corporeal information etc.). While our preferred term is "embodied information", it would only be through more fundamental theoretical work that these varying terminologies could

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be reconciled. Similarly, we do not seek to clarify the relation of cognition, affect and body in this paper. In most of the theories we are using these are closely interwoven. We will suggest this as another area where further research is needed.

The paper is organised as follows. In the first section we explore some previous important theories of information behaviour, and applications of these theories, to examine the extent and character of the neglect of the body. We then turn to a number of important~~some~~ theorists in the study of information ~~studies~~ behaviour who offer starting points for thinking about the role of the body. Then, inspired by work done in sports science, we discuss how we can further elaborate the role of the body in information behaviour, through consideration of a case study of running. Further points are made through two other cases of serious leisure activity: amateur music and liberal arts hobbies. The discussion and conclusion bring together thoughts about how to theorise the body and suggest directions for future research.

2. A body is missing

The first section of the paper considers a number of the theoretical works that have been influential in the study of information in serious leisure and considers how far they have encompassed the role of the body. If one thinks of the major models of information such as the nine classic ones reviewed by Case (2012) there is virtually no mention of the embodied, though there are some hints. In Krikelas's model, direct observation is acknowledged as an information source, which tacitly acknowledges the role of the senses in gathering information. Kuhlthau's (2004) information search process identified three dimensions of information behaviour pertaining to feeling, thoughts, and actions. However, it was the affective element that was deemed ground breaking, and relatively little attention has been paid to action. Following Kuhlthau, there has been much interest in the affective aspects of information seeking (Nahl, 2005), but this has not been paralleled with a similar reconsideration of the role of the body. Metaphors abound in information behaviour theorisation that suggest an active body, such as browsing, encountering and~~,~~ foraging ~~and berrypicking~~, but the landscapes involved are mental not physical or material. Dervin's (1983) sense-making theory has been illustrated as a stick figure jumping over a gap, and yet the setting in this case is mental. Rereading Fisher et al.'s (2005) *Theories of Information Behavior* one is struck by the absence of reference to the body. Even the account there of flow, originally defined through a mode of physical being, is disembodied (Naumer, 2005). To further illuminate the gap in embodied information, the next section analyses several theories that seem most likely to encompass embodied experience and explore how it comes about that they do not do so in great detail.

2.1 Information grounds

The theory of information grounds is one influential perspective on information behaviour that might be thought likely to have some concern with the body. An information ground~~s~~ is a temporary environment where people come together for some other practical reason, but ~~in which~~where the social atmosphere favours the exchange of information (Fisher and Naumer, 2006). Such grounds are realized through the presence of human beings, and partly configured by space, place, and by material arrangements, so it would seem reasonable to expect the theory to recognise the importance of the body. Also, one of the key moves of the theory is to switch attention from professional knowledge, written information sources, and formal channels of communication to

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informal communication. It recognises the importance of flows of information in all directions, from the patient to the health professional, as much as the other way round. In a break with the ~~rational~~ goal-oriented spirit of information behaviour theories, information is encountered serendipitously rather than deliberately sought. These moves away from an emphasis on formal and book knowledge seem promising for recognition of the body. Furthermore, the initial domain in which the concept emerged was a health care setting: a foot care clinic (Pettigrew, 1999). So by definition, there might be expected to be some salience to the body. Finally, the methodology, for earlier studies at least, is ethnographic with a strong emphasis on observation, a method far more likely to notice the importance of the body, than interview or questionnaire based research.

Notwithstanding these promising indicators, information grounds work does not seem generally to have a concern with the body. Physical space is seen as important, but primarily because it shapes the flow of movement of people and so social interaction. An information ground~~s~~ is a social setting, not a specific material place as such. The focus is on people talking to each other and how the character of interaction is shaped by various conditions. Surprisingly, the information grounds idea does not attend to the physical realities such as proximity of the participants, their facial expression and gestures, and other practical matters such as being within earshot of another. Indeed Pettigrew's (1999) definition of information in one of her first papers is "a communicative construct produced in a social context." This definition is derived via Tuominen and Savolainen (1997) from discourse analysts, such as Simon Potter and Margaret Wetherell. Thus the work reflects the "linguistic turn" but not the "embodied" turn that followed in many subjects in reaction to it (Howes, 2014a).

An example of a work drawing on and further extending the theory of information grounds, and in serious leisure, is Prigoda and McKenzie's (2007) excellent analysis of public library knitting groups. Again the context is promising in that the central practice is a making and tinkering hobby (see Stebbins, 2009, p. 623) to which physical activity is central. Furthermore, the method used in the study is a mix of ethnographic participant observation and interviews, an approach more likely to encompass bodily activity than a questionnaire based survey, for example. Indeed, one explicit object of observation in the study was to focus on what people's hands were doing.

Thus at certain points the embodied character of the activity is apparent: "Knitting as a physical activity is also visible to other participants. Others can see what a project looks like, how much progress has been made, and how confidently (or tentatively) the knitter is working." Thus group members gain information about each other through direct observation of other bodies.

> *"A participant's appearance and behaviour provides clues about her age, taste, income, and level of experience: for example, the complexity of the knitting project chosen and the degree to which she asks for assistance. Relationships among strangers entering the programme room are therefore facilitated because participants may identify one another as likely having interests and preferences in common simply by walking into the room."* (Prigoda and McKenzie, 2007, p. 94).

Here we see the way the participants read off information from each other's appearance, dress and demeanour. We sense that the ethnographic observational method foregrounds such forms of knowledge, because it is precisely their embodied co-presence that the researchers themselves are relying on to build their own understanding.

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Reference is also made to "show and tell" as the starting point of each session, and the materiality and physical skill gained through the practice are reflected in the authors' reflection: "Textile objects themselves carry significance, and the hand crafting of objects contributes to women's individual development (creativity, aesthetics, technical skill, management of materials and time)." (Prigoda and McKenzie, 2007, p. 105). The authors comment: "The physical act of knitting both facilitated and constrained HIB in the knitting circle" (Prigoda and McKenzie, 2007, p. 103). The physical act brings people together, provides opportunities and occasions for talk but it seems that the demands of concentration on the physical act of knitting is seen as preventing conversation, and so the exchange of information, for again the assumption that it is conversation, talk that is informational. The paper begins by asserting "collectivist approaches aim at understanding the ways that discourse communities collectively construct information needs, seeking, sources, and uses" (Prigoda and McKenzie, 2007, p. 91). This implies that it is through discourse that what constitutes information is constructed.

Thus the authors clearly have data that relate to the body, but partly because of their initial definition of information, embodied aspects of the phenomena are reported but not fully theorised.

2.2 Everyday life information seeking and information practices

Another case in point is everyday life information seeking. Savolainen's model of everyday life information seeking is a framework for understanding people's information activities in non-professional settings, including hobbies and leisure. It seeks to capture the role of sociocultural factors that affect preferences in information sources. In the first formulation of the idea, Savolainen draws on Bourdieu's concept of habitus, to develop a notion of an ingrained "way of life", a "socially and culturally determined system of thinking, perception and evaluation, internalised by the individual" (Savolainen, 1995, pp. 261–2). This gives it potential to encompass the role of the body, because habitus is very much about deeply ingrained, tacit assumptions that govern action. Hexis is Bourdieu's term for how cultural beliefs and values are written onto our bodies (Bourdieu, 1977). However, since ~~his~~ Savolainen's main aim is to explain preferences in use of different media, for his purposes this is not salient.

In a later and more extensive monograph Savolainen (2007) develops everyday life information seeking by drawing further on practice theory~~, via authors such as Bourdieu, Giddens and Schatzki~~. At this point habitus is downplayed as too deterministic. The social phenomenological approach adopted by Savolainen acknowledges that human experiences, gathered through action, activity, behaviour and habit are important in considering people's social interactions, including those related to information.

Although Savolainen does not address the body directly, at least in principle a theory of everyday life information seeking that is based upon practice theory is a move away from seeing the body and mind as completely separate and towards a more unified view of the ways in which people interact with information, since such theories overall are founded on "bodily doings and sayings" (Savolainen, 2008, p. 75; Schatzki, 2001, p. 56). In addition, Savolainen recognizes that affect plays an important part in people's relationship with information, especially in evaluating the cognitive authority of information sources and in dealing with information overload. Savolainen's empirical

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research, however, is largely focused on information seeking and monitoring of traditional media sources like newspapers and the Internet.

Subsequently, others have used the information practice approach to study several everyday information settings, including newcomers' urban wayfinding tactics (Lingel, 2015), leisure in the settlement experiences of immigrants, (Quirke, 2014) and information sharing in rural communities in Canada (Pollak, 2015). Each of these studies covers some aspect of everyday life (e.g., wandering in urban space, playing football, crafting, and prayer) in which the body or embodied knowledge and information would seem to be important.

For instance, in her study of one rural Canadian community, Pollak (2015) uses both Savolainen's theory of everyday information practices and Stebbins's serious leisure framework to help explain how people's information activities are bound to broader local pastimes and traditions (p. 265). Many of these activities, such as hunting and fishing, engage the body and require learning physical skills from people who are more experienced. According to Pollak, these skills are learned "without the advantages of technological and documentary support" and are instead "grounded in practice" and dependent on "interpersonal information sharing" (pp. 193-4). Because of the scarcity of books and the persistence of a technological divide in the community, people are the most important resource for information. She emphasizes that indigenous knowledge of "hands-on skills" are "information-intensive" and of high value (Pollak, 2015, p. 194).

Pollak's preliminary definition of experiential information acknowledges the importance of both explicit and tacit modes of knowledge. In addition, she identifies that experiential information depends on not only intellect but is also developed through responding to sensations and affect. Thus Pollak recognises important aspects of the role of the body in her empirical data, but has not yet fully developed this at a theoretical level.

3. The "corporeal modality" of information (Lloyd, 2010)

Thus in a number of major theories and studies of serious leisure, while the body does not pass completely unnoticed, its role in information activities is never seen as central or fully theorised. Yet a handful of authors have recognised the failure of information behaviour theories to consider the role of the body in any depth, and taken steps to address the omission. One of the most important of these is Lloyd who draws more deeply on the practice theory-related literature that Savolainen first tapped. She also locates her work in the phenomenological tradition of Merleau-Ponty. Phenomenology is a branch of philosophy concerned with the structure and content of consciousness (Trace, 2016). It considers that perception is action and that we constitute what we perceive. It has a central interest in everyday experience. Since it is through our bodies we perceive the body is central.

Across her work, Annemaree Lloyd has developed the notion that information has three modalities: epistemic, social, and a corporeal (Lloyd, 2010). She argues that the corporeal modality has been neglected in information literacy research, a statement that seems also to apply to the study of information behaviour. Thus she suggests that information literacy has tended to be seen in terms of "cognitive abilities... within frameworks that are legitimised by educational and library-centric discourses." Learning is treated as purely cognitive (and individual) and information as "codified and

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explicit" (Lloyd, 2010). This neglects the importance of the body, reflecting a Cartesian mind-body division. Abstract learning is consistently perceived to have higher status, to the point that embodiment disappears. The neglect of the body's role in learning has been reinforced by the increasing reliance on educational technology, she suggests.

Her main statement on the corporeal modality is Lloyd (2010), reiterated with small additions in Lloyd (2014). Empirical studies of emergency workers (2009), renal nurses (Bonner and Lloyd, 2011) and people with chronic health conditions, supply illustrative examples (see also Olsson, 2016). She states, "Corporeal information can be understood as information that is experienced through the situated and sensory body as it interacts with material objects, artefacts and other people that inhabit the same landscape" (Lloyd 2010). Lloyd also posits, "bodies, the information they possess, produce and disseminate are central for understanding the information experience" (Lloyd 2010). This wording suggests that corporeal information has a tripartite aspect: firstly, bodies "possess" knowledge. Secondly, the senses "produce" information and so knowledge. Knowledge "resides within the body but is also obtained through the body" she says at another point (Lloyd 2010). Thirdly, our bodies can be read by others, and so are a means to "disseminate" information. Indeed, in the broadest sense as signs "our bodies reveal the cultural-discursive, material economic and social historical features of the social sites that shape us," she suggests (Lloyd 2010). Thus the way that the web of practices we are embedded within is inscribed on and potentially readable through our bodies, makes the body a medium of information dissemination. Or, put in simple terms, in Lloyd's view the body is a medium for information dissemination.

Examples in Lloyd (2010) are drawn from her study of emergency services, especially of how novices learn to apply their learning. Within this work, she draws attention to how in the field practitioners rely on the senses to understand emergency situations, picking up all sorts of visual - even olfactory - cues to quickly establish what is going on when they arrive on the scene. Achieving competence is thus to learn to look differently, and so for emergency workers to listen to their bodies in different ways is central to what they have to learn.

In the earlier work that she is referencing here, Lloyd (2009) was particularly interested in the interplay of modalities during complex learning processes. She holds that learning occurs when ideas from books are tested out in practice through bodily action. Learning in a classroom is text centred, with a social element, though some carefully controlled bodily practice is involved. What the body experiences in the classroom is recognised as not realistic, however. What the emergency situation really looks like and how the human body appears in crisis situations cannot be very fully captured in classroom exercises. Yet learning how to operate effectively in the field is obviously crucial to skilled performance, and this knowledge has to be acquired through carefully managed exposure in the field. As in the apt phrase placed in the title of the study, emergency workers recognise the importance of not just "talking the talk" but also "walking the walk," phrasing which immediately implies bodily skills that are action orientated. In a practical point that further underscores the importance of the corporeal in learning, Lloyd asserts that observation of others is a means for novices to learn. And at the same time, experts observe novices to evaluate their performance, making the body important across the whole experience.

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Lloyd's notions of the three modalities of information and the three aspects of corporeal information is a solid starting point for developing more fully a theory for the role of the body in information behaviour.

4. "The estranged relationship with embodiment" (Lueg, 2014)

Lloyd's main reference points are practice theory and the phenomenology of Merleau-Ponty. Another key theoretical resource for reconsideration of the body, but with a very different disciplinary origin, is embodied cognition (see Wilson, 2002). Embodied cognition recognises that cognitive processes are shaped by the body. This is illustrated by how physical gestures and movement help us think or remember. Our thinking processes are thus bound up with our body in a deep way. Embodied cognition has philosophical connections to phenomenology, but has developed in neuro-science, and with strong links to cognitive psychology (Wilson and Foglia, 2016). In the information field Christopher Lueg has been the first to recognise the potential importance of embodied cognition for the study of information behaviour. He refers to information behaviour's "estranged relationship with embodiment," arguing that perception, cognition and behaviour are deeply intertwined (Lueg, 2015, p. 2705). His model "grounding information in human perception" points to some of the factors shaping how we gain information from the senses (Lueg, 2014). At the most basic level, the human senses are not able to capture all the potential information in an environment. More immediately body size, orientation or "impairment" can influence what is sensed, and so perceived. A tall person or someone standing in a particular part of a room sees something different from a shorter person and one standing somewhere else. So in the same context individuals will receive different sense information about the same event, because of characteristics of their body or the body's location in space. Further, what we perceive is influenced by expectations and assumptions. If we are focussed on a particular task we may sense things but not notice them: what Lueg refers to as "inattentional blindness". Thus we may receive sensory information but cognitive processes may mean that it is not perceived. Sometimes we even sense things that are not there, as in a magic trick. These points reveal that our bodies shape the information we receive. Beyond the factors in his model he also acknowledges that our current feelings interact in complex ways with what we perceive. Indeed, such feelings induce physiological changes (Lueg, 2015).

The main thrust of Lueg's argument is that these factors reduce an individual's ability to sense or perceive all potential information in their environment. Lueg (2013) concludes that "failing to notice information" is more the rule than the exception. So his is really a picture of the radically limited nature of human perception, arising from limits of the body or cognition. What Lueg gives less consideration to is the richness and range of the different senses - most of his examples are based on vision - or the way these are shaped by the cultural resources we bring to sensory experience, and he does not fully acknowledge how cultural factors influence sensory perceptions (see Classen, 1997).

5. Bodying out information behaviour

In order to further consider how some of these theoretical resources can inform the study of information behaviour in serious leisure the paper proceeds to consider three examples: the hobby of running, amateur music and the liberal arts hobby. The examples were chosen because they

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represent a range of types of leisure, including some where an element of embodiment is self-evident and others where it is far less so. We draw on existing research from ~~other fields~~beyond information studies which ~~that we are suggesting~~with some translation work can be seen to be ~~is~~ highly relevant to information behaviour.

5.1 Running

In a recent paper, Gorichanaz (2015) identifies that in ultrarunning the body is the primary, if usually taken for granted, source of information. In an autoethnographic study of his own information behaviour during a race, he discovered that he was constantly monitoring bodily sensations as he ran, which shaped his mental state. If a problem was identified during the race, he turned to his existing knowledge base or sought information to address the problem. This is a useful beginning, and the work of Hockey and Allen-Collinson (Allen-Collinson, 2008; Allen-Collinson and Hockey, 2007; Hockey, 2004, 2006, 2013; Hockey and Allen-Collinson, 2007, 2013) can take us several strides further in considering the role of the body in information behaviour. In a fascinating series of studies over nearly two decades, largely based on phenomenological philosophy and auto-ethnographic methods, these two authors explore how "we know the world through the body" (Hockey and Allen-Collinson, 2007). These insights can be organised around two of the three aspects of the corporeal modality identified by Lloyd.

The body as an information source: sensory information

A rich range of information from the runner's own body is received while running (Hockey, 2004, 2013):

- Visual information about the path ahead but also of the wider environment through which the runner is trying to navigate;
- Sensations from a number of muscle groups that are engaged in the effort of running;
- Sensations on the skin from the wind and the elements;
- Heightened awareness of breathing as one struggles for breath;
- Sounds of the footfalls on the path and the wider environment;
- The smell of sweat or the natural environment;
- Pain or pleasure.

For example, Hockey and Allen-Collinson (2007) describe how attention to their own respiration gives the runner immediate feedback on performance. They listen out for what is happening around them and for danger. The runner also learns to see, to glance round themselves, in certain particular types of way. The smell of sweat on running clothes is emblematic of effort (Hockey, 2006). They touch things, not just with the hands, but also with the feet (Allen-Collinson and Hockey, 2007). The runner is also monitoring feeling from various muscle groups, for example a gradual loosening of tight muscles at the beginning of a run or loss of form towards the end of a long run. Such bodily sensations constitute information that is evaluated.

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Runners have a strong sense of trying to evaluate their own overall form while running (Hockey, 2013). The sense of form is based on "corporeal sensations, linked emotions, together with an ongoing cognitive evaluation" (Hockey and Allen-Collinson, 2013). Thus performance is about trying to coordinate the sensations, emotions and cognition so they are in alignment. The sum of sensations, with emotions and thoughts is the basis of an aesthetic judgement of whether the going of a run feels good or bad (Gorichanaz, 2015; Hockey, 2013).

The runner develops heightened perception of physical sensation through running, learning to distinguish strength or tightness in a particular muscle group (this may be perceived more clearly through learning theoretical ideas about muscle groups) and linked to a desire to improve performance.

For the runner, as well as receiving embodied sensory information during running there is a heightened conscious concern with signals from the body when not running, e.g., to monitor indications of over-training, such as general tiredness (Shipway, 2010). Behaviour changes radically during injury, when directly monitoring the affected bodily parts could be construed also as an information activity (Allen-Collinson and Hockey, 2001). In a similar way, Chen (2015) has written about body-as-information in the context of people learning to listen to their body in new ways during chronic illness.

Naturally the importance of sensory information is not confined to the sport of running. Any sporting leisure pursuit involves sensations of movement (rhythm and timing), the aural, the visual, touch (the haptic) and even the olfactory (Hockey and Allen-Collinson, 2007). Sports are ~~highly~~ multi-modal. Such corporeal information is not merely about the immediate senses (hearing, sight, touch) but direct kinaesthetic knowledge of one's own organs such as the lungs taking in breath, exertion in leg muscles, etc. Sporting activity involves nearly all of the senses, which are themselves more various than is conventionally recognised. Rather than there being the traditional "five senses," there seem to be more, with a number of ways of classifying them according to where the receptors are and what type of information they convey. One standard book on physiology suggests the following breakdown (Tortora, 2007):

1. Special senses	a. Olfaction (smell)	
	b. Gustation (taste)	
	c. Vision	
	d. Hearing and equilibrium	
2. General senses	a. Somatic	(i)Tactile (touch, vibration, itch, tickle)
		(ii) Thermal sensations
		(iii) Pain sensations
		(iv) Proprioceptive (relating to the position of our body)
		(v) Kinaesthetic (relating to sense of movement)
	b. Visceral (relating to our internal organs)	

Table 1 - The senses. Adapted from Tortora (2007).

While the senses are multiple – the corporeal modality is itself made up of multiple modalities - they are often experienced collectively, rather than as discrete channels. They can also be experienced as in conflict with each other.

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Such sensory information generated by the body while running could be seen as simply made up of signals that are interpreted unconsciously to achieve successful motion. One does not, and indeed could not consciously control muscles to accomplish the act of running. Similarly, pleasure in running could be interpreted as simply a result of the release of endorphins and discomfort or pain as simply a signal about the status of a muscle or joint. But this form of reductionist or essentialist account is challenged by social theory and also by historians of the senses. Thus historians have shown how different ages have thought about sensory experiences in different ways, e.g. the experience of pain. Hide et al. (2012) comment:

> *"Pain has meaning, which is formed out of the complex interactions taking place between the body, mind, and culture. As a result, it differs from person to person, social group to social group, and it changes over time and space. It is profoundly influenced by personal beliefs as well as social mores and temporal contexts… Through ever-changing biomedical theories, socially constructed discourses, and the embodied consciousness, pain forges identities, and identities re-forge and reshape the felt experience of pain. Pain is a tightly interconnected and constantly shifting mesh of the physical, the psychological, and the cultural — continually reforming and redefining the person-in-pain."*

Sensory signals are at least partly interpreted via learned beliefs. At a high level how the senses are understood is shaped by broad cultural assumptions. Historical sensory studies show how radically different these are in different cultures (Classen, 1993; Howes, 2005, 2014a; Howes and Classen, 2013). With practice based approaches, phenomenology and embodied cognition, sensory studies offer another rich vein of inspiration for studies of the body. Sensory studies draw on sensory anthropology and the history of the senses (Howes and Classen, 2013). They are concerned with the cultural construction of meaning attached to the senses, and often there are power implications of the sensory order in a society. ~~The~~ A key thesis in sensory studies is that the privileging of sight (ocularcentrism) and hearing is a particular trait of western culture. Such thinking ~~and~~ is reflected in the ordering of the senses as articulated in Table 1 above. The implications for information behaviour have not yet been thought through, but suggest that in different cultural contexts the value of different forms of sensory information vary in fundamental ways. Western cultural assumptions about priorities about how information is sought will not apply in cultures with different sensory orders.

More immediately a large part of the sub-culture of a sport is composed of specific understandings of bodily sensation: one could say that each practice has its own sensory order. Much of the talk in a running community, for example, consists of narratives linked to the physical, emotional and aesthetic experience of running. Runners learn sub-cultural norms about ignoring or "running though" certain forms of discomfort, but taking notice of others. Coping with, even celebrating, such suffering seems to be central to distance running sub-culture (Bridel, 2010; Shipway et al., 2013). Analogously, Atkinson defines triathletes as a "pain community"; though pleasure has its place within the experience of running too (Atkinson, 2008, p. 178). Information from all the senses is understood through cultural codes. Thus we all see landscapes through learned codes. Specific groups learn to look differently, e.g., runners glancing around themselves to evaluate the safety and the going in a particular area see the territory differently from a dog walker or someone simply out for a stroll (Hockey, 2004).

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Since sensory information is interpreted through cultural assumptions the distinction Lloyd makes between what the body possesses and that which it produces may be seen to break down. There is no sensory information that has not been shaped by our existing knowledge. Nevertheless, her third role for the body as a means of disseminating information is certainly distinct.

The body as sign

Skilled sporting performance not only involves monitoring one's own body but involves observing others, such as the respiration of competitors through the sound of their breathing, reading visual cues about where to move next, and so on (Hockey and Allen-Collinson, 2013). Even in an individual sport such as running, coordination of a joint shared training run, involves a vast amount of mutual monitoring, especially aurally and visually (Allen-Collinson, 2008). Just as listening to their own breathing is a form of direct feedback for the runner, key to coordination is listening to the other's breathing (Hockey and Allen-Collinson, 2013). This is combined with listening to non-linguistic utterances, such as grunts and sighs. Another source of information is glances at the other's running form, looking for evidence of it being hard going. This is analogous to the micro information seeking concept proposed by (Kelder and Lueg, 2011) to describe the moment by moment monitoring of others' body in the practice of a community health worker wishing to persuade people to consider breast screening.

Information behaviour often recognises other people as an important source, but, at least in studies of information needs, how the source is accessed and used is less commonly explored; it is perhaps assumed that this is primarily verbal. Gorichanaz (2015) emphasises that ultra-running is an oral culture. Yet information exchange to coordinate running together or coach running technique would probably be through brief words, gestures and physical demonstration, more than words. Indeed, in other aspects of life conveying meaning in social contexts is partly achieved through words, but also through non-linguistic utterances, tone of voice, gestures (particularly of the hands) and the face (Hydén, 2013). Studies have shown that people with restricted ability to communicate are able to convey complex meanings and share information through mediums other than words. They may do this by using their body (Hydén and Antelius, 2011). Doing things is a means of conveying information; and is read as information by others. Information is both given and taken in through the body. One could even say that recurrent habits of personal grooming effectively serve to communicate stories about ourselves. How I look is a means of conveying information and can be read as information.

> *"Appearance embodies the biographical self, materialising the stories of who we are."* (Ward et al., 2014).

We may deliberately use our bodies to convey information (as in gestures), but also information can be read off from things we consciously choose to do but were not intended as signs (demeanour in a job interview suggesting lack of interest), give off unconsciously (looking worried) or unintentionally (our muddy shoes show we have been walking in a field – this can be read as a sign, but it was not created as a deliberate act of conveying meaning). Like any information source such signs can be unnoticed or misinterpreted. Yet by neglecting such channels, information behaviour research is missing a whole layer of informing activity (Hydén, 2013; Hydén and Antelius, 2011). When we say information is social we fail to identify fully such mechanisms, and perhaps assume everything is accomplished by verbal discourse.

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Thus information experiences in running are largely through the body; our body is an important means by which we convey information and how others gain information. This is obvious enough, though it has rarely been noticed and theorised in information behaviour. But it could be suggested that this is only relevant for sporting hobbies. Our second example shows that it is not the case.

5.2 Music

Studies of musicians' information behaviour have traditionally focused on topics such as search and retrieval of documents (e.g., Futrelle and Downie, 2002), annotation (e.g., Winget, 2006), and organizing personal collections (e.g., Lingel, 2012). The embodied, or physical nature of these tasks, along with other bodily information activities of musicians, which include creating, using and sharing information directly related to physical movement has not yet been well studied in information science. Perhaps this is unsurprising, since documents such as sheet music, audio recordings and films have long been central to sharing musical knowledge. But developing an understanding of all kinds of information in music practice and performance will likely require moving beyond the traditional physical document paradigm (see Weissenberger, 2014) or rethinking what constitutes a musical document, especially considering the recent innovative information technologies that take advantage of the multi-media and multi-modal qualities of music. This creates both new opportunities and problems for musicians. The ability to capture and measure these embodied and sensory dimensions of music also presents an interesting area of research for information science.

One potential starting point for this kind of research is the embodied music cognition approach (see Leman, 2008 for an overview). In contrast to cognitivist perspectives of music, embodied music cognition recognizes that both performing and hearing music is based on a dependence on embodied experience. In performance, musicians must use movement and "body choreography" (Muñoz, 2007, p. 56) to create sound from their instruments. These movements are related to particular techniques (e.g., playing staccato notes), and also to emotive expression (e.g., playing a section dolce con affetto) (Muñoz, 2007, p. 57). A large percentage of all annotative marks made on sheet music are related to technical skills (Winget, 2006) and emotional, expressive qualities. This suggests that traditional music scores, which notate the tempo, intervals between notes and other basic information are insufficient for documenting all the relevant knowledge related to performing a piece of music.

Music is a multi-modal sensory experience. Most obviously, it is an aural phenomenon, but taking in visual data is also an important part of musical activity. Audiences perceive music not only sonically, but watching musicians' movements and non-verbal gestures is also an important part of experiencing the whole of a performance. In many settings, music is used to motivate physical movement, such as dancing, marching, and other "pleasurable aerobic activities" (Stebbins, 2004) such as running or cycling.

Music can convey abstract emotional information, and music is a way to share and regulate mood (Shifriss et al., 2014). Dancers' movements are also seen as an expressive embodied performance of some quality of the accompanying music. Olsson (2010) explains, analogously, how actors must not only learn to walk and talk like the character they are portraying, but also how to think and feel like them (p. 251). In a similar way, musicians must learn how to embody or become the music they are performing. In order to give a good performance, musicians must learn to perform the music in a

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way that expresses how the music feels (Bowman, 2004, p. 5). Blacking (2000) observed that if one could know "…how Debussy might have held his hands and body when he played the piano, [they] might get a better feeling for his music" (2000, p. 111). To this end, musicians employ a wide range of body techniques such as facial expressions, tapping the feet, nodding the head, or swaying in time to the music to try and convey the intended feelings of a composer or another performer.

Music education also depends on the exchange of various kinds of embodied information. In addition to formal lessons and training, musicians also rely on informal learning, which "involve[es] the noticing and reading of others' bodies in order to work out how to do something: listening, looking and experimenting" (Pettinger, 2015, p. 288). Musicians consider each other to be important sources of information about social and communicative aspects of music (Lavranos et al., 2015, p. 7). Often, valuable knowledge is passed from teacher to student during lessons and master classes without the use of any formal information sources.

Musicians' primary instruments are their bodies. Like athletes, musicians must monitor their bodies for sensory information related to injury such as tightness, soreness, and pain. As in sports, attaining musical virtuosity requires thousands of hours of practice (Ericsson et al., 1993). Repetitive motion injuries can have a negative effect on immediate performances and can be detrimental to a long-term career (see Pettinger, 2015, pp. 286–7). While the risks and severity of injuries in music practice are well known and documented, there is scant research on injury preventing techniques and rehabilitation. Additionally, accessing this kind of information as well as information technologies that can monitor the body and help musicians avoid injury is another possible point of intervention for information studies.

Music is an information rich activity. A traditional information behaviour perspective acknowledges that musicians use a range of documents in their practice. Additionally, musicians use their body to technically produce sound from their instruments, share affective information, and exchange knowledge about these kinds of information. Insights from studies that acknowledge the role of the body in music practice and performance are the basis for new technological developments for digital interfaces for music performance, retrieval and annotation.

5.3 The Liberal arts hobby

Gorichanaz's suggestion that bodily information is central to the experience of running is not in itself surprising. Music is, similarly, by definition experienced through the senses of hearing and sight; and performance of music involves the body in multiple ways, as we have seen. Nevertheless, it remains to be demonstrated that an emphasis on embodied information really has wider applicability across information behaviour in leisure pursuits. To attempt to show that it is indeed widely applicable, we turn to our third case: the liberal arts hobby.

Liberal arts hobbies are characterized by "systematic and fervent pursuit…of knowledge for its own sake" of a topic such as "arts, sports, foods, languages, cultures, histories, sciences, philosophies, or literary traditions" (Stebbins, 1994, p. 175). The pursuit has two elements: firstly acquiring knowledge. According to Stebbins (1994), reading is the liberal arts hobbyist's primary means of acquiring new information and developing knowledge (pp. 176-7, 181). The second element is expressing knowledge. This could be through writing or talk. For example, a liberal arts hobbyist

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might take a specific interest in lost civilizations and spend many months reading and watching films about ancient Egypt, visiting museums, take a trip to see the pyramids at Giza, and then present a slideshow on the experience at a local library. Or, a liberal arts hobbyist focused on the history of their community would go to great lengths to know about their town's settlement, industry, and geography, spending many hours in libraries, visiting different local places and perhaps serve as the volunteer director of an historical society.

We can immediately recognise that this is an information rich leisure pursuit, in a very familiar sense. Using information resources of all sorts, from books to films, and other information media, and searching in libraries and other information collections are central activities. Pleasure in searching for and finding information is one of the hobby's main satisfactions. Existing models of information could be expected to have great applicability in describing such activities. Indeed models of information seeking and use derived from the study of academic scholars would probably be a good starting point for theorising it. Surely, then, in this familiar territory, we do not need to be concerned with the neglect of the body that has been revealed in our case studies of running and music. The hobby includes some embodied activities, such as nature walks, travel and historical enactments. Yet the body, at first glance, would seem to be largely irrelevant to the study of liberal arts hobbies.

However, this would be to neglect the sense in which the core activities of the hobby, reading and disseminating knowledge, are both in a profound sense embodied~~, at least according to the thesis of embodied cognition~~. Authors both from the embodied cognition (Mangen, 2008) and practice based traditions (McLaughlin, 2016) suggest this. Studies of reading on new types of devices such as Kindles and iPads reveal that changing the technologies of books reshape reading, and in doing so reveal the extent to which reading is always an embodied experience. At the most obvious level we use the eyes to read the text. But books engage our other senses. The material qualities of printed books, their feel, even smell, are often cited as a reason to prefer them to digital versions. A book is perfectly designed to fit into the human hands (Mangen, 2014); what the human hands do while reading is central to how we read (Mangen, 2008). "The tactility of a mouse click, of touch screen page turning or of a click with the e-book page turner bar is very different from that of flicking through the print pages of a book." (Mangen, 2008, pp. 407–8). Certain types of pleasurable reading tend to be done in a favourite place, in a particular comfortable posture (Rose, 2011). This material aspect of the experience has a profound impact on the experience of reading. Thus iPads and eBook readers tend to produce a different type of immersion. We read in a more superficial way. We scan more and are more easily distracted (Mangen, 2008). The way we remember certain parts of a printed book is linked to the fixed material place of pages on which the text occurs. The same experience does not occur with an iPad (Mangen, 2008). When we annotate a text, it gives us a sense of ownership over the ideas too (McLaughlin, 2016; Rose, 2011). Reading an iPad is closer to writing (Rowsell, 2014). "An iPad reader […] touches, taps, scrolls, moves in and out of, and expands texts – touch is more invoked and dominates engagement more" (Rowsell, 2014, p. 122). The same argument extends to the seemingly disembodied experiences of web browsing. Keilty (2012, 2016) argues that people's activity related to searching and browsing online pornography, for example, is not only a cognitive experience, but is also sensual and embodied. Corporeal states such as arousal and affect are central to the activity, but others including surprise, disgust and irritation are also commonly experienced (Keilty, 2012).

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> "Different technologies require, address and engage our corporeal, sensory phenomenological being-in-the-world in highly particular and specialised ways." (Mangen, 2014, p. 94).

Thus the acts of reading and writing are embodied, and this is significant e.g., in how much is absorbed and how it is remembered. For the argument of this article this is a critical point, for it reveals the embodied character of activities such as reading texts, which have always been at the heart of information behaviour research, not just those relating to serious leisure.

Furthermore, embodied cognition suggests that how we understand what we read (and all language) is not simply a "cognitive" process. Understanding a word, such as "geranium" activates the same parts of the brain that are engaged when encountering the real thing, the flower (Mangen and Schilhab, 2012). According to the theory of simulation, the text is understood through previous experiences, memories and associations. As Wilson puts it "off-line cognition is body based" (Wilson, 2002, p. 632). Abstract notions are understood by analogy to actual experience (Glenberg, 2011). Much language draws on the body and its characteristics as a key reference point (Hydén, 2013).

Thus the central activity of a liberal arts hobby, also a key aspect of all "traditional" information behaviour, reading, is in fact embodied, in ways that have not been acknowledged in information behaviour theory. It can also be argued that in the second main aspect of a liberal arts hobby, the expression of knowledge, the body also plays a role. Writing is an embodied act. The presentation of knowledge verbally, be that formal or even informally, in everyday conversation relies on embodiment. The authority of the liberal arts hobbyist is conveyed not just through ideas but through how they perform their words: through the body as sign. Thus even in the familiar territory of information behaviour of the liberal arts hobby, we have to recognise that the body plays a central role in information activities.

6. Discussion

Studies of information behaviour have tended to ignore embodied information, reflecting:

1. A privileging of encoded, symbolic information sources;

~~2. Within the senses a privileging of vision over other senses;~~

2.~~3.~~ A focus on work, especially knowledge work (e.g. scholarly activities) and the use of computers as the domain of study. These are often seen as immaterial, even though we know that reading a book is an embodied experience and indeed digital devices are enmeshed in embodied experience (Pink, 2015); and

3.~~4.~~ A methodological choice to use questionnaires and interviews (especially transcribed words), rather than methods that engage with real world activities, particularly ethnography and auto-ethnography.

The two aspects of what we mean by embodied information are how we receive information from the senses and the way the body is a sign that can be read by others. Some understanding of this has been developed by reviewing a number of writers within and outside information behaviour. Drawing on phenomenology and practice theory, Lloyd identifies the corporeal as one of three

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modalities of information that are differently organised in different social sites. Lueg's work, rooted in theories of embodied cognition, focuses more on how characteristics of our bodies shape what information we receive through perception. In the paper we extend this understanding to the field of leisure pursuits, through three cases we have selected to reveal the central role of the body in information. Hockey and Allen-Collinson's phenomenological work on running reveal vividly how a leisure pursuit such as sport involves all the senses. We have a range of at least ten distinct senses, referred to in physiology as special and general senses. So the corporeal modality is itself multi-modal. The senses work together and sometimes in opposition, and in some way relate to affect and cognition. Our reading suggests that insights from sensory studies into the way that our experience of the senses is culturally constructed may also be relevant. Different societies have different sensory orders. Thus Western society privileges vision over other senses; it is ocularcentric. We can also suggest that different practices, such as running or music, have their own sensory orders, which reflect the meaning that is attached to different forms of sensory information. Thus the senses are a major information source, yet relatively rarely discussed in studies of information behaviour. We also draw attention as meaning of embodied information to the way that the body is a sign that is read for information by others. Empirical studies in information behaviour have often found information from others (the social modality) to be a valued source of information. Yet much of this may not be oral, as one tends to assume, but may involve reading from the bodies of others. Our second and third cases draw primarily on previous work within the embodied cognition tradition. Importantly, our third case reminds us that activities are always of central interest to information studies such as reading are embodied.

Information behaviour research has generally been motivated by the need to gather requirements for the design of an information service, such as a library, and embodied and mundane knowledge may seem unimportant in this context. Yet for the study of information behaviour in leisure in particular, it seems problematic to exclude such aspects of information. One could confine interest just to the finding of books, magazine articles and web pages about running, but that would be of very limited relevance to understanding information in this leisure pursuit. The experience of running is primarily embodied. Learning skilled, encultured interpretation of information from all the senses is central to the experience and culture of any sport. Understanding where encoded sources fit into the cultivation of such skills and how they are critically evaluated through practice and bodily experience, would have to be part of a complete account of codified information in such forms of leisure. What is learned directly from the bodily senses has to be fitted also into social frameworks of beliefs about health and fitness. Furthermore, the increasing use of technologies to encode information about the body make the neglect of these forms of information ever more problematic.

The significance of these matters extends beyond sporting leisure pursuits. Indeed, it extends beyond information in serious leisure. In exploring the example of the liberal arts hobby, the embodied nature of reading came to the fore. Since the whole study of information behaviour turns around seeking and finding information written down in texts it follows that all information behaviour is in a critical way embodied. This is well understood in the study of reading, but rarely recognised in studies of information behaviour.

If we accept sensory experience and mundane knowledge are part of the picture of relevance to information behaviour we might organise thoughts around which particular senses are most important in which leisure pursuits. Running focuses on direct sensation from the lungs, muscles,

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balance etc., and certain sorts of pleasure and pain. Music is aural (and visual), but also for the player experienced through touch and vibration. Reading or writing as part of a liberal arts hobby also employs a particular combination of eye and hand. More precise ways of describing these channels are needed. A leisure activity is thus defined by a very particular pattern of "somatic modes of attention" (Csordas, 1993; Hockey, 2013, p. 6). Perhaps part of having a talent for a sport is related to a focus of attention and ability to learn from sensory information in a different way. Equally we need to understand the codes that are used to interpret the body as a sign.

One of the consequences of the neglect of embodied information in information behaviour research is that it tends to position it behind official and formal forms of communication neglecting alternative modes of informing that are more accessible to socially marginal groups and cultural minorities. An unquestioned privileging of the visual, has a similar effect of normalising socially dominant perspectives. There is a lot more work to be done in recognising the way that different ways of sensing, within which the concept of information is constructed, help to produce differing social orders.

In undertaking such an exploration of the role of the body in information behaviour, we have some good starting points, both from within the field and beyond. There will be work to do in terms of bringing together ideas from widely divergent perspectives such as practice theory, phenomenology, embodied cognition and, sensory studies ~~and practice theory~~. In this article we have drawn on material from all these traditions, but they have very different philosophical roots. A Foucauldian perspective could also have relevance (Olsson, 2010). Future research will need to see how these differing perspectives can be reconciled. A model is available in (Gärtner, 2013) review of the body in organisation studies. Work at the level of case studies of particular areas of information behaviour will be useful in this context to show which of these is most generative. Part of the work will also be to agree upon appropriate terminology. The relation between cognition, affect and the body in information behaviour will also be an important area to explore. Most of the theories we have mentioned say something about the close inter-relation of affect, thought and action. Thus links to the existing work on affect in information experience will be highly relevant.

The natural methods to explore such experiences go beyond those usually deployed in information behaviour studies, such as questionnaires and interviews, and are ethnographic (Lueg, 2014) or autoethnographic (e.g., Gorichanaz, 2015), since this gives access to bodily experience in a way that other methods do not. It may also require writing in different ways (Allen-Collinson and Hockey, 2007), because the autoethnographic tradition is committed to the "narrative visibility of the author's self" (Anderson, 2006, pp. 383–5).

7. Conclusion

Many other disciplines have long since made a turn towards the body; there seems good reason for the study of information behaviour to follow. Immediate prompts for such a shift in perspective are all around us and in what every body knows. When we sit reading a book or hunched over a desktop it seems that information is linked to static, disembodied symbolic activity. In reality there is always an embodied aspect of it. As we move freely accessing information from a mobile device, perhaps using our voice or gesture to control the device, the sense of embodied mobility of information is revealed vividly. Trends in computing signal a growing interest in the embodied: such as "haptic"

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interfaces that allow the user to interact with a computer in rich sensory ways. Self-tracking of bodily functions using apps and wearable technology mean that more aspects of the body are being encoded (Lupton, 2014). The growing acceptance of the physical nature of music is a driving force in the development of new tools for musical performance and music information retrieval systems (Godøy and Jensenius, 2009). ~~3D printing of material objects is an exciting area of technical development, with a potential link to another trend towards the use of objects (such as museum objects) in learning.~~ In the library world, the focus on the information commons and learning commons concepts recognise the crucial aspects of spatial design in learning and in library use. Interest in tracking movement through space (in libraries and elsewhere) and improving wayfinding all point to a concern with bodies moving around material spaces (Lueg and Bidwell, 2005). It also chimes with the growing interest in the impact on how archives are used of their materiality (Dever and Morra, 2014) and the recognition of the need to expand the range of public engagements beyond the visual in the "sensory museum" (Howes, 2014b). In this context, it becomes more essential that the study of information behaviour encompasses the embodied nature of information, and fully theorises the ways in which the body is the medium for knowing and a channel for the dissemination of information.

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[i] Aware of the ongoing debates around the terms information behaviour and information practice (see Wilson and Savolainen, 2008) we use the term information behaviour to mean "the many ways in which human beings interact with information, in particular, the ways in which people seek and utilize information" (Bates, 2010, p. 2381). We also use the phrase to refer to the research specialty in information science dedicated to the same topic.

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