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Review

Intuitive expertise: Theories and empirical evidence

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ABSTRACT

Intuition has been long seen as an element of effective human performance in demanding tasks (i.e. expertise). But its form, constitutive elements and development remain subject to diverse explanations. This paper discusses these elements and explores theories and empirical evidence about what constitutes intuitive expertise, and offers an account arising from a review of these explanations. Commencing with a consideration of examples of intuition from distinct fields of working life, it uses a cognitive perspective to open up the discussion for theorizing about intuition from an information processing perspective. It evaluates the widely acknowledged theory of two systems of information processing that proposes two parallel operating systems: the rational and intuitive. This theory provides foundations for understanding experts' abilities to act intuitively in high-performance-level activities. Research on expertise, finally, opens an educational perspective on intuition, with the progression from novice to expert being understood as an enduring and long-term learning process that inherently generates intuitive capabilities. The paper concludes by returning to and making connections with the literature on workplace and professional learning to provide insights into how individual and social learning processes support the development of intuitive expertise.

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1. Introduction

In recent years, intuition has been a hot topic in the popular as well as scientific literature, where it has long been the focus of empirical inquiry, speculation and theorisation. Some authors now promote a daily-life understanding of intuition as being the hidden power behind successful decision-making across a range of activities (e.g. Osho, 2002; Robinson, 2006); whilst others describe, in popularly accepted yet scientifically based accounts, intuition's contribution to high levels of performance in professional areas (e.g. Gigerenzer, 2007; Gladwell, 2005; Klein, 2003; Myers, 2002; Sadler-Smith, 2010). Scientific accounts are now presenting revised, new and empirically informed accounts of intuitive decision-making's efficacy in an increasingly wide range of applied fields (e.g. Asvoll, 2012; Atkinson & Claxton, 2000; Chudnoff, 2013; Eisenkraft, 2013; Gilovich, Griffin, & Kahneman, 2002; Kinchin, Cabot, & Hay, 2008; Plessner, Betsch, & Betsch, 2008; Sinclair, 2011). Yet, these bodies of literature have their sources in diverse academic disciplines and discourses, including those from educational, managerial and psychological fields of inquiry. Consequently, as intuition is a concept used across disciplines it is important to be clear about how it is conceived within these disciplines and differs across them, particularly when, as here, there is a concern to understand its form, potential and development for making professional practice more effective.

Intuition is usually defined as the capability to act or decide appropriately without deliberately and consciously balancing alternatives, and without following a certain rule or routine, and, possibly, without awareness (Harteis, Koch, & Morgenthaler, 2008; Hogarth, 2005; Kahneman & Klein, 2009). It is commonly held to permit rapid reactions that result in effective outcomes. That is, it supports the rapid and effective performance of tasks, and not only for those largely requiring quick reaction times (e.g. as in sport), but also in rapid response to complex and urgent problem-solving scenarios, such as those undertaken by emergency room medical practitioners (Harteis, Morgenthaler, et al., 2012). Yet, other examples illustrate the diversity, scope and potential of intuition. Klein (1998) describes how firefighters make crucial decisions when under considerable time pressure and without the time to engage in conscious introspection and analysis. When engaging in emergency situations, they report not even being aware of their decision making; just perceiving the necessities for action and describing their responses as (almost linear) reactions to the situation. Undoubtedly, laypersons when involved in such incidents would probably feel the need to consciously engage and decide amongst various courses of action and, potentially, become overwhelmed by the extent of task, and if pressed to perform, may well experience dissonance. Experienced firefighters, however, seemingly apply rich cognitive resources without needing to resort to conscious considerations or extensive awareness of the situation. It is this difference between inexperienced and experienced persons that indicates intuitive expertise likely arises as an outcome of, at one point in time, conscious learning processes. However, to date, little is known about how best to support the development of intuitive expertise.

Gladwell (1999), in a New York Times essay, identified some shared characteristics of professional performances of a surgeon, the famous ice hockey player Wayne Gretzky, and renowned concert musician Yo-Yo Ma. These characteristics are that they: (i) constantly perform on an extraordinary high quality level and (ii) act quickly and often very surprisingly which accounts for their professional competence. Further, Gladwell (2005) describes a situation in 1983, when the Getty Museum received an antique statue and experts' intuition played a role in commencing a process that ultimately led to it being declared a fake. Even though assessment reports documented and vouchsafed the authenticity of the statue, some experts doubted about its authenticity, and these doubts were ultimately confirmed. Yet, when asked, these experts could not identify the source of their doubts: they just described feeling that something was wrong with the statue and its documentation. Then, in January 2009, a US Airways aircraft collided with a flock of geese just after taking off from New York's La Guardia airport. The pilot Sullenberger became a hero, because he decided within seconds that because the engines had failed and could not be re-started to carry out a difficult aviation manoeuvre: to land a large passenger aircraft in the Hudson River. Instantly, after realising he had lost forward propulsion, he made a series of decisions without considering and balancing details of the situations, and through successfully landing the plane in the Hudson River he saved almost 200 lives of his passengers and crew members (Sadler-Smith, 2010).

Together, these cases demonstrate the importance of intuitive processes for extraordinary kinds of occupational performance. However, they also indicate there are different kinds of intuitive actions. More than comprising sportspersons' quick reactions, or professionals addressing very non-routine situations effectively, intuitive behavior also includes the enactment of activities that had not been practised and rehearsed. In this article, we aim at providing a systematic discussion of theories and empirical studies on intuitive expertise to derive conclusions that can inform professional learning processes. In doing so, we are drawn to a statement about intuition made some time since by Reber (1989) that captures well the situation we are seeking to advance:

> There is probably no cognitive process that suffers from such a gap between phenomenological reality and scientific understanding. Introspectively, intuition is one of the most compelling and obvious cognitive processes; empirically and theoretically, it is one of the processes least understood by contemporary cognitive scientists (p.232).

It is proposed here that there are distinct kinds of intuitive actions supporting high levels of performance of different kinds. Yet, across them arise the common elements of highly learnt procedures and informed strategic capacities that, together, support the capacity to act intuitively and with great effect. In elaborating these points, this article discusses the theoretical approaches and their empirical evidence from an educational viewpoint. The case is made in the following way. First, the relations between intuition and work performance are discussed, drawing on examples from diverse domains of occu-