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Book Reviews

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Diagnostic Expertise in Organizational Environments

Edited by Mark W. Wiggins and Thomas Loveday
2015, 226 pages, £60 (hardback)
Farnham, UK: Ashgate
ISBN: 978-1-4724-3517-0

Although there have been various empirical studies, diagnostic expertise in the operational field is still approached in a pragmatic way. The book edited by Wiggins and Thomas bridges theory and practice; the authors present in a comprehensive manner theoretical concepts and the applicability of the latter in real world cases. Throughout the book the reader is introduced to the fundamentals of diagnostic expertise and exposed to examples in a variety of sectors, where expertise plays a paramount role in effective decision-making and achievement of strategic organizational goals.

The 1st chapter sets the ground for understanding what diagnostic expertise is and discusses the importance and development of cue-event associations in complex environments, the context-dependent nature of expertise, and the effects of heuristics and cognitive resources limitations. Focusing on situational awareness (SA), the next chapter addresses quality issues of cues, the prevalence of traditional views on SA, the lack of ecological validity in relevant studies, and our temptation to see SA as a causal factor of wrong decisions instead of an adaptive capacity of humans.

Chapter 3 emphasizes on communication as a principal source of cues when cooperation and coordination amongst operators is present. Through the aircraft flying paradigm the authors convincingly articulate the problems associated with ineffective communication, especially the ones related to linguistics (e.g., communication protocols, interpretation of prosodic cues, non-native languages spoken under various accents and rates, and unavailability of non-verbal cues during remote communication). Starting from the importance of appropriate cue perception and diagnosis for the survival of all living species and an introduction to the functions of attention, the 4th chapter discusses the concept of vigilance and suggests an alternative explanation of boredom. The authors articulate the views that boredom is a regulatory mechanism of the brain that relieves itself from continuous high demands when searching for salient cues in monotonic operational environments.

The challenges of remote and centralized control of operations where staff is supported by technology but lack a direct contact with the operational field are presented in Chapter 5, accompanied by design strategies that can facilitate the development of diagnostic expertise for novice employees. The

advantages and drawbacks of choosing between static or dynamic, integrated or discrete, and abstract or iconic features, and information- or cause-oriented indicators are in detail argued. The authors of the 6th chapter point the effects of mood in decision-making and place expertise in its social context. Under the concept of naturalistic decision-making, positive and negative emotions might drive correspondingly a top-down or bottom-up information processing, the former being highly subject to heuristics and potentially leading to misjudgements.

In Chapter 7 the challenges in training for diagnosis are explored. Following the explanation of three cue-based learning methodologies, the author notices that changing operators' mental models is difficult to achieve, and careful design of training and consideration of context are necessary. Involvement in operational tasks, exposure to various combinations of real-world cues, consideration of effects of heuristics, intuition and level of experience compose the mosaic of cue-based training requirements. Expertise in medicine is the topic of the 8th chapter, where the authors discuss interesting contributing factors, such as the differences between tacit and explicit knowledge of health practitioners, introduction of new technology as means to augment environmental cues, communication difficulties across teams and professional groups, organizational influences and increased task complexity.

Continuing the presentation of real-world examples of diagnostic expertise, Chapter 9 regards major crimes investigation and points the plethora of available cues in the crime scene, and the demand to appropriately select and timely process those cues. The need for respective training of novice investigators is recognized and the use of decision support systems is suggested. Finance comprises the area addressed in the 10th chapter, where the authors distinguish between off-task and on-task cues, the former often taking priority over the latter during decision making and regularly leading to misalignments between organizational expectations and activities at the frontline. Through examples from finance related tasks, the reader's awareness is raised about the influences of norms, cultures and values when experts balance amongst individual, team and organizational goals.

Chapter 11 suggests the consideration of diagnostic support systems, especially when operators might become overwhelmed due to numerous salient cues under time constraints. Following the description of an aviation accident case, the author discusses the differences in diagnostic capacity between experienced and inexperienced employees, and proposes strategies to deal with high cognitive loads of novice operators, such strategies being possibly supported via technology. An empirical study about the paramount role of communication in collective diagnosis of cues in safety critical environments is presented in Chapter 12. The results of this study showed effects of "can do", masculinity and "professionals do not need help" cultures, over self-confidence, communication styles and types of leadership on collective diagnosis. The last chapter presents the paradigm of operations control center (OCC) in aviation; the author presents the complexity of modern air operations and the tight interconnectivity amongst OCC staff and agents that support flights. In such an intensive environment expertise is required to confront with unanticipated disruptions when time is limited and high financial losses might occur.

Concluding this review, the efforts of all authors to achieve comprehensiveness of their work and successfully balance between academic

and professional language must be highlighted. Another strength of the book is that although all chapters are more or less linked, the authors present their topic in an inclusive manner and, therefore, each chapter can be read separately. A highly recommended book for human factors theorists and practitioners as well industry professionals.

Nektarios Karanikas is Associate Professor of Safety and Human Factors at the Aviation Academy of the Amsterdam University of Applied Science. He was awarded his doctorate (Safety and Quality Management) from Middlesex University and he holds an MSc Human Factors and Safety Assessment in Aeronautics (Cranfield University). His prior professional experience includes aeronautical engineering, maintenance management, quality assurance, accident investigation and lecturing – research in safety and human factors (Hellenic Air Force Academies and CPD courses). He has been member of various relevant to human factors and safety associations such as ISASI, IOSH and EAAP.