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Preface

In this edited book, we will focus on documenting recent theory and research on the teaching and assessment of cognitive readiness. What is cognitive readiness? Although there are many definitions of this construct, as indicated in the chapters in this book, we view cognitive readiness through a knowledge, skills, and attributes (KSA) lens (McLagan, 1997), that is, knowledge is domain specific, skills are either domain specific or domain independent, but attributes are relatively domain independent. Attributes are considered as widely applicable but hard to train. The term attribute is usually considered to be interchangeable with the term competency. However, Klieme, Hartig, and Rauch (2008) provide an interesting alternative view of competence reflecting mainly a European view.

Figure 1 provides a graphic representation of the constructs that compose cognitive readiness. This figure also provides the overall conceptual framework that drove the selection of authors to write book chapters by the editors. As may be seen in Fig. 1 the key constructs in our model are shown and consist at the top level as KSA. Knowledge includes domain-specific knowledge for developing cognitive readiness in specific domains as well as prerequisite skills. There are five cognitive readiness skills: adaptability, adaptive problem solving, communication, decision making, and situation awareness. There are four competencies, that is, adaptive expertise, creative thinking, metacognition, and teamwork.

Our definitions of these constructs are provided in Table 1. There are many different but closely related definitions of cognitive readiness that are used in this book. Each author was requested to be explicit regarding his or her conception of the constructs that compose cognitive readiness.

Chapters in this edited book vary from broad theoretical views to more narrow in-depth descriptions of specific subconstructs composing cognitive readiness. This book is organized into two major sections: theory/context and cognitive readiness applications.

The theory/context section (Chaps. 1–10) provides a rich description of cognitive readiness and its various definitions, models, and theories, as well as models for its teaching and assessment. The specific cognitive readiness constructs of adaptability, adaptive problem solving, situation awareness, and adaptive expertise are

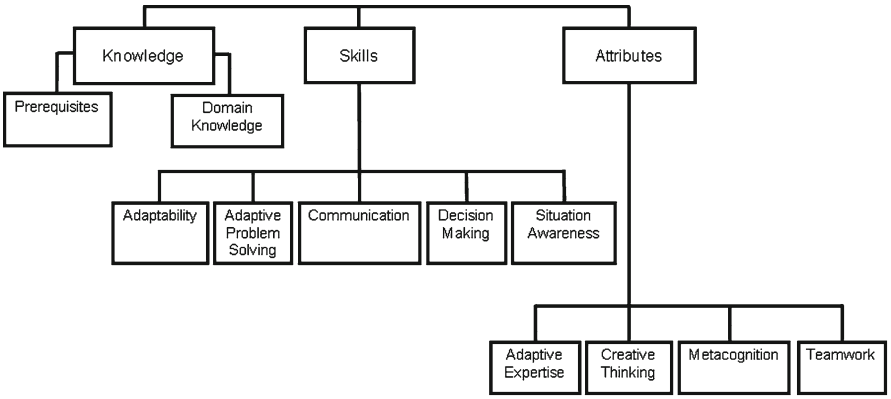

Fig. 1 Cognitive readiness model

Table 1 O'Neil's cognitive readiness skills and attributes

Skills and attributes	Definition
Adaptability	Adaptability is a functional change (cognitive, behavioral, and/or affective) in response to actual or correctly anticipated alterations in environmental contingencies (Banks, Bader, Fleming, Zaccaro, & Barber, 2001, p. 4)
Adaptive expertise	Adaptive expertise entails a deep understanding of the knowledge of a problem domain. Adaptive experts understand when and why particular knowledge is appropriate or not (Zaccaro & Banks, 2004; Ericsson, this volume)
Adaptive problem solving	Adaptive problem solving involves the ability to invent solutions to problems that the problem solver has not encountered before. In adaptive problem solving, problem solvers must adapt their existing knowledge to fit the requirements of a novel problem (Mayer, this volume). Adaptive problem solving has also been conceptualized by O'Neil (1999) as being composed of content understanding, problem solving strategies, and self-regulation
Communication	Communication is the timely and clear provision of information (Bowers, Braun, & Morgan, 1997) and the ability to know whom to contact, when to contact, and how to report (Hussain, Bowers, & Blasko-Drabik, this volume)
Creative thinking	Creative thinking is a predictor of creative accomplishment. Creative thinking is the ability to generate ideas and solutions that are novel, appropriate, and of high quality (Hong & Milgram, 2008)
Decision making	Decision making involves the use of situational awareness information about the current situation to help evaluate the utility of potential courses of action and then execute a course of action and judge its effectiveness. It involves the ability to follow appropriate protocols, follow orders, and take the initiative to complete a mission (Hussain et al., this volume)

(continued)

Table 1 (continued)

Skills and attributes	Definition
Metacognition	Metacognition is awareness of one's thinking and is composed of two components: planning and self-monitoring. Planning means that one must have a goal (either assigned or self-directed) and a plan to achieve the goal. Self-monitoring means one needs a self-checking mechanism to monitor goal achievement (O'Neil, 1999)
Situation awareness	Situation awareness involves being aware of what is happening around you, to understand how information, events, and your own actions will affect your goals and objectives, both now and in the near future. More formally, situation awareness can be defined as the perception of elements in the environment within a volume of time and space, the comprehension of their meaning, and the projection of their status in the near future (Endsley, 1995, p. 36)
Teamwork	Teamwork is a trait of the individual that predisposes the individual to act as a team member. There are six teamwork processes: (a) adaptability, (b) coordination, (c) decision making, (d) interpersonal, (e) leadership, and (f) communication (O'Neil, Wang, Lee, Mulkey, & Baker, 2003). A complementary definition is provided by Bowers and Cannon-Bowers in this volume. Their definition of teamwork includes knowledge of teamwork, leadership, mutual performance monitoring/back-up, communication, interpersonal skills, and positive teamwork attitudes

also presented. The section closes with chapters on twenty-first century skills and a cognitive readiness prerequisite skill.

The cognitive readiness applications section (Chaps. 11–17) provides both empirical and theoretical data of creative thinking, the use of analogies for instruction, and the use of simulations for teaching and assessment. This section concludes with two chapters related to software support and team training for cognitive readiness. In summary, this section's chapters are a synthesis of both empirical as well as theoretical views of specific cognitive readiness constructs.

The chapters also reflect the following issues: (1) a focus on a KSA view of cognitive readiness; (2) a focus on individual cognitive readiness KSA rather than team cognitive readiness (the exceptions are the chapters by Bowers and Cannon-Bowers, and Hussain et al.); (3) contexts in both schools and the workplace; (4) multiple approaches for assessment; (5) a focus on validity and cost; and (6) common low-stakes assessment purposes, i.e., diagnostic, program evaluation, or accountability.

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