monitoring directly may benefit elderly residents and healthcare professionals, we posit that their acceptance is determined foremost by the ability to control and influence the technique, and by implication, the (careful) design of the pervasive technology.

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Purpose Numerous findings and principles from cognitive science and psychology inform our understanding of human memory. Scientific issues raised in these fields are challenging and adequate design-based theories of intelligence[1] are still lacking. This invites valid scepticism regarding so called 'brain training' products. We posit that scientifically valid studies can guide the development of software to support and enhance memory performance among older adults. In this paper, we synthesize relevant theory and research findings about cognition and affect. We describe how they can be leveraged to create functional specifications (i) for designing integrated client-server software that supports memory performance for computer-literate adults, and (ii) simultaneously provide a test bed for sharpening and extending theories upon which the system is based. A key principle governing our designs is that, like other skills, memory skills are difficult to develop by reading alone (e.g. self-help books[2]. Developing skills requires deliberate practice that (i) articulates content, (ii) regulates the timing of practice and (iii) provides two types of feedback, knowledge of results and process feedback[3]. Pertinent theories and findings for our specifications include: perceived self-efficacy[4,5] goal setting[6], self-regulated learning[3], testing memory and spacing effects[7], cued recall, neuroticism and stress, use of mnemonics[8], learning strategies, self-management of knowledge gaps[9] and goal processing[10]. Our integrated-software specifications call for functionality to promote users' off-line engagement in a mixture of aerobic and resistance training, optimal sleep hygiene, and healthful nutrition, which appear to be beneficial to human cognition[11,12]. We examine issues of transfer of skills and conjecture to address them, in particular by helping users to practice the recall of personally relevant information. Our design principles also ensure that products derived from our specification are straightforward and easy to use.

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