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Standards for smart education – towards a development framework

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Abstract

Smart learning environments (SLEs) utilize a range of digital technologies in supporting learning, education and training; they also provide a prominent signpost for how future learning environments might be shaped. Thus, while innovation proceeds, SLEs are receiving growing attention from the research community, outputs from which are discussed in this paper. Likewise, this broad application of educational digital technologies is also the remit of standardization in an ISO committee, also discussed in this paper. These two communities share a common interest in, conceptualizing this emerging domain with the aim to identifying direction to further development. In doing so, terminology issues arise along with key questions such as, *How is smart learning different from traditional learning?* Presenting a bigger challenge is the question, *How can standardization work be best scoped in today's innovation-rich, networked, cloud-based and data-driven learning environments?* In responding, this conceptual paper seeks to identify candidate constructs and approaches that might lead to stable, coherent and exhaustive understanding of smart learning environments, thereby providing standards development for learning, education and training a needed direction. Based on reviews of pioneering work within smart learning, smart education and smart learning environments we highlight two models, a cognitive smart learning model and a smartness level model. These models are evaluated against current standardization challenges in the field of learning, education and training to form the basis for a development platform for new standards in this area.

Keywords: Smart learning, Smart learning environments, Standardization, Reference model, Development framework

Introduction

The word 'smart' is now routinely used by the educational research community forming new terminology like Smart Education, Smart University, Smart Learning, Smart Classroom, Smart Learning Environment, etc. (Uskov et al., 2017; Roumen & Kovatcheva, 2017). We could see this as an expression of the dynamic nature of the contemporary educational domain, which is now also often characterised in terms of transformation (Liu et al., 2017; Bell, 2017; Walker et al., 2016; Tuomi, 2013; Baker & Wiseman, 2008). Fast changing domains need to be conceptualized in order to be understood and optimised for their stakeholders (Bell, 2017). This is one role of educational research now articulated in several journals and books and explored in this paper. In the domain of digital technology, however, innovation has its own dynamics and is not necessarily driven by research – often it is all about being 'first to market'. Thus, from a different

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