

Chapter 25

The Significance of Situation Awareness in Education: Being Aware of What We Learn

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ABSTRACT

Learning today is no longer related to the “classroom” as the physical environment; it is instead an “across spaces” place characterized by the possibility to build serendipitous, pervasive and seamless experiences. Such experiences are in fact no more constrained to space-time limits and bounds but focused on context and situation awareness to enhance the learning process. Also, these experiences are often associated with next generation technologies which well fit to a paradigm shift marked by seamless continuity of learning. The interest in context-aware educational settings mainly based on mobile and sensor systems has led researchers to investigate new ways to recognize issues mainly related to the definition of “learner’s contextual information” (profile information in situation) and, on the basis of this information, to identify the “types of adaptation”. In this work, we present the first theoretical and applicative results that the Italian scientific community has achieved as part of the research lines that revolve around the concept of Situation Awareness (SA).

INTRODUCTION

In the last decade, the use (and abuse) of formulas such MOOC, Open and Distance Learning, Ubiquitous Learning, has accustomed us to think of learning as something that happens, or should

happen, “elsewhere”, in a place whatever, as long as physically other than that in which the learner is. The ability to access anywhere (Learning Anywhere) and anytime (Learning Anytime) to a hypothetical immaterial bubble in which resources and learning objects reside (a kind of

new, immaterial and hypertrophic edition of the Alexandria library) led someone to overlook that there is a “here and now” of the learning process.

A part of the Italian scientific community involved in educational research has instead worked in the opposite direction, giving meaning and value to the context as the object of investigation and cardinal element of the learning process (Aiello, Di Tore, Di Tore, & Sibilio, 2013; Frauenfelder, Rivoltella, Rossi, & Sibilio, 2013; Rossi, 2011; Rossi, Sgambelluri, Prenna, Cecoro, & Sililio, 2013; Sibilio, 2013).

Rivoltella, in particular, reported vigorously, at the center of the pedagogical-didactic debate, the concepts of situation and of situated learning (Rivoltella, 2013). According to the concise and effective definition of Rivoltella, “situation is a landscape into which learning actions make sense” (Rivoltella, 2014). Rivoltella cites the principle of “situated meaning” by James Paul Gee:

The meanings of signs (words, actions, objects, artifacts, symbols, texts, etc.) are situated in embodied experience. Meanings are not general or decontextualized. Whatever generally meanings come to have is discovered bottom up via embodied experiments. (Gee, 2003)

Pedagogy and education, however, are certainly not the only disciplines that have investigated the importance of the situation. The idea of situation and, more specifically, the concept of Situation Awareness indeed seem to be a theoretical meeting place of distant fields of knowledge, from aeronautics to medicine, through neuroscience and computer science.

The importance of ‘situation awareness’ (SA) in assessing and predicting operator competence in complex environments has become increasingly apparent in recent years. It has been widely established that SA is a contributing factor to many commercial and military accidents and incidents. (Banbury & Tremblay, 2004)

This very peculiar nature, which eludes the disciplinary boundaries, makes it difficult to find a general definition:

Yet determining exactly what constitutes SA is a very difficult task, given the complexity of the construct itself, and the many different processes involved with its acquisition and maintenance. (Banbury & Tremblay, 2004)

Trying to narrow down the field, we can state that Situation Awareness concerns those activities in which physical and cognitive tasks are performed in a complex system in which individuals and artifacts interact under quickly changing conditions (Salmon, Stanton, Gibbon, Jenkins, & Walker, 2009).

Situation Awareness and complexity, then, are closely related, at least as complexity and unpredictability are coupled:

Weather is the classic example: many components interacting in complex ways, leading to notorious unpredictability. Ecosystems, for instance, economic entities, developing embryos, and the brain - each is an example of complex dynamics that defy mathematical analysis or simulation. (Lewin, 1999)

Sibilio (2013) uses Lewin to illustrate how “the meaning of the nonlinear interactions in terms of systemic adaptation references to the difference between chaos and complexity”:

In one case, you may have a few things interacting, producing tremendously divergent behavior. That’s what you’d call deterministical chaos. It looks random, but it’s not, because it’s the result of equation you can specify, often quite simple equations. On another case interactions in a dynamical system give you an emergent global order, with a whole set of fascinating proprieties. (Lewin, 1999)

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