Emergent Knowledge Artifacts for Supporting Trialogical E-Learning

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ABSTRACT

This article elaborates on scenarios for collaborative knowledge creation in the spirit of the trialogical learning paradigm. According to these scenarios, the group knowledge base is formed by combining the knowledge bases of the participants, according to various methods. The provision of flexible methods for defining various aspects of the group knowledge is expected to enhance synergy in the knowledge creation process and could lead to the development of tools that overcome the inelasticities of the current knowledge creation practices. Subsequently, these scenarios are projected to various knowledge representation frameworks and for each one of them, we analyze and discuss related techniques and identify issues that are worth further research.

Keywords: collaborative learning; electronic learning (e-learning); educational technology; technology mediated learning; knowledge artifacts; knowledge models; semantic models; knowledge management

INTRODUCTION

Classical learning theories are based either on the *knowledge acquisition* metaphor (where a learner individually internalizes a body of knowledge) or on the *social participation* metaphor (where a group of

learners collaboratively appropriate a body of knowledge). Although widely accepted, these theories do not sufficiently capture innovative practices of both learning and working with knowledge (i.e., knowledge practices). Only sharing of knowledge in action, that is, sharing the process of learning itself, is a reliable base for developing a shared cognition (seen both as a group and an individual characteristic). In this context, the emerging theory of "*trialogical learning*" (*TL*) focuses on the social processes by which learners collectively enrich/transform their individual and shared cognition.

According to trialogical learning, knowledge creation activities rely heavily on the use, manipulation, and evolution of shared knowledge artifacts externalizing a body of (tacit or explicit) knowledge (Paavola, Lipponen, & Hakkarainen, 2004). By representing their cognitive structures or knowledge practices under the form of artifacts, individual learners can interact with themselves as well as with external tools (e.g., computers, information resources) to negotiate the meaning of concepts and signs embodied in these artifacts; this would ultimately allow them to reach a common understanding of the problem at hand. We could therefore consider the notion of shared objects of activity as the cornerstone of trialogical learning, a notion that is general enough to accommodate the requirements of various application contexts.

Shared knowledge artifacts are very useful in many applications involving some kind of collaboration. For instance, a video that records how group members carry out their tasks could be considered as a shared knowledge artifact that the group could annotate (with free text or with respect to an ontology), analyze, and further discuss (e.g., for capturing tacit group knowledge). Moreover, and more interestingly, a knowledge artifact could take a more formal substance (e.g., for capturing explicit group knowledge) as in the case of documents (e.g., a survey article), conceptualizations (e.g., a data/knowledge base), or even software code exchanged within a group. Hereafter, we shall use the term *knowledge artifact* to refer to what is being created and/or shared by a group of learners (which could be a set of words, documents, concept maps, ontologies, annotations, etc.). It is worth mentioning that the paradigm of trialogical e-learning can be very useful within communities of practice (CoPs), as it can facilitate the negotiation of meaning and it can contribute to the development of explicit and innovative knowledge inside a CoP (Domingue, Motta, Shum, Vargas-Vera, Kalfoglou, & Farnes, 2001).

In order to communicate and meaningfully interpret their individual viewpoints, cooperating learners need to agree on a common conceptual frame of reference. Models and techniques that allow diversification and flexible amalgamation of different worldviews are still in their infancy. In this article, we investigate various ways to build emerging knowledge spaces using the trialogical learning paradigm for eliciting the functional requirements. In particular, we focus on the various methods that can be used in order to form the common knowledge of a group by combining the individual knowledge of its members. The provision of flexible methods for defining various aspects of the group knowledge is expected to foster knowledge creation processes, and could lead to the development of tools that overcome the inelasticities of the current knowledge creation practices.

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