

Interoperability in Asynchronous Collaborative Learning Forums

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Abstract

"Asynchronous collaborative learning forums" (abbreviated as ACLF) is the generic title given to a category of educational technologies that are widely used, variously understood, but that manifest specifiable uniformities in their structural and behavioral characteristics. This paper enumerates these uniformities in a manner such that they can be represented as a general, abstract model independent from, but also descriptive of specific implementations and systems. This paper then shows how such a model would allow collaborative learning activities to be analyzed, evaluated, and managed in ways that are both flexible and platform-independent.

ACLF: A Common Definition & Model

Internet technologies that support the asynchronous interchange of messages (ACLF systems) are used in a wide variety of collaborative learning contexts, and are described using a broad range of terms and theoretical frameworks. These systems have been labeled "bulletin boards"[5] "computer conferences" [12], "learning networks" [7] and "discussion" [11] or "knowledge forums" [14]. They have been understood in terms of "distributed decision-making"[16] "knowledge construction" [14] "communities of inquiry" [13] and "computer-supported collaborative learning" [9] to name just a few theoretical frameworks.

These systems, and the turnkey instructional management systems in which they are frequently integrated, are widely used in a broad variety of educational settings and organizations today. WebCT, for example, includes an asynchronous "discussion" tool, is available in 14 language, and is said to be used by "thousands of institutions in more than 80 countries worldwide" [15]. Similarly, Blackboard, with its "discussion board" component has been adopted "at 3,000 Institutions in 140 Countries" [4]. Edutools (www.edutools.info) ranks dozens of systems that incorporate "discussion forums" technology,

and there are also many more stand-alone tools available [18].

Despite the variety of software --and of ways in which its educational efficacy is understood-- these systems manifest specifiable uniformities in their underlying structural and behavioral characteristics. The most basic of these commonalities is represented by "messages" (textual, multimedia or otherwise) possessing titles, which are both arranged systematically (e.g. sequentially or thematically), and are associated with contributor names (e.g. actual or pseudonymous). Further shared characteristics are:

- Messages that are composed, shared and organized over specifiable periods of time
- Participants/authors who are identified in some manner, have permissions associated with them (e.g. defining them as groups/subgroups), and can undertake specifiable actions (e.g. composing and reading messages)
- The fact that messages can identify new topics, reply (recursively) to previous messages, and be thus hierarchically organized or structured
- This organizational hierarchy or structure can be extended, either to a higher level of generality (to include, for example, forums and sub-forums), or a lower level specificity (attachment, elaboration, counter-argument)
- Messages can also be organized by date, author, title and through the use of a variety of other labels and criteria, chosen by the participants and/or enforced by the system

The data-structures underlying these commonalities can form the basis of a common, generalized and abstract model. Such model, when further refined and tested, has the potential to describe the structures and actions arising in these asynchronous communication systems, and could also be adaptable, extensible, and capable of simplification.

ACLF: Benefits

Together, the data elements that make up this ACLF abstract model can be said to represent structured data or "metadata." They take the form of attribute/value pairs, with multiple and semantically rich interrelationships. (Such metadata is, of course, much sought after in

recent work on learning objects, repositories and the semantic Web in general.) As Barros and Verdejo [3] explain, "computer mediated collaborative learning [in general allows for] the recording of a large amount of data about the interaction processes and the task performance of a group of students." This, in turn, can provide empirical data [which] is a very rich source to mine for a variety of purposes. Some purposes are of practical nature like, for instance, the improvement of peer awareness on the on-going work. Other purposes are of a more long-term and fundamental scope such as to understand sociocognitive correlations between collaboration and learning.

Other, more specific purposes and applications include pattern and network analyses [2], concept or "dialog" mapping [8], latent semantic analysis [10], and syndication [6]. Still further

potential benefits include data preservation for legal and regulatory purposes, and the transfer of structural templates and other resources from one system to another. (In ACLF systems, such templates or structures can be specified in terms of forum/sub-forum structure, group memberships, participant permissions, etc.) These benefits, however, can only be realized if the structured data generated by ACLF systems can be represented in a manner that is system-independent such that it can be extracted and made portable and reusable.

Conclusion

By simultaneously enabling a wide variety of functions and leveraging their common characteristics, the model proposed in this paper has the significant potential to increase the interoperability, sharing and reuse of educational systems and resources.

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