

The Interdisciplinary Study of Interdependencies

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Abstract:

Modularity is a very general principle for managing complex systems. It suggests the division of a system into smaller parts, called modules. This principle has been applied to complex systems in many domains, including product engineering, organizations and development processes. In any domain, modules must interact in a coordinated fashion for an effective system. Interactions imply interdependencies. Therefore, interdependencies between the modules need to be supported—analyzed, engineered, documented, developed, and managed—efficiently and effectively if the complex system is to be successful. Indeed, different disciplines have created approaches for supporting interdependencies, each with its particular perspective. This paper surveys approaches from several different disciplines, including software engineering, organization science, management, computer-supported cooperative work, and human-computer interaction. It uses a theoretical framework that supports the comparison of approaches across disciplines. This paper also creates a vocabulary for discussing interdependencies. Commonalities among the approaches are identified and suggestions for promising research areas in the study of interdependencies are described.