

Information-Seeking Tools for Global Teams

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Information-seeking is a critical aspect in the work of many productive teams. It includes the cognitive processes and behaviors associated with actively acquiring the information required to accomplish some task. (Pirulli & Card, 1999) . Information-seeking behaviors can range from formal search of, e.g., library sources, to more informal, social contact with peers. It has been shown that how information-seeking is accomplished has a significant effect on productivity and depends on individual, situational and task factors (Marchionini, 1995). Information-seeking provides a larger, goal-directed context for understanding collaboration.

One important question has been whether seekers prefer social or non-social information sources. Source preferences depend on many interacting contextual and task factors, including information relevance and quality, familiarity, organization distance, trust in the source, project-stage, information-type and effort involved in seeking. Another factor may be national and organizational culture. There are theoretical reasons to believe that cultural background may contribute to information-seeking strategies. (Carlin and Komlodi , 2004), associated, for example, with the degree of "collectivism" in a culture. Indeed, empirical research has shown some cultural effects of information-seeking behaviors and strategies (Dunker, 2002; Iivonen & White, 2001, Komlodi et al., 2004; Komlodi & Gal, 2005; Honold , 1999).

Because global teams has become so pervasive in software development, we have explored the role of cultural factors by studying information-seeking source in a global context with software engineers of diverse national cultures (Milewski, 2006). The information-seeking strategies of engineers has received substantial attention (Tenopir & King, 2004) and while it is commonly cited that engineers have strong preference for informal, social, and often oral sources of information compared with more formal, non-social sources such as documentation and other written sources, preferences depend on many factors (Hertzum & Pejtersen, 2000). Our web-based survey of 84 engineers spread across four locales required respondents to predict where they would get various kinds of information in a variety of software development scenarios.

For the software development scenarios used here, web browsing was the most highly rated source of answers. Beyond that however, there was little evidence for an overall preferences for either formal, non-social sources on the one hand, or for informal, social sources on the other. There was a strong effect of task-type on preferences. For "factual" tasks (e.g. what methods are available for a particular software class) non-social information sources were generally favored while for "diagnostic" tasks (e.g. why won't my program compile) social sources were favored. However, cultural differences

moderated this general trend. For example, engineers from a more collectivist culture (India/Pakistan) rated social sources as highly as non-social sources for the factual tasks so that ratings for social sources were the same for factual and diagnostic tasks. Also, engineers from more individualistic cultures (NW-Europe) rated non-social sources as highly as social sources for diagnostic tasks. While this study explored only reported preferences, we are currently analyzing further data on actual information-seeking behaviors amongst globally-distributed student software teams.

National culture differences in information-seeking likely have significant implications for the entire dynamic collaborative fabric of global teams. For example, if some members rely heavily on social sources and others avoid them, conflicts and misunderstandings may arise and be reduced only by the careful design of collaborative tools. We have not yet developed such tools for the multicultural context, but our current and planned research target three specific areas. The first two are based on the presumption that when cultures prefer social sources it is related to higher perceived credibility in humans rather than, for example, a simple fondness for face-to-face contact. Popular new techniques for social book marking and tagging (Millen, et al, 2005) might be particularly effective in multicultural teams because they integrate social cues with non-social means of information retrieval. We are interested in both the positive effect of increased collaboration and also negative effects wherein decisions are based on majority filtering rather than potentially expert minorities. Moreover, techniques for increasing the credibility of social book marking such as listing social sample size and level of expertise may increase this technique's effectiveness among cultures that do not normally favor social sources. Finally, techniques for integrating traditional retrieval of information with synchronous, interactive communications (e.g. IM, voice and video) with its authors may also be an effective way of integrating social and non-social sources, although these techniques will have to be applied carefully assuming that those that avoid social sources may also avoid sharing information socially. We still need a fuller understanding of the underlying causes of cultural source preferences, but it would appear that research-based tools can facilitate collaboration of global, multicultural teams.

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