FAYETTEVILLE, Ark. – It seems so simple – the boss says “do it” and the workers comply. But when it comes to adopting new software development methodologies, managerial mandates are the least effective means to achieve compliance in a technical environment, according to University of Arkansas researchers in the Sam M. Walton College of Business.

“Previous researchers found that the more voluntary the adoption of a technology is, the less likely it is to be used,” explained Bill Hardgrave, Edwin & Karlee Bradberry Chair in information systems. “We expected that making the usage mandatory would increase employees intention to comply, but it didn’t. In fact, of all of the parameters we evaluated, managerial mandate was the least likely to induce compliance.”

Hardgrave and researchers Cynthia Riemenschneider, assistant professor of information systems, and Fred Davis, professor and department chair of information systems, wanted to know what influenced employee intentions to adopt a new methodology for developing software. The results of their research will appear in an upcoming issue of the Journal of Management Information Systems.
According to Hardgrave, implementing development methodologies has been called "one of the most serious areas of concern in information systems (IS)." He cautions that it is important to distinguish between the adoption of specific software development tools and adoption of an entire methodology.

"Earlier research had mixed or inconclusive results, which may have been caused by the unintentional confusion between adoption of a development tool and the adoption of the methodology it is used with," said Hardgrave. "We avoided this possibility by studying the adoption of a methodology that did not include the introduction of new development tools."

Methodologies are comprehensive systems that standardize the steps in the development process. Although they can provide increased productivity and profitability, development methodologies are only used in about half of all companies that develop software because of the difficulties in deploying the systems.

"Many organizations are trying to improve their software development by implementing methodologies," explained Davis, who holds the David D. Glass chair in information systems. "But this usually represents a substantial change from their previous practices. Developer resistance can prevent the company from fully deploying or realizing the benefits of the methodology."

Overcoming this resistance requires knowledge of the factors make an employee intend to use the methodology. To determine these factors, the researchers conducted a study with 128 developers in a Fortune 1000 firm implementing a new methodology that had been custom-created for the company’s internal use.

"The new methodology represented a radical change for the developers," explained Hardgrave. "They moved from an environment with no prescribed processes in place to an environment guided by an organization-wide methodology."

The developers were introduced to the methodology in a presentation, trained with it for six weeks and given written and online instructions. At the end of the training period, developers were instructed in writing to begin using the new policy. After 12 weeks they were given a questionnaire to assess their intention to use the new methodology on the basis of five common determinants – usefulness, compatibility with their existing practices, social pressure, complexity of the new methodology and organizational mandate.
"As we expected, complexity had little impact on intentions," Hardgrave added. "But neither did organizational mandate. The greatest influences were usefulness, compatibility and social pressure."

According to the researchers, these findings point to several approaches that managers could take to improve acceptance of new methodologies. Perceived usefulness is crucial; if employees do not think a methodology is useful, they are unlikely to adopt it. Demonstrating the individual productivity benefits of the methodology could help to address this issue, for example.

Managers might also improve adoption by explicitly demonstrating how the new methodology is compatible with existing work practices. The researchers also suggest designing a migration path that will introduce parts of the methodology incrementally rather than in a single step.

When mandates are used, the researchers point out that they need to be used effectively. At the company in the study, as in many methodology deployments, the mandate did not include an expressed reward or punishment. They speculate that this could have weakened the influence of the mandate, which might have been more effective if methodology use had been directly rewarded or if non-use had been severely punished.

"From a managerial perspective, mandates may be used as a lever, but it would me a mistake to focus on this to the exclusion of usefulness, compatibility and social pressure," said Hardgrave. "An ideal implementation would target all five of these known intention determinants. Merely mandating methodology use by software developers does not guarantee that the methodology actually will be followed."

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