

Psychology researchers explore how engineers create

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Simply put, engineers make things. But is finding that "new" invention a massive mental leap from point A to point B, or are there scores of unnoticed intermediate steps in between?

The University of Pittsburgh's Joel Chan and Christian Schunn say that not enough has been done to understand how engineers create. Understanding the process, they say, may provide a road map for speeding up innovation.

Chan, a graduate student in psychology in Pitt's Kenneth P. Dietrich School of Arts and Sciences, and his mentor Schunn, a professor of psychology as well as a senior scientist in Pitt's Learning Research and Development Center, recently published a paper online in the journal *Cognitive Science* that delves into the workings of the creative engineering mind by examining the process in real life.

"Most companies make all their money on new products," Schunn says. "They barely break even on old products. They have to innovate to be viable, and that's a hard path to follow."

In the pursuit of innovation, Schunn says, companies pay big money to consultants to help spur creativity. "But little of what they do is based on research," he adds.

So, along with Chan, Schunn used multiple hours of transcripts of a professional engineering team's "brainstorming" sessions and broke

down the conversation systematically, looking for the path by which thought A led to thought B that led to breakthrough C.

"We want to understand the nature of cognitive limitations," Schunn says. "Why do we get stuck (on an idea), what kinds of things get us unstuck, and why do they work?"

What they found in the sessions they studied is that new ideas didn't spring fully formed after massive cognitive leaps. Creativity is a stepwise process in which idea A spurs a new but closely related thought, which prompts another incremental step, and the chain of little mental advances sometimes eventually ends with an innovative idea in a group setting.

Channeling Thomas Edison's dictum that genius is 1 percent inspiration and 99 percent perspiration, Schunn concludes that "inspiration creates some ... perspiration."

So, thus far, the lesson seems to be that if you're not making creative progress, don't wait for a bolt from the blue, keep talking to your peers, and keep sweating.

Provided by University of Pittsburgh

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