

SFU Press Releases Collection

These archival copies have been generated from web press releases maintained and originally written by SFU Communications and Marketing. Where possible, an effort has been made to preserve the public comments left on the website as well as any included photos or other images. All textual content should be faithful to the original press releases; contact numbers have been removed but they have not otherwise been altered in any way. However, this collection of documents spans multiple generations of web authoring software and not all formatting will be exact.

Eureka! Mathematicians find solutions in unexpected places

Contact: Peter Liljedahl, [Phone removed]; pgl@sfu.ca
Marianne Meadahl, Media & PR, [Phone removed] marianne_meadahl@sfu.ca

March 31, 2004

Leading mathematicians do some of their best work in the shower, while cooking, even while asleep. That's how several internationally reputed math geniuses describe what happens when the proverbial light bulb goes on, otherwise known as the ah'ha experience, that pivotal moment when they think 'eureka!' as a problem they are trying to solve suddenly makes sense.

SFU education doctoral student Peter Liljedahl surveyed 25 mathematicians to determine how those moments are achieved. Most said how the idea came about - and how it made them feel - held greater significance than the idea itself. "It was Monday morning in the shower, in conversation, while falling to sleep - these are how they remember their greatest ah'ha moments," says Liljedahl. "Through their use of metaphors and visual imagery in describing these moments, it also became very clear that what mathematicians do is a highly creative process." Liljedahl wanted to study what prompted these moments to see if they could be manufactured in a controlled setting, like a classroom. He expected to find something more firmly rooted in their ideas. Instead, the mathematicians often conveyed the essence of these moments without telling him anything about such details. "Usually the ideas were not that significant," he says. "But the mathematicians painted these incredible pictures around them that were very personal and had deep pedagogical implications." They also showed an incredible respect and acceptance of the fact that a huge part of the mathematical process relies on chance, which has critical implications for problem solving." Among survey participants were five Fields medallists, including Italian mathematician Enrico Bombieri, a leading authority on number theory and professor at Princeton University. The medal is comparable to a Nobel prize. Liljedahl, who collaborated with SFU mathematics professor Peter Borwein, based his work on a survey created in the 1940s by Jacque Hadamard, who studied the psychology of mathematical invention.

Liljedahl's work could lead to new strategies for teaching math in the classroom. He has since restructured a math course on problem solving to monitor the occurrence of ah'ha moments. During a trial run, he gave a class of university students more time, more direct contact and encouraged them to keep journals documenting their feelings, and even their failed attempts, during the process. "It's clear that to be able to produce such moments they need room to move and time to incubate and talk things through," surmises Liljedahl.

Not only is the ah'ha experience accompanied by an emotional response, Liljedahl says that response can be substantial enough to alter the negative belief structures and poor attitudes of resistant mathematics students.