



Analogy, Causality, and Discovery in Science: The engines of human thought

Professor Kevin Niall Dunbar

Director: Laboratory for Thinking, Reasoning, and Educational Neuroscience
Professor: Department of Human Development and Quantitative Methodology
College of Education, University of Maryland College Park

At the

University of Hong Kong

Dr. K.N. Dunbar: "The Faculty of Education Visiting Scholar"

Science of Learning & Educational Neuroscience

January 13, 2015, 12:45-2:00pm

Open a newspaper or webpage, read a textbook, visit a classroom, or take an online class with 60,000 fellow students, and you will be exposed to the most fundamental teaching and learning tool that the human mind has created: Analogy. Analogy, the understanding and creation of new knowledge using previously acquired knowledge is central to being human and is so frequently used that we often fail to note that it underlies all learning. Over the past 25 years, we have been investigating the use of analogy by students, scientists, and even politicians. Of note, often times analogies can fail to be effective, particularly in educational contexts. To understand why, in my laboratory, we have put analogy under the microscope, drawing empirical power from the exciting disciplines of The Science of Learning, and its deeply related discipline, Educational Neuroscience. We have discovered key situations and brain mechanisms underlying analogical thought and discovery that are needed for learning. Furthermore, in discovering why analogies can fail (in ways that I will identify), we have also found how we can propel the use of analogies that succeed. Here we have found that causal reasoning is often a triggering mechanism for the use of analogy and it can provide innovative opportunities for learning—both in and out of the classroom—as well as for explanation and further discovery.