

THE NISOD PAPERS



An occasional publication dedicated to topics of interest to community and technical college educators.

Rationality in Education

In 1993 a new word entered the English language completely unnoticed. Perhaps the most important educational term since John Dewey, American philosopher, psychologist, and educational reformer, introduced “critical thinking” in 1910, “dysrationality” describes being intellectually capable of rational thought, but failing to use that capacity to think and act rationally. Since that time, a team of psychologists led by Keith Stanovich has confirmed the reality of dysrationality, and has expanded the understanding of rationality and irrationality through numerous experiments resulting in nearly 100 published papers and three books. The first of these three books, *What Intelligence Tests Miss*, argues that rationality is a measurable entity, but that it goes unnoticed and unmeasured because of education’s focus on the cultivation of intelligence through content mastery. The second, *Rationality and the Reflective Mind*, makes the case that rationality and intelligence are separate entities, explaining the classic conundrum of why smart people sometimes do dumb things. The third book, *The Rationality Quotient*, presents the various measurable entities that make up human rationality and invites educators to turn their attention to building rationality among students.

Irrational Thinking

To emphasize the importance of rationality, Stanovich and other scholars have highlighted the numerous social and personal costs of irrational thinking. Irrational behaviors cause individuals to make poor financial decisions such as investing in get-rich-quick schemes; to reject modern medical practices and over rely on homeopathic medicine; to be susceptible to pseudoscientific claims; to be involved in religious cults; to reject important and well-established scientific theories and practices such as evolution, global warming, and vaccinations; to fall prey to demagoguery resulting in political disempowerment; and to believe in conspiracy theories. Rather than a lack of intelligence or education, these manifestations of irrationality can often be traced back to an individual’s disinclination to use his or her cognitive powers to make rational decisions.

Part of this disinclination occurs because of how the human brain works. Scientists now know that, in general terms, the human brain operates in two modes known as “system one” and “system two.” System one is the default processing mode that is quick, relies on mental shortcuts such as familiarity, is often emotional, can be inaccurate, and fails to deploy the cognitive resources for decisions

and judgments that require thoughtful reflection. System two requires conscious effort, uses many more cognitive resources than system one, is rather slow, and requires suppression of the default inclination to quickly reach conclusions. The fact that human brains default to “system one” helps explain why people often make emotional decisions, ignore evidence, are swayed by emotional arguments, and continue believing debunked claims.

Mindware

According to Stanovich, dysrationality arises from more than merely failing to override the inclination toward quick and messy thinking. It also arises from problems surrounding “mindware.” Simply put, mindware consists of learned knowledge and strategies at our disposal that help us make better decisions and reach sounder judgments. Quite often, these thinking strategies (mindware) are missing because educational systems do not typically emphasize applying thinking strategies beyond educational coursework. For example, even when students advance far enough in mathematics courses to receive instruction in probability theory, they rarely learn how to apply knowledge gained regarding probability to real-world problems.

Even when individuals learn important thinking strategies, they sometimes fail to see how those strategies might apply to various fields. Some college courses teach thinking strategies and principles such as the scientific method, yet students still have difficulty transferring these lessons to problems outside of class. For example, an undergraduate student might learn that effective scientific design requires a control group, data collection, variable control, adequate sample size, and other factors. However, that same student might not think that this type of thinking applies to personal health decisions, investing for retirement, or the value of education. Hence, failure to apply knowledge about thinking strategies from one field to another can result in irrational decisions as well, potentially leading to a lower quality of life.

Contaminated Mindware

In addition to the potential problems caused by missing mindware, and the ineffective application of thinking strategies, irrationality can also happen because of “contaminated mindware.” Contaminated mindware describes unconscious rules that drive an individual’s decisions and judgments that disregard scientific evidence. Virtually all unscientific thinking qualifies as contaminated mindware, such as acceptance of conspiracy theories and pseudo-scientific thinking, beliefs in paranormal activity (attempted communication with the dead, mental telepathy, or contact with aliens),

and overreliance on intuition. Certain cultural practices, even if widely accepted, also qualify: voodoo, exorcism, and spiritual purification through self-mutilation, to name a few. These various practices and beliefs may seem quite diverse, but they are in fact united by the lack of evidence supporting their efficacy or veracity. The practices listed above are labeled as unscientific because experiments testing these practices have consistently failed to produce positive results under scientific conditions. Despite the lack of scientific foundation supporting these mental theories, millions of people continue to accept them as being real. This disconnect between what one believes and what science has confirmed or disconfirmed is what Stanovich calls contaminated mindware.

Pedagogical Implications

The fact that irrationality arises from missing mindware, contaminated mindware, failure to apply thinking strategies, and the brain's tendency to quickly respond to matters that require prolonged reflection has profound pedagogical implications. The confirmed existence of dysrationality and the recent emergence of tests that quantify rational thinking should force educators to consider making rationality a part of academic courses. What would this entail? Currently, the educational system focuses strongly on content mastery. That focus is supported by testing strategies that emphasize problem solving (mathematics, physics, chemistry), memorization of content (the exact sciences, social sciences, history, foreign languages), and writing (most disciplines). It would be equally possible to focus on content and skills that enhance rational thinking and an understanding of its impediments.

Science classes could demonstrate ways in which thinking errors are committed (while simultaneously teaching the scientific method) and emphasize not merely experimental design within a particular field, but how that same process can and should be extended to other aspects of life. Business classes could include instruction regarding the recognition and avoidance of pyramid schemes and concrete advice about retirement planning and the errors that people commonly commit in the process. Psychology classes could instruct students about cognitive errors and how to avoid them, including lessons on dysrationality, cognitive traps, heuristics and biases, and, most importantly, how to recognize, avoid, and overcome irrational thinking on a personal level.

Being Rational Requires Effort

In my experience, students are fascinated by how the mind works and are consistently surprised to learn that all humans can act irrationally and make sub-optimal decisions because of the way the brain operates. Students are surprised to learn that humans process information emotionally before doing so rationally. Once students learn the pattern of rational behaviors, they are able to see instances in their lives in which people react emotionally to matters that deserve more careful thought.

In an emotionally charged and divisive political climate, learning about rationality and irrationality helps students

begin to make sense of the emotions driving discord and see the need for more restrained, analytical approaches to resolve seemingly intractable problems. Most importantly, once students learn that being rational requires effort, they begin to see the importance of evidence in decision making.

Social and Personal Costs

As inspiration to increase focus on enhancing students' rationality skills in the classroom, educators need to be aware of the staggering social and personal costs of irrational thinking, behavior, and judgment. One scholar has claimed that irrationality in the political realm "is the greatest social problem humanity faces," bigger than "crime, drug addiction," and "world poverty." Why such a seemingly hyperbolic claim? Because Americans spend more than \$30 billion on alternative medicine; because from 2008-13, Americans dumped \$50 billion into Ponzi schemes; because belief in UFOs is actually on the rise; because people spend money on mediums who specialize in communicating with their dead pets; and because thousands of people think that vaccinations cause autism.

Humans are all susceptible to beliefs in conspiracy theories, pseudoscience, and the promises of alternative medicine. Until recently such susceptibility was discounted as aberrational, transient, or the product of immaturity or low intelligence. Stanovich's research, combined with numerous findings from cognitive science and social psychology, suggests that irrationality cannot be discounted as a deviation from the norm. It is the norm.

Conclusion

Addressing irrationality among students requires a shift in educators' attitudes. Instead of focusing on content mastery or skill acquisition, the goal needs to be changing the current habits of students' minds. While this may have seemed like an unrealistic goal before, the discovery that rationality and irrationality are distinct and measurable entities makes such a change realistic and desirable. If rationality is separable from intelligence and is not merely a product of maturation, it's important for educators to address this significant aspect of human cognition. Rationality is education's next great challenge.

Dr. John D. Eigenauer, *Professor, Philosophy, Computer Science*

For further information, contact the author at Taft College, 29 Cougar Court, Taft, CA 93268. Email: jeigenauer@taftcollege.edu

Dr. Eigenauer facilitates "Teaching Critical Thinking," a NISOD workshop that provides participants with concrete tools for teaching critical-thinking skills while covering required course content. Visit www.nisod.org/ws1/ to learn more about the workshop and contact Edward Leach at ed@nisod.org or (512) 232-1430 to have the workshop brought to your campus (www.nisod.org/campus) or region (www.nisod.org/regional).