Viewpoint

Toward a Science of Educational Practice

By Herbert J. Walberg & Rena F. Subotnik

Ed. note. "Viewpoints" are editorial and reflect the opinions of the writer only, and not a policy or position of NASP or the Communiqué.

Although some educational researchers call for a balance of qualitative and control-group research, control-group studies are exceedingly rare. The National Reading Panel, for example, uncovered 1,962 studies of phonological awareness but only 52 rigorous control-group reports. Apparently, there have only been two national multi-site randomized experiments in education; these were course effectiveness studies in health and physics, fields that commonly require experimental evidence.

Certainly, group experimentation is only one of several ways of seeking causal confidence. Single-student studies, for example, obtain many observations over time while employing experimental, on-again, off-again treatment and control conditions with a single learner. They look for improved rates of learning or behavior during the experimental condition. Such methods have long been successfully used in special education, and they are now being effectively employed in computer-based learning and testing.

Objections and Alternatives to Experiments

Scientific skepticism may conflict with common professional practice. Before science challenged the centuries-old medical practice of bloodletting, physicians repeatedly bled President George Washington shortly before his death. It required courage and control groups of non-bled patients to end such folly.

Experiments can present ethical questions: Is it right to give children an unproven program? Conversely, is it ethical to continue policies and programs that may be doing them little good or even harm?

In situations where experiments are too difficult or premature, research analogous to epidemiological studies in public health can shed light on causation. Economists and policy analysts have long inferred causality from analyses of non-experimental data, which they employ partly because they cannot, for example, randomly change currency values and tax policies. They can, however, include and investigate rival, competing hypotheses to test their validity. Similar analyses of longitudinal educational surveys can test hypotheses about the effects of policies and programs for a variety of students in various conditions.

Research can efficiently employ multiple methods such as observation and surveys to inform experiments. A good example from medicine is the insight of physicians who noticed that nearly all their lung cancer patients were cigarette smokers. Large-scale epidemiological surveys corroborated their views, which justified control-group studies of animals. Today, there is little doubt about the causal link even though the definitive experiment on humans neither has nor will be conducted.

Educational observations can lead to fruitful hypotheses for testing in experiments and other research designs as well as promising explanations of outcomes. Reflecting a long-lived precedent in science, "outlier studies" of exceptionally high performing individuals, organizations, or even countries may prove particularly fruitful. For example, the landmark report to the U.S. Secretary of Education, *A Nation at Risk* (1983), stimulated interest in Japanese and other Asian schools which produce top achievement at low costs. The report's background papers and subsequent research revealed features that explained the extraordinary learning productivity of the Japanese culture and education system. These features included intensive maternal support of their children's' studies, a school year of 240 days in contrast to the usual 180 in America, a nation-wide curriculum, competitive examinations for admission to middle and high schools and college, the prevalence of private tutoring schools, and knowledgeable teachers. Since then, surveys and experiments have supported the efficacy of such policies.

Similarly, the Education Trust and other groups have found from large surveys that high-poverty, high-achieving schools have common features. These include clear, rigorous content goals; results-oriented management; staff teamwork oriented toward student success; alignment of curriculum and instruction with state standards; frequent testing and use of information about student performance to guide teaching and learning; and a humane, goal-directed atmosphere in the school.

Critical reviews and summaries of research are also valuable, particularly if they can validly conclude that findings from a variety of high quality studies lead to the same conclusion. They are also valuable if they can definitively conclude that some innovations do not work and are not worth pursuing. A substantial corpus of experimental research awaits sorting out for application to K–12 schooling and as a basis for new research.

Even if an innovation has been rigorously and extensively tested and even if it has consistently yielded favorable effects on learning, it may not be worthwhile. Other considerations may weigh heavily. Even "statistically significant" innovations may have small effects, high costs, or implementation difficulties that make them poor choices for continuation and expansion.

After the Evidence

Success in educational practice will depend on informed education consumers. In the past, educators had little coursework and background in research, and they seldom followed it closely. They often chose programs because of traditions, fads, and developer claims. If science is to help improve schools, educators must be better prepared. It seems reasonable for education majors, like physicians-to-be, to know not only about research findings but also how evidence is gathered and analyzed; they should become critical consumers of research. It may be the dawn of new era for those that believe that education practice and practitioners, as in engineering, medicine, and public health, can be grounded in science. ◆

 Herb Walberg, PhD, is Emeritus University Scholar and Research Professor of Education and Psychology at the University of Illinois at Chicago and Distinguished Visiting Fellow at the Hoover Institution, Stanford University. Rena Subotnik, PhD, is Director of the American Psychological Association's Center for Psychology in Schools and Education.