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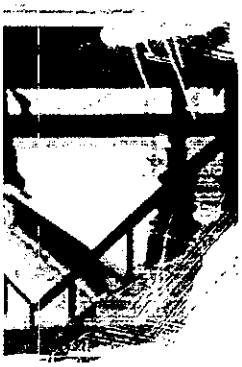

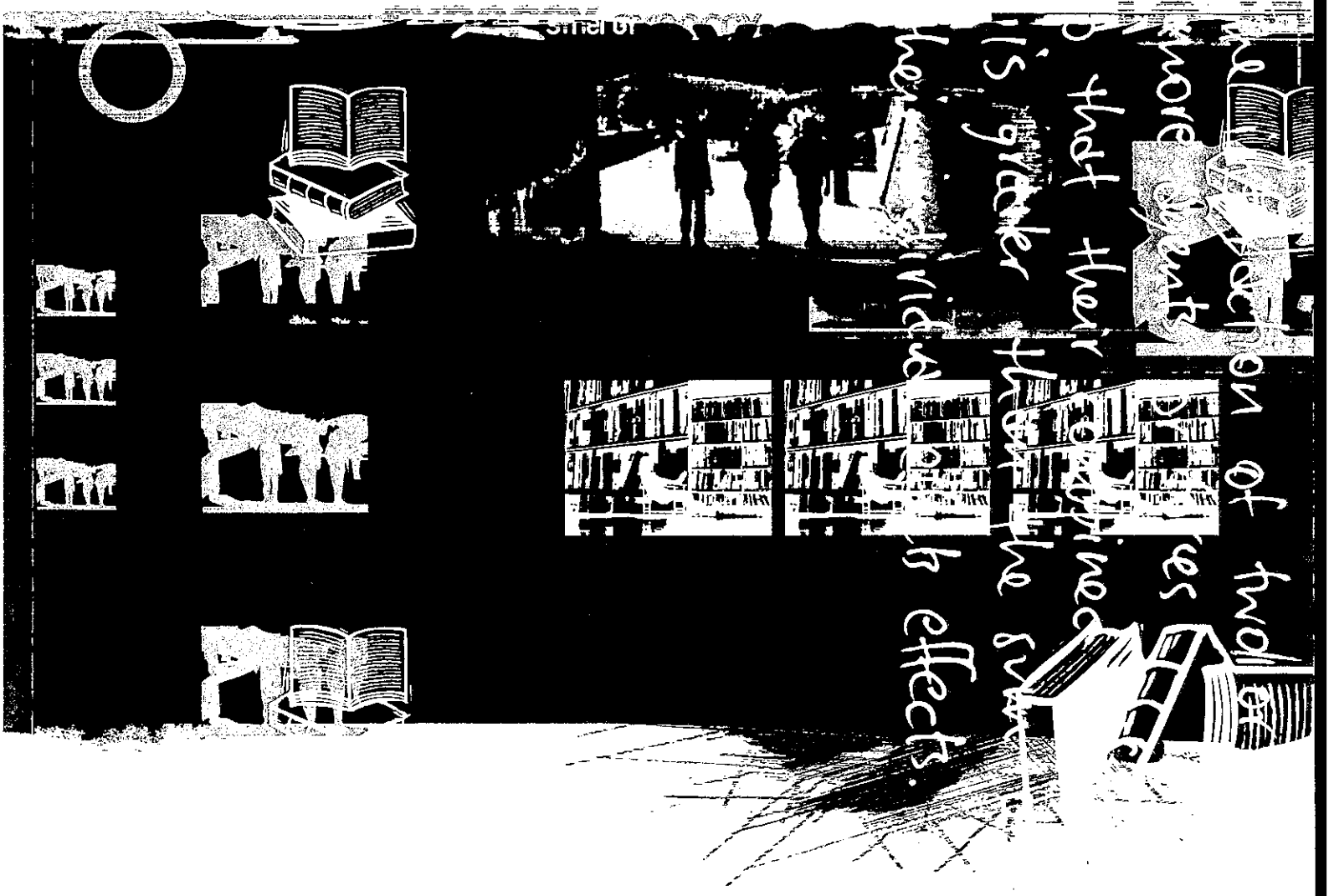

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The medical model for educational research: Prospecting for the gold standard or fool's gold?

Dr Carol A. Gordon

In her regular Synergy section, Dr Carol Gordon explores issues relating research to practice. In this article Dr Gordon explores the different methods of research and the external standards applied to these forms. She questions how relevant these varied approaches are to research in the field of school librarianship.

Research is a systematic inquiry that collects evidence that either supports or denies a belief, but it wasn't always this way. Superstition and tradition based on unfounded beliefs have supplied answers to burning questions about life, death, and everything in between for as long as historical records exist. Medieval medical treatments, derived from Roman and Greek texts, relied on what was accepted as the conventional wisdom regarding sin, fate, and the stars. In fact, medieval physicians were schooled in astrology. One of their strongly-held beliefs was that bleeding a patient with leeches would restore the balance of the four humors, or fluids in the human body and affect a cure.

Five hundred years later another physician used this 'cure', draining four quarts of blood from the body of his patient within twenty-four hours. He held the unfounded belief that the human body contained twelve quarts of blood, rather than six. His patient, George Washington, the first president of the United States, died within a few hours.

Strongly held beliefs die hard. They become cultural traditions that echo the sentiment, 'This is the way we have always done it'. Some still believe that fish is brain food and toads cause warts. Many accept reports of urban legends such as computer viruses and sightings of Elvis Presley in supermarkets.

These traditions affect our decisions and choices when we reject evidence for what is convenient or comfortable. Denial of global warming is perhaps the most dangerous unfounded belief that persisted for decades, despite strong scientific evidence to the contrary. The anecdote, or story generated by observation and experience, can drive our decisions about what works. It is a life-experience story, known in the workplace as 'professional opinion' and praised by parents counseling their children as 'common sense'. Anecdotal evidence is not reliable because it is based on an individual case which may be only case that exists. This kind of evidence generalisable: we can not, with validity, ap anecdote to other cases, and certainly no or even most cases.

It is only as recently as the 1940s that struck gold in the form of a scientific me called the randomised controlled trial (R emerged from medical research to test the of drugs and medical procedures. This 'g method' requires that participants in a st chosen randomly, and randomly placed i experimental group that receives the int or in a control group that does not. The mathematical logic behind random samp which argues that if you flip a coin enoug and have enough people in your sample, groups will be 'statistically equivalent'. In words, the only difference for the purpo the experiment is the intervention being It is important to limit the variables that explain the effects of an intervention so can establish cause and effect. RCT is the research method that can claim causality it is the 'gold standard' of research bec yields the most reliable evidence.

> *In the United States these days, the surprising amount of attention being the improvement of research in edu This rhetoric is also beginning to see the borders and oceans surrounding and finding its way into political and sional discourse regarding educatio the world* (Silver, 2002, p. 1).

There is a demand for rigorous evide methodology that ensures reliability of findings that will inform educational de Why then, isn't gold standard research establish the effectiveness of all instruct interventions, such as school libraries? It what the U. S. Department of Education

to know. It has set the gold standard for educational research in *Identifying and Implementing Educational Practices Supported by Rigorous Evidence: A User Friendly Guide*, available at <http://www.ed.gov/rschstat/research/pubs/rigorousevid/index.html>.

You will not find school library impact studies, or any other school library research, for that matter, in a recently published book that features gold standard educational research (Friedman, et al., 2006). Nor are school library studies among the fourteen gold standard studies published in the *What Works Clearinghouse* (<http://www.whatworks.ed.gov>) created by the Institute of Education Sciences.

This is disturbing for researchers who depend on dissemination of their work to communicate scholarly findings and traditions. It is also disturbing to practitioners who depend on research to inform their work. The issue is not whether the gold standard generates the most reliable evidence. The issue is whether it is the only way to find out what works, or even the most appropriate methodology for the wide array of questions that educational research raises.

School library research is considered educational research and is vulnerable to the same criticism that has plagued educational research for decades.

> *The field of K-12 education contains a vast array of educational interventions . . . that claim to be able to improve educational outcomes and, in many cases, to be supported by evidence. This evidence often consists of poorly-designed and/or advocacy-driven studies (U. S. Department of Education, 2003, <http://www.ed.gov/rschstat/research/pubs/rigorousevid/index.html>).*

Is the medical model the best way to test instructional interventions that operate in structured learning environments called schools? From a practical viewpoint, randomised controlled trials involve large samples, i.e., a minimum of 300 students, or 50 to 60 schools, because random sampling and statistical analysis require large samples to ensure that the effect is not occurring by chance, within a small margin of error. RCT requires that half the participants in a study are randomly placed in a control group. This raises the problem of conducting research outside of a school environment because students are not always placed randomly in their classes, or are not placed randomly enough to ensure that the classes are statistically equal.

Even if removing hundreds of children from their schools to a more laboratory-like testing environment is feasible, the new environment lacks the necessary social (Vygotsky, 1978) and cultural aspects of schooling where the intervention takes place over time and is dependent on elements of schooling (e.g., resources, familiar classmates, a teacher with whom the students have built rapport). In other words, there are contextual elements of educational phenomena that cannot be surgically removed from the independent variable, or instructional intervention. Doing so may have the effect of changing the intervention itself. Educators who are interested in what works are not particularly interested in generalising from an RCT to the student population at large. A .05 degree of significance, which is good enough for the federal gold standard, means that there is a chance that 1 out of 20 occurrences of a positive effect of the tested intervention happened by chance. How does this reconcile with No Child Left Behind legislation?

In addition to being timely, costly, and difficult to manage in instructional settings, the clinical trial approach raises an ethical question: How do we justify withholding practices from the control group when they are based on sound theoretical frameworks, such as constructivist learning theory? Additionally, there are theoretical issues that affect the methodologies used in educational research. Silver (2006) notes that there is little disagreement: the quality of educational research needs to get better.

> *According to the current prevailing view among policymakers, educational progress will not be made unless and until we have such research in hand to guide decisions* (Silver, 2002, <http://my.nctm.org/eresources/view_media.asp?article_id=2404>).

But what does getting better mean? The gold standard questions the validity of comparison studies and all other studies that do not use the 'medical model' including the entire corpus of qualitative research that gathers data from in-depth studies of individuals, focus and other small samples. This age-old debate of quantitative vs. qualitative research centres around whether the evidence of hard science, usually in the form of statistical data, is superior to the verbal, soft data generated by the social sciences.

Much has been written about this debate and it is suggested that we may be asking the wrong question (<http://www.ualberta.ca/dept/slis/cais/olso.htm>). The right question addresses the methodology best suited to the research question at hand, and that methodology is embedded in the fundamental principles of a discipline.

For example, an historian is interested in what really happened in the past and how truth is determined. S/he conducts an inquiry that relies on primary documents and the content analysis of these documents. An historian, for obvious reasons, does not conduct a survey to find out what people were really thinking during the Crimean War.

If the gold standard of educational research is the medical model, does this mean that education is a science? "Efforts to cast educational research as a scientific field have been challenged almost

The right question addresses the methodology best suited to the research question at hand, and that methodology is embedded in the fundamental principles of a discipline.

continually, both from within and from outside the field." (Langmann, 2000, p. 1). Langemann (2000) chronicles the history of educational research and acknowledges that it rests on the foundation of social sciences. Education is a field of studies that includes sociology, anthropology, psychology, as well as philosophy. These disciplines usually pose how and why questions that are nested in a context that requires qualitative methods. How do people learn? What are the emotional and behavioral dimensions of learning, in addition to the cognitive? How do we progress from novice to expert? How do we deal with new constructs and how do we repair misconceptions? The basic questions of educational research focus on the nature of learning and the instructional interventions that work in the context of the culture of the learner.

Can it be that educational research is more complex, and less understood, than medical research? Berliner (2002, p. 18) observed that educational research may be the "hardest science of all" because it deals with "complex contextual elements and interactive human concerns." Unlike a scientific laboratory, a school is an organic, dynamic, institution with hundreds of variables intervening to complicate the 'experiment'. While stratified random sampling allows the researcher to select members of the sample to balance inequities and differences in facilities, access to resources, and diverse student ability, there are variables that defy control, such as scheduling, diverse administrative and teaching styles and personalities. Berliner (2002, p. 19) noted, "We do our science under conditions that physical scientists find intolerable".

Gardner (2002) observed that exemplary educational programs around the world are not based on the kind of scientific evidence set by the gold standard. Data are collected through observation and journaling. This is how Maria Montessori developed her model for schooling. Highly successful early childhood education in Reggio Emilia adopts a qualitative approach of observation and documentation as educators listen to children and provide opportunities for creativity and problem solving.

Constructivist learning theory that guides inquiry in the school library originated with the work of Piaget (Inhelder & Piaget, 1958), who observed and documented the development of his young daughters. Dewey (1943) was a philosopher whose work transformed education from the 19th century industrial model of drill and kill to a child-centered, 'progressive' hands-on approach that connected schooling to the world outside of school. Kelly (1963) built on Piaget's (Inhelder & Piaget, 1958) schema theory and provided the theoretical framework for Kuhlthau's (1983) Information Search Process. Bruner (1977) articulated structuralism, advocating that we understand the structure, or fundamental principles, of an academic discipline for d understanding and learning how to learn.

Vygotsky (1962) provided theories abou learners as they progress from novices to e passing through a continuum he called the of Proximal Development. In that zone lea begin with needing assistance almost all th and as they progress from novice toward e the need for assistance decreases. This th inspired Kuhthau's (2004) zones of interven as information searchers move from uncer to understanding. The Media Lab at M.I.T (<http://www.media.mit.edu>) is based on theoretical constructs of Papert and Minsky, use Piaget's theories to understand how p learn in digital environments. Project Zero Harvard University (<http://www.pz.harvard edu>) uses Bruner's (1977) structuralist app to the academic disciplines and contructivi learning to develop instructional interventi that teach for understanding.

Educational researchers have struck gold they learn about learning. These gold nugg are the triumphs of our qualitative researc corpus of educational research, including re on the effectiveness of school libraries, pro us with a rich body of knowledge from whi can construct and adapt effective interventi

So take heart, school librarians. The res of your profession is valid and reliable; it a the most appropriate methodologies to th research situations it investigates. While go standard research is one methodology for educational researchers to consider, it can l fool's gold when we restrict our research to method of testing instructional interventio Phonics is a good example; there is no de research, some of which meets the gold sta which indicates phonics works. However, th a disconnect between that research and th success of phonics in practice. Phonics has solved the 'reading problem'. When we res our research methods to one methodology, may be prospecting in the wrong mines.

Educational researchers have struck gold when they learn about learning. These gold nuggets are the triumphs of our qualitative research.

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