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SABER: The Searchable Annotated Bibliography of Education Research in Astronomy

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Abstract

Starting a new research project can be a challenge, but especially so in education research because the literature is scattered throughout many journals. Relevant astronomy education research may be in psychology journals, science education journals, physics education journals, or even in science journals. Tracking the vast realm of literature is difficult, especially because libraries frequently do not subscribe to many of the relevant journals and abstracting services. The Searchable Annotated Bibliography of Education Research (SABER) is an online resource that was started to service the needs of the astronomy education community, specifically to reduce this "scatter" by compiling an annotated bibliography of education research articles in one electronic location. Although SABER started in 2001, the database has a new URL—http://astronom- y.uwp.edu/saber/—and has recently undergone a major update.

1. INTRODUCTION

Although it is hard to pin down the first research-oriented paper in astronomy education, we can see the beginnings of the current educational research era in the 1970s and 1980s as scholars began to look at the efficacy of planetarium programs (for example, Reed & Campbell 1972; Fletcher 1980; Sunal 1976) and how children develop mental models of Earth and its motions (e.g., Nussbaum & Novak 1976; Nussbaum 1979; Rollins, Denton, & Janke 1983).

The growth of astronomy education research can be tracked by counting papers in the education journals. A search of the bibliographic database described in this article reveals 13 papers in the 1970s, 8 papers in the 1980s, 5 papers from 1990 through 1994, 12 papers from 1995 through 1999, and 38 papers from 2000 through 2004. Research published during the last five years alone has matched that of the previous three decades.

Additional evidence for the recent growth in astronomy education research includes the establishment of an education office in the American Astronomical Society in 1997; the roughly triennial colloquium on teaching college-level astronomy called Cosmos in the Classroom, sponsored by the Astronomical Society of the Pacific and started in 1996 (e.g., Fraknoi 2000 and Fraknoi & Waller 2004); the introduction of astronomy education programs in universities such as Montana State University and the University of Arizona; and the introduction of the journal the *Astronomy Education Review* in 2001.

In 2000, Gina Brissenden and Tim Slater proposed that an annotated bibliography of solely astronomy education research would support researchers in this growing field. A handful of volunteers surveyed about a dozen journals and produced a bibliography of roughly 40 papers. These papers formed the start of SABER, the Searchable Annotated Bibliography of Education Research (in astronomy) (Brissenden, Bruning, & Slater 2001). A consolidated effort to collect pertinent research into a single location was, and remains, important because astronomy education research resides in so many different journals and indexing services that many astronomers are not familiar with.

The SABER Web site started as a project of the American Astronomical Society Education Office, with additional funding from the Wisconsin Space Grant Consortium. Originally, SABER was hosted at an education Web server at the University of Wisconsin–Madison for about two years. After the initial grants expired, the site moved to the University of Wisconsin–Parkside.

The first UW-Parkside server was an instructional course server and had issues with service during the summer and academic holiday periods. In addition, the server name (shiva.uwp.edu/saber) led to difficulty for some users because they often forgot part of the address. To avoid these problems, we recently moved SABER to its own server, where we hope it will permanently reside for many years. SABER's new address is http://astronomy.uwp.edu/saber/. In addition, SABER now includes more than 155 papers from a recent updating of the bibliography.

2. THE ANNOTATED BIBLIOGRAPHY

Other resources exist for activities, lab exercises, syllabi, and course materials (e.g., Hudson 2006 and the AstronomyCenter at http://AstronomyCenter.org), so SABER concentrates on astronomy education research. Relevant database entries are those refereed articles that describe quantitative and/or qualitative research methods and results about teaching, learning, and assessment in astronomy and space science. Currently a dozen journals are regularly searched by volunteers for articles on astronomy education research, including:

American Journal of Physics
Astronomy Education Review
International Journal of Science Education
Journal of College Science Teaching
Journal of Geoscience Education (previously titled *Journal of Geological Education*)

Journal of Research in Science Teaching
Mercury
The Physics Teacher
Publications of the Astronomical Society of Australia
School Science and Mathematics
Science Education
Science and Education

SABER also includes selected dissertations, book chapters, and articles from other journals, such as:

Australian Science Teachers Journal
Cognitive Science
EOS Transactions
European Journal of Science Education
European Journal of Teacher Education
Human Development
Innovative Higher Education
Journal of Educational Research
Journal of Science Education and Technology
Learning and Instruction
Physics Education
The Planetarian
School Science Review
Science and Children
Research in Science and Technological Education

Each entry in the annotated bibliography includes the title of the article, author names, publication date, volume and issue number, page references, and a short description of the article. Its format is similar to most journal reference formats, including the *Astronomy Education Review*, making development of reference lists for papers easy. In addition to a complete listing of the entries in the bibliography, SABER also has search capabilities, permitting searches by author name, year of publication, journal name, title keywords, and annotation keywords.

The SABER entries are neither reviews nor critiques of the research. This annotated bibliography intends merely to provide researchers with enough information about the literature to let them gauge whether an article may be germane to their research interests.

3. AN INVITATION TO CONTRIBUTE

SABER started as, and remains, a volunteer effort. Regular, ongoing support and one-time contributions of annotations are both gratefully received. Sharing even one paper not currently in the database is one more paper that may help another researcher. Graduate students may share their thesis research bibliographies with us. Authors of educational research, especially of works that appear in journals other than the regularly scanned ones, can help by notifying us of their papers to ensure their inclusion. Authors are also invited to provide an annotation of the article.

The basic format for an annotation is:

Author list: last name, initials and last name, initials, year.
Title in lower case, journal name, volume (issue), starting and ending pages.
A brief, roughly 50-word description that describes the population studied and the general topic area and results as appropriate.

EXAMPLE
Zeilik, M., Schau, C., and Mattern, N. (1999).
"Conceptual astronomy. II. Replicating conceptual gains, probing attitude changes across three semesters," *Am. J. Phys.*, 67 (10), 923–927.
Survey of 400 undergraduates in one-semester course shows gains in conceptual understanding. No relationship between course achievement and prior science and math courses. Small relationship between self-image and course achievement.

If you are interested in contributing an annotation, we encourage you to look at the SABER Web site. Read through some of the annotations, and then look at the link entitled "Contribute." It has more information for formatting your annotation.

We would like to hear from users of SABER. Please let us know how the bibliography has been useful in your research or in the development of classroom materials, or if you have any suggestions for making the bibliography more useful to you. SABER exists for the astronomy education community; we hope that it serves you well.

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