Research presented in this "progress report" is identified and categorized as doctoral dissertations, journal articles, conference papers, and other documents. This one-year "snapshot" provides an overview of the field for experienced researchers, doctoral students, and practitioners who use research findings. A listing of the institutions where the research was completed is included for dissertations. A listing of journals searched and the number of articles found in each is also included. (DDR)
RISE 96

An Annotated Listing of
Research in Science Education
Published During 1996

Edited by David L. Haury
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David L. Haury, ERIC/CSMEE Executive Editor
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- An outline of chapters and major sections.
- A 15-word abstract for use by reviewers for initial screening and rating of proposals.
- A rationale for development of the document, including identification of target audience and the needs served.
- A vita and a writing sample.
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Columbus, OH 43210-1080
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Preface

For many years, the Clearinghouse for Science, Mathematics, and Environmental Education published an annual Summary of Research in Science Education, a document that appeared annually as a special issue of Science Education. The annual Summary was intended to facilitate access to research findings and provide a critique of research efforts in science education at one-year intervals. Sort of a "progress report." A variety of factors led to the demise of that annual Summary, but many individuals have continued to express interest in some sort of annual overview of research in science education. This publication has been developed in response to those expressions of interest: it presents an annotated listing of research in science education that was reported during 1996. No effort has been made to provide a critical analysis of research reports or areas of research, but we have attempted to identify and accurately describe the science education research reported through doctoral dissertations, journal articles, conference papers, and other documents. In the case of dissertations, we have included a listing of the institutions where science education doctoral research was completed, and in the case of journals, we have identified the journals we searched and the number of science education research articles we found.

Though this may not be a comprehensive listing of the science education research reported during 1996, we believe it is the most complete listing available and represents the major trends in science education research. Our hope is that this one-year "snapshot" of research will provide an overview of the field for experienced researchers, doctoral students, and practitioners who use research findings. We will not know if our hope is realized unless those who find this report useful tell us. Though ERIC/CSMEE has the capacity to produce this listing, it is not clear the extent to which a single annotated listing of science education research is valued by the science education community. We earnestly desire feedback, either in writing or by e-mail at the addresses listed below. This listing will also be available through the ERIC/CSMEE World Wide Web site.

Please forward feedback by mail to: Science Education Research Listing, ERIC/CSMEE, 1929 Kenny Road, Columbus, OH 43210-1080; or send e-mail to ericse@osu.edu.

DLH
**Key to Codes**

The following topic codes have been used to indicate the major and minor emphases of each dissertation, journal article, and paper in this listing. Each entry has been assigned a minimum of one and a maximum of three major codes and a maximum of three minor codes. Within the index at the end of the volume, major codes have been used to categorize each publication.

The grade level or educational level of each study is indicated in parentheses after the topic codes. The level codes for teacher education studies reflect the grade level(s) at which the interns or teacher participants teach.

### Topic Codes

<table>
<thead>
<tr>
<th>ach</th>
<th>achievement</th>
<th>ene</th>
<th>environmental education</th>
<th>nas</th>
<th>nature of science</th>
</tr>
</thead>
<tbody>
<tr>
<td>alf</td>
<td>alternative frameworks</td>
<td>eqt</td>
<td>equity issues</td>
<td>nfd</td>
<td>informal &amp; informal education</td>
</tr>
<tr>
<td>asm</td>
<td>assessment</td>
<td>esg</td>
<td>earth &amp; space science</td>
<td>net</td>
<td>networks</td>
</tr>
<tr>
<td>att</td>
<td>student attitudes</td>
<td>eth</td>
<td>geology</td>
<td>part</td>
<td>partnerships</td>
</tr>
<tr>
<td>bdf</td>
<td>student beliefs</td>
<td>evo</td>
<td>ethnicity</td>
<td>pro</td>
<td>problem solving</td>
</tr>
<tr>
<td>bft</td>
<td>teacher beliefs</td>
<td>fsl</td>
<td>evolution</td>
<td>sci</td>
<td>science reasoning</td>
</tr>
<tr>
<td>bio</td>
<td>biology</td>
<td>ped</td>
<td>field studies</td>
<td>ped</td>
<td>pedagogy</td>
</tr>
<tr>
<td>bkg</td>
<td>background factors</td>
<td>gen</td>
<td>outdoor education</td>
<td>phi</td>
<td>philosophy</td>
</tr>
<tr>
<td>car</td>
<td>context, social factors</td>
<td>his</td>
<td>gender</td>
<td>phy</td>
<td>epistemology</td>
</tr>
<tr>
<td>car</td>
<td>science-related study</td>
<td>his</td>
<td>history</td>
<td>phys</td>
<td>physics</td>
</tr>
<tr>
<td>car</td>
<td>career choice</td>
<td>hos</td>
<td>historical implications</td>
<td>ref</td>
<td>reform</td>
</tr>
<tr>
<td>cbi</td>
<td>computer-based instruction</td>
<td>inq</td>
<td>hands-on science</td>
<td>educ</td>
<td>educational change</td>
</tr>
<tr>
<td>ceg</td>
<td>conceptual change</td>
<td>int</td>
<td>inquiry</td>
<td>stan</td>
<td>standards</td>
</tr>
<tr>
<td>che</td>
<td>chemistry</td>
<td>kns</td>
<td>integration, interdisciplinary</td>
<td>rep</td>
<td>representation</td>
</tr>
<tr>
<td>chs</td>
<td>student characteristics</td>
<td>knt</td>
<td>student knowledge</td>
<td>mod</td>
<td>modeling</td>
</tr>
<tr>
<td>cht</td>
<td>teacher characteristics</td>
<td>lab</td>
<td>teacher knowledge</td>
<td>res</td>
<td>research</td>
</tr>
<tr>
<td>cid</td>
<td>classroom interactions</td>
<td>lit</td>
<td>laboratory</td>
<td>rev</td>
<td>review of research</td>
</tr>
<tr>
<td>cid</td>
<td>discourse interaction</td>
<td>lrg</td>
<td>science literacy</td>
<td>conf</td>
<td>conference proceedings</td>
</tr>
<tr>
<td>egr</td>
<td>constructivism</td>
<td>comp</td>
<td>learning</td>
<td>sks</td>
<td>student skills</td>
</tr>
<tr>
<td>cpl</td>
<td>cooperative learning</td>
<td>lly</td>
<td>comprehensive</td>
<td>skt</td>
<td>teacher skills</td>
</tr>
<tr>
<td>cpl</td>
<td>group work</td>
<td>sto</td>
<td>learning style</td>
<td>sci</td>
<td>science, technology, &amp; society</td>
</tr>
<tr>
<td>cul</td>
<td>cross-cultural studies</td>
<td>lth</td>
<td>cognitive style</td>
<td>tec</td>
<td>technology</td>
</tr>
<tr>
<td>cur</td>
<td>curriculum</td>
<td>mat</td>
<td>learning theory</td>
<td>trd</td>
<td>teacher professional development</td>
</tr>
<tr>
<td>cct</td>
<td>educational technology</td>
<td>mee</td>
<td>materials, equipment</td>
<td>trd</td>
<td>teacher professional development</td>
</tr>
<tr>
<td>ctt</td>
<td>multicultural education</td>
<td>bilt</td>
<td>bilingual education</td>
<td>bilt</td>
<td>bilingual education</td>
</tr>
</tbody>
</table>

### Level Codes

- AD: adult
- EC: early childhood, K-4
- EL: elementary, K-8
- MS: middle school
- SE: secondary, 5-12
- HS: high school, 9-12
- PS: post secondary, 13+
- K-12: all school levels
- ALL: all student levels
- TE: teacher education, teachers
- GEN: general interest

### Further Elaboration of Selected Codes

In some cases, the codes we have used to group items may not correspond to the more precise terminology often used within the science education discourse community. To aid readers in making a match between the codes we have used and some common areas of research, we offer a further elaboration of codes on the next page. The codes we have used are indicated on the left, and the categories they represent include the topics listed on the right.
### Elaboration of Codes

<table>
<thead>
<tr>
<th>ach</th>
<th>achievement, grades, academic success</th>
</tr>
</thead>
<tbody>
<tr>
<td>ats</td>
<td>student attitudes, mental state, interest, motivation</td>
</tr>
<tr>
<td>bfs</td>
<td>student beliefs, perceptions, views</td>
</tr>
<tr>
<td>bkg</td>
<td>background, context, including social or economic factors, past experience, family interest or background, environment, rural vs. urban</td>
</tr>
<tr>
<td>chs</td>
<td>student characteristics, including creativity, locus of control, at-risk behaviors, physical disabilities, learning disabilities</td>
</tr>
<tr>
<td>cid</td>
<td>classroom interaction, discourse interaction (not necessarily classroom), conversational analysis studies</td>
</tr>
<tr>
<td>cul</td>
<td>comparison of cultural factors, not simply a study of another culture</td>
</tr>
<tr>
<td>edt</td>
<td>educational technology, design of software, instructional technology other than computers, distance education, multimedia education</td>
</tr>
<tr>
<td>eqt</td>
<td>equity issues, power issues</td>
</tr>
<tr>
<td>int</td>
<td>integration, interdisciplinary issues, including thematic education</td>
</tr>
<tr>
<td>kns</td>
<td>student knowledge, cognitive structures, mental constructs, system of constructs</td>
</tr>
<tr>
<td>lrg</td>
<td>learning, comprehension</td>
</tr>
<tr>
<td>lth</td>
<td>learning theory in a more general sense than lrg</td>
</tr>
<tr>
<td>mce</td>
<td>multicultural education, including bilingual education</td>
</tr>
<tr>
<td>ntw</td>
<td>networks; collaborations between students, teachers, schools; partnerships; mentoring programs</td>
</tr>
<tr>
<td>res</td>
<td>research, review of research, including conference proceedings</td>
</tr>
</tbody>
</table>


Dissertation Research Reported in 1996

Wendy Sherman McCann, The Ohio State University
Bernard Durkin, The Ohio State University

This section lists 328 dissertations in science education research that were completed in 1996 and abstracted in Dissertation Abstracts International during 1996 through 1997. Each entry is coded (see Key to Codes) with one to three major codes (in bold type) and up to three minor codes, as well as the grade level (in parentheses). Studies related to preservice or inservice teacher education are indicated by the the code for "teacher professional development" (tpd). The level designation that accompanies the teacher professional development varies, depending on the focus of the research. A general code, "TE," is used if the research focuses strictly on issues related to teacher education, but a second level code is added when appropriate to indicate the grade level(s) at which the intern or teacher participants teach. All entries are indexed by major codes at the end of the volume (see page 149). An index of dissertations by institutions is included at the end of this section (see page 75).


Fifth-grade students' alternative conceptions about the solar system were identified, and an instructional approach employed to enact conceptual change. The approach was shown to be effective in promoting conceptual change.

clog, alfl, cns, ped, esg (EL)


Case study of four beginning science teachers found that teachers' system of constructs for teaching and learning were most significantly affected by being an undergraduate teaching assistant, taking science methods courses, and taking content courses.

knt, bkg, tpd (TE)


Survey of professional engineers and earth scientists in Alberta found that these individuals report informal learning in the workplace as most important for developing and maintaining competent professional performance, rather than pre-professional learning experiences.

car, nfd (PS, AD)


This research investigated university programs in preparation of elementary teachers and how they meet the Search for Excellence in Science Education criteria. The ethnographic case study concluded that they were all exemplary programs.

tpd, skt (EL)


This qualitative study investigated the use of analogies in instruction to helping students learn a scientific principle and learning in general. No significant difference was found between Analogy and No-Analogy groups. There appears to be a relationship between analogies and student recall but not students' comprehension.

ped, lrg (SE)


Factorial ANOVA on overall achievement scores indicated that high school biology students in cooperative groups significantly outperformed those in traditional groups and also demonstrated more positive attitudes toward science laserdisc instruction. Some differences by class group and gender were also found.

cpl, cbi, ach, ats, bio, gen (HS)

This study investigated the relationship between attitude toward evolution and agreement with statements of non-religious rationales as well as exposure to science. No difference was found among attitude and exposure to science. Those accepting evolution were more objective in interpreting research.

**evo, ats, bkg** (PS)


An examination of the educational processes that contribute to the underachievement of female and minority students in science. Three strategies were used: non-participant observation, interviewing and analysis of documents. Results indicate that a host of subtle social processes have a cumulative effect of disadvantaging students.

**eqt, ach, bkg, gen, eth** (MS)


A comparison of the secondary biology curricula in Nigeria and the United States was used to determine the conditions and common practices that exist in high schools in Imo State of Nigeria.

**cur, cul, bio** (SE)


The use of a constructivist model to teach science was shown to enhance understanding and broader thinking for Nigerian students (n=70) more than a traditional teaching method.

**cns, ped, lrg** (SE)


An examination of how women's perceptions of their experiences affects their persistence in mathematics and science. Students who did not persist chose pedagogical reasons as significant factors in their leaving.

**gen, car, bkg, ped, bfs, ats** (PS)


Physics students who played computer games set in a Newtonian microworld improved achievement on force and motion problems. Students who played the games in a cooperative setting improved more than students in an individual learning setting.

**csg, cpl, ebi, phy** (HS)


Case study of a new elementary science curriculum used narrative inquiry and document analysis to interpret conceptions of the curriculum. Findings indicate the difficulty of conceiving of curriculum implementation in ways other than as an instrumental action.

**cur, kn trial, att, ref, eqt** (TE)


This study was an inquiry into teachers' support for curriculum projects and textual materials which purport to improve science teaching and learning. It is suggested that to increase the commitment of the teachers' voice to improving science education it is necessary to change the method of curriculum development by publishing materials outside the normal power structure.

**cur, att, ref, eqt** (TE)


No significant difference was found for students' science scores on The Texas Assessment of Academic
Skills between students who participated in traditional courses and those whose courses were organized thematically. Some matching criteria showed significant effects on achievement.

ach, ped, int. bkg (MS)


A 58-item questionnaire was employed to determine student and faculty attitudes regarding science, science education, and important aspects of scientific literacy. Significant differences appeared when assessing the respondents' attitudes toward what science is and how science is conducted.

ats, nas, att. lit (PS)


College biology students improved their laboratory learning strategies when they were led to anticipate weekly performance assessments.

asm, int. lab. bio (PS)


Study found that the strongest perceived implementation of the California mathematics and science curriculum reform frameworks was in content at the district level for both mathematics and science. Technology was perceived as needing further implementation.

ref, bft, cur. (ALL)


This study examined the relationship between performance on measures of integrated process skills, previous science experience and performance in a course in human anatomy and physiology. Small but significant correlations were found for all variables except science experience.

sks, bkg, ach (PS)


This dual study attempts to identify ideational networks and cognitive operations of students as they study the effect of soil compactness on the amoeba population of swampy soil. Results were that participants developed complex ideational networks which correlated with higher order cognitive operations.

kns, lth. ent (SE)


The significant relationships of creativity and performance on an achievement test to solving real-world problems in cooperative groups were assessed through analysis of group products. The conclusion was that student creativity and performance criteria were most important in focusing middle school students on specific tasks.

chs, ach, pbs. mpl (MS)


Eighty-nine high school biology students were studied as they used student response keypads during instruction. Student motivation, grades, self-efficacy ratings and goal setting all increased as a result of the instructional strategy.

ebi, ped, ach, att, cts, bio (HS)


A case study of a beginning teacher and how she was affected by the socialization process of schools. The conclusion was that constructivist-based teacher education programs should be taught in restructured schools and the teachers need practice teaching in restructured schools.

bkg, cns, tpd. knt (EL)

Teachers' attitudes toward teaching science were related to number of undergraduates science courses taken, gender, and years of teaching experience. Students' attitudes toward taking science courses were related to gender, parental influence, and teacher experience.


This investigation focused on the practices and beliefs of eighth-grade teachers. Findings indicated that many teachers were using the recommended writing practices. Both groups identified specific content-related activities and opportunities for teachers to discuss strategies with associates as beneficial.


Content knowledge, strategic knowledge, and forms of knowledge organization used in phylogenetic tree construction are described to account for expert performance. Rationales are provided for the development of a computer-based problem-solving environment, model problems, and research problems and methodology.


ANOVA showed no differences in student knowledge between groups who used hands-on activity-based study and traditional textbook instructional approach.


Study found that a majority of teachers were found to prefer to teach integrated rather than separate units of...
problem solving and science process skills. Teachers who preferred integration were also more confident in their skills to teach problem solving, science process skills, and integrated units.


Students participating in anatomy and physiology courses (n=619) who chose to use computer tutorials at home had higher final grades than those who did not use software or used it in the laboratory. Students who used the software had significantly more positive attitudes toward science than others.


This study explored virtual reality as an educational tool. Interactivity was found to be significant, while immersion was found to be insignificant.


Case studies of college science, engineering, or math students with physical disabilities were analyzed. Common backgrounds and motivations are presented.


An interactive multimedia package was developed to accommodate cognitive and learning styles. Time on task and preferences on the Learning Style Inventory were compared. There was no correlation between score on the LSI and time spent on the IMP.


A multi-sensory model is described. The model requires students to do research. The use of case studies as a tool for bringing research methods into the classroom is described. The theme is that comprehension and appreciation of scientific research prepares students to use concepts and technological information.


This research studies urban middle school teachers’ epistemologies of science teaching and their attempts to change instructional practices. The researcher constructed meanings from observations and interviews of inquiry-teaching and teacher change within the context of mitigating factors against implementation of the desired methodology.


Study of public expressions of environmental understanding found that environmental information stems from many sources and influences the public and individuals in many ways which should be taken into account in environmental education development.


Twenty-five second grade children and their parent(s) participated in an exploratory study that examined their attitudes about the natural environment. Children were willing to participate in activities in the natural environment, regardless of prior exposure.

Students who were presented with instructional objectives performed slightly better on instructional posttest items than students who received either advance organizers or no orienting activities. Orienting activities were also shown to significantly influence interaction behaviors. No significant effect on attitude was found.

*ped, cbi, ach, ats, cid* (SE)


A problem solving-based instructional model was shown to significantly improve the overall achievement of ninth grade earth science students in Taiwan. The same students also experienced more significant conceptual change than traditionally-taught students.

*pdb, pbs, ach, ceg, esg* (SE)


A problem-solving model based on Greeno's was used to study the extent to which students developed a better understanding of physics. The model teaches students to work in the abstract while keeping in touch with the real world. Results suggest that students benefited from using the model.

*pbs, rem,lth, phy* (SE)


An investigation of the relationship between mechanics misconceptions, achievement and the cognitive structures of high school students. No significant difference in cognitive structure was found between students with and without misconceptions.

*kns, ach, alf, phy* (SE)


The purpose of the study was to examine patterns between achievement and background factors in countries with limited resources. A student questionnaire, a school questionnaire and a rational questionnaire were administered. Chinese students scored higher in math and lower in science than Korean or Hungarian students.

*cul, ach, bkg, chs* (ALL)


Students with computer network support demonstrated statistically significant more positive attitudes toward science and toward computers.

*tec, ntw, ats, sks* (SE)


This study examined the effect of normative and perceived environments of single-sex and coeducational school settings on science self-concept and science anxiety. An ANOVA revealed significantly higher math and science self-concept in a single-sex
school environment. Anxiety was higher in the coeducational environment.

gen, bfs, ats, bkg (HS)


The intent of this study was to design, implement and evaluate an inservice program that would meet the needs of teachers and a state mandated science-teaching concept. Results indicated a positive effect on participants' knowledge, skills and attitudes.

tpd, int, cur, att, skt, knl (TE)


New representations and measures of students' knowledge integration made visible middle school students' thinking about thermodynamics and light, and allowed evaluation of the degree to which students had connected new information to prior knowledge.

kns, asm, ceg, phy (MS)


This study employed concepts associated with a general expectancy-value model of motivation to explore students' motivation within a developmental perspective and examined how specific aspects of motivation are related to students' achievement in mathematics and science.

ats, ach, chs (SE)


Fixed-effects analysis showed that females and males differed in their acquisition of science process skills under a project-based science curriculum. Some difference by ethnicity was also found.

gen, sks, eth, cur (MS, HS)


Student attitudes toward bacteria were affected by a five-week unit of study.

ats, cur, bio (HS)


Computers are shown to be essentially formal tools, incapable of processing tacit thought. It is argued that the current expansion of the use of computers serves to work against increasing the employment of tacit knowledge.

cbi, kns, phe, ref (EL)


Study provided insight into conceptions of scientific literacy within a technology-rich curriculum and one teacher's integration of technology and science. It concluded that engaging in technology activities and using the Internet allowed students to "extend 'real-world' learning to a global context."

tec, cur, lrg, lit (EL)


Elementary students reacted to 15 science scenarios and drew pictures with descriptions about where science takes place. Students were able to picture science occurring anywhere instead of the stereotypical classroom or laboratory setting.

bfs, nas (EL)


Six third-grade students' concept maps and science reflective logs were analyzed to identify learning processes of children engaged in science problem-solving tasks.

kns, pbs, lth, ped (EL)

This study examined the essential elements that emerged when forming a community of learners in an eighth-grade science classroom. A project-based science curricular approach was used.

cid, lth, cur (MS)


Focused on an elementary science course taught by distance education, this work attempts to determine the relationships between teaching practices and several factors such as location, socioeconomic level, gender, ethnicity and grade level. Results indicate an equal opportunity to learn and appreciate science.

ped, bkg, gen, eth, eqt (EL)


This study is a qualitative multiple case study using cross-case analysis to analyze the effect of a biology course on elementary education majors. The findings were positive and their courses in science have been implemented.

cur, att, tpd, bio (TE)


A conceptual framework, a curriculum design, introductory materials, and a field validation curriculum implementation document were developed for a new high school biology course in Canada.

cur, bio (HS)


At-risk students improved knowledge of how microbial techniques are used in business and research after completing specially-developed laboratories and units on food microbiology and plant pathology.

lab, tms, ped, bio (SE)


Study determined differences in science achievement by gender and race following professional development with Ohio’s SSI. The findings supported the evocativeness of the Ohio SSI reform efforts and described variations in predictors of achievement between male and female middle school students.

ach, gen, eth, tpd, ref (MS)


Purposes of the study included: to develop and evaluate a model for field testing a new ninth-grade curriculum; to assess the results of the actual implementation of the model, and to revise the model using the results of the implementation. The curriculum was deemed appropriate for its intended users.

cur, asm (SE)


Qualitative case study of three kinesiology students in a work-placement experience uses works of Schön, Lave and Wenger and Vygotsky to analyze the students’ situated, cooperative learning.

lth, kns, cpl, lrg (PS)


Examines two support groups for women and girls aimed to increase participation in the science community. Despite ability to capture capital valued by the community, the study still found exclusion from the science community.

gen, ntw, car (AI.L)

A professional development model for fostering teachers' understandings of the nature of science was developed and evaluated. Participant teachers exhibited a better understanding of the nature of science, incorporated nature of science issues into their instructional plans, and emphasized nature of science issues in their teaching.

nas, tpd, knl, cur (TE)


This study compared student learning outcomes of the Principles of Technology Physics instructional approach with outcomes from traditional physics instruction and analyzed this instructional model in light of current cognitive science theories of learning and instruction.

ped, lrg, lth, phy (HS)


Study explored issues of student learning as they developed in a university classroom. Results indicated that students need to encounter explicit and consistent lessons stressing conceptual understanding and teachers need to be careful about making problem solving too easy.

cid, ped, lrg, bsf, pbs (TE)


The experience of eight teenage participants on a twelve-day wilderness trip was investigated through participant observation and semi-structured interviewing. The wilderness trip was ineffectual in promoting care for the earth.

ene, fsd, ats (SE)


Case study found that communication, inclusion, valuation and empowerment were critical to successful participation in curriculum development.

cur, eqt, bkg (GEN, PS)


Study concluded that critical environmental assessment education has potential to clarify the role of education in the complex of public involvement, and to increase the effectiveness of environmental assessment by helping participants present credible arguments.

ene, sts, lit (ALL)


The West Virginia K-12 RuralNet Project impacted teachers' views concerning the influence of society on science and technology. Teachers held positive views concerning the changes made in their classrooms when the Internet was used to enhance classroom learning.

sis, tec, att, tpd (TE)


A metacognitive training program designed to assist students in learning from science objects was found to be effective for students who scored lower on induction assessments and was found to be counterproductive for high-ability students.

lrg, chs, sks (PS)


The focus of this work is to determine what specific factors affect the decision to pursue graduate educa-
tion and persist to the doctorate. Logistic regression model results indicated that grade performance, research experience and high job expectations were significant predictors.

**car, chs, ach. bfs, bkg (PS)**


No significant differences were found when comparing the performance of traditional biology students and scope, sequence and coordination (CSSCP) students on several biology achievement measures. Significant differences were found between CSSCP and traditional schools regarding sections of science, student enrollment, and lab time.

**cur, ref, ach. ats. lab (HS)**


The Beliefs about Science and Science Education survey and the Stages of Concern Questionnaire were used to determine teacher beliefs about science and science teaching and concerns about educational change. The length of the workshops and the grade level targeted were found to be important in affecting the beliefs of teachers.

**lft, nas, ref. tpd, phe (TE)**


Survey of physical science teachers (n=334) found that general science courses, science methods courses, and inservice training did not prepare physical science teachers for lab safety. Frequency of student injury was linked to several variables.

**lab, tpd, skt (SE, TE)**


Study investigated and described traditional vs. constructivist instructional strategies and homogeneous vs. heterogeneous ability-grouping practices on conceptual understanding and critical thinking skills in the secondary biology classroom.

**cns, ped, cpl. lrg. sks (SE)**


Canadian primary and elementary school teachers (n=127) were surveyed to determine attitudes toward science. Problem areas reported by teachers were lack of background and inservices in science, and poor school facilities and equipment. Fear of science was also found to affect teaching technique.

**att, tpd. ped. lab (EL, TE)**


A three-factor, 36-item Derived Chemistry Anxiety Rating Scale (DCARS), with Cronbach’s alpha .94, was used to measure students’ (n=64) anxiety stimulated by learning chemistry, being evaluated in chemistry, and by handling chemicals. Some significant differences by gender occurred.

**ats, che, gen (PS)**


Survey of elementary teachers found they had positive attitudes toward teaching science but concerns about lack of knowledge. Other curriculum priorities and lack of time were frequently given reasons for neglect of science in elementary classrooms.

**att, cur (EL, TE)**


This qualitative study focused on how Latino students and teacher developed a critical practice of science learning. The development of learning was found to be non-linear since students were drawn in different directions by challenges and multiple perspectives.

**mce, lrg. cid (SE)**

Eicher, Robert D. (1996). *Developing biotechnology and plant technology laboratory skills and attitudes in*
High school students made significant gains in confidence about targeted lab skills and positive attitudes toward biotechnology after completing specifically-developed lab activities.

**lab, ats, cur, bio (HS)**


A content analysis of 21 teachers' editions of middle school science textbooks determined the extent of multicultural content, the distribution of foundational knowledge categories of the multicultural content, and the extent the multicultural content relates to science concepts.

**mee, mat (MS)**


This research examined the characteristics of scientific inquiry development, the application of scientific visualization during scientific inquiry and the effects of collaborations. It was demonstrated that authentic research assisted by cognitive apprenticeships can provide a powerful method to prepare students for the work force.

**inq, lrg, sks, res (SE)**


A conceptual change discussion was found to be an effective means of reducing the number of misconceptions students had about force and motion and improving students' physics achievement in force and motion. Some difference by gender was observed.

**ped, ceg, phy, chi, gen (HS)**


The results of several activities were compared to an analysis of the mathematical structure of mechanics, and to the historical development of physics. The author argues that the teaching of mechanics should begin with momentum and conservation laws.

**cur, kns, his, alf, phy, ped (HS)**


This research investigates the value of US predictors of academic achievement on students in China. Performance in introductory computer courses had the most predictive power. Significant gender differences were not found for the College Entrance Exam but females outperformed males in high school and college.

**ach, cul, asm, gen (PS)**


Detailed account of the American secondary science curriculum during World War II. Success of wartime curriculum directly related to the work of individual teachers. Classroom teachers connected the rhetoric of wartime science curriculum with the reality of student knowledge and practical understanding.

**cur, his (SE)**


Seventh-grade students showed significant improvement in their understanding of the structure and function of plants after participating in hands-on activities.

**hos, lrg, bio (MS)**


Case studies of nine elementary teachers seeking to implement the California Science Framework with students who are English Language Learners revealed the importance of in-depth professional development for teachers in science content and pedagogy, and in instructional strategies to help ELLs access the core
science curriculum.

**mee, tpd, ped** (EL. TE)


Study examined the effects of the interaction of teachers’ understanding of the nature of science, their instructional strategies, and textbooks on students’ understandings of the nature of science, and the instructional strategies that enhance students’ understanding of the nature of science.

**nas, ped, kns, kn, mat** (HS)


Study of students working cooperatively to solve an ill-structured problem showed that in group discussions, students develop general and specific strategies for effecting solutions, and that they use text and other resources to understand parameters of the problem not outlined in class.

**cpl, pbs, cld** (HS)


A computer simulation used in conjunction with a specially-developed guide produced statistically significant gains in physics students’ qualitative understanding of projectile motion.

**chi, ceg, phy** (HS, PS)


The experience of a science summer camp challenged the teacher’s ideas on how students notice phenomena and how they might be drawn more deeply into investigation and inquiry.

**nd, fsd, ped, inq** (EL)


An instrument from the Association for the Evaluation of Educational Achievement was used to measure the achievement of students in three mixed and two single-sex schools. No significant difference in achievement related to gender was found. Attitudes toward science for both genders correlated strongly.

**gen, ach, ats** (SE)


This qualitative study was intended to explain lower achievement and participation of women in math and science. Very few gender differences were found but several factors about student interest in math and science were identified. The teacher was identified as the most important factor influencing students’ attitudes.

**gen, ach, ats, bkg** (SE)


Two survey instruments were used to investigate the perceptions of women in 17 two-year and 7 four-year institutions. They agreed that they were receiving adequate faculty and peer support but not the level of support and inclusion they wanted.

**gen, hfs, eqt, car** (PS)


Analysis of environmental education teachers’ semantic networks before and after a training program showed reconstructed and reorganized conceptual knowledge, according to the principles of the training.

**knt, ceg, lth, end** (TE)


21
Right mode preference students were found to drop out of college preparatory chemistry classes at significantly higher rates and attain significantly lower achievement scores than left mode preference students.


Scientific reasoning ability is studied as a function of informal learning and classroom teaching procedure. The results of two-way ANOVAs indicated that both informal and classroom procedures had significant main effects on scientific reasoning.


This research studied the Kentucky K-3 Science Specialist Partnership for Reform Initiative in Science and Mathematics (PRISM). The study was designed to provide evaluation data regarding the extent to which the K-3 Science Initiative has been implemented.


An analysis of four current elementary science textbook series showed that activities recommended to integrate science and mathematics are optional and occur infrequently. Only two process-oriented characteristics of science/math integration are adequately represented.


Study found that a constructivist-type science curriculum can be effective when administered to minority students in an after-school environment, and can overcome language barriers.


Parents’ responses and attitudes toward an organized Family Science Night event were examined. Results showed that parents enjoyed the hands-on activities and wanted the program to continue.


This research asked whether students interact with the systems of college life to construct identities as students, women and scientists, and whether gender played a role in this construction. The conclusion was that many systems and persons contribute to the culture of success for women.


Analysis of elementary science textbooks (n=269) from 1930 to 1990 showed a lack of representation of an ecocentric viewpoint when compared to an anthropomorphic viewpoint of humans as a component of the ecosystem.


This study documents the development, classroom testing, and revision process employed in a project to produce scenario investigations for use in General Chemistry laboratory programs and a supporting instructor manual.

Student conceptions of the interaction between charged conductors were elicited by surveying students in a physics course. The evolution of student ideas was traced in interviews of students from fifth grades through graduate students. Findings indicate that the main ideas about electrostatics occur through the various populations in varying degrees.

phy, alf (ALL)


High school students given Non-Coordinated models of electricity outperformed their control group on post-tests, while students given Coordinated models did not.

rem, lrg, ccg, phy (HS)


An interview-based methodology explored influences shaping perceptions and involvement in environmentalism. The research led to recommendations for curriculum reform and teacher education from a multicultural environmental perspective.

mce, ene, bfs. tpd. cur (TE)


Weak chemistry students who used a computer simulation (WASSER) had a more scientific understanding of how electromagnetic forces cause water molecules to pry salt molecules apart, compared to other weak students who did not use WASSER.

cbi, lrg, che (HS)


Student-student discourse was shown to have a significant impact on students' conceptions of graphs of kinematic variables.

cbi, cpl, cid, ccg, phy (PS)


Vietnamese university students (n=60) showed increased interest and motivation toward physics when an introductory-level course included some history and physics demonstrations.

ats, his, phy, nas, sts (PS)


Study examining the role of science in science education found that within science, knowledge is valued more than methods, but within education, the processes and attitudes of science are valued more than the knowledge itself.

nas, phe (GEN)


Study found that a majority of Spacelink Educator account holders (n=96) access Spacelink by the NASA toll-free number, use the service primarily for e-mail and internet access, and that there is some increase in the use of Aerospace topics in the curricula of account holders.

ntw. tec. cur. csg (TE)


The purpose of this research project was to study the changes in the meanings, thoughts and beliefs of elementary teachers via a generative learning model of teaching. Teachers changed their conception of science pedagogy through newly constructed knowledge.

knt, bft, ped. cns. tpd, phe (TE)

A narrative study about the social identities of seven Mexican girls and the meaning of science in their lives. The researcher believes that the results will encourage teachers to ask questions to gain understanding of the forces that shape our lives.

ats, bkg, ped, mec (SE)


Students who experienced a hands-on outdoor environmental education curriculum showed more positive attitudes toward the environment after one year than students who experienced a traditional textbook environmental education course.

ats, ene, hos, fsd, nfcs (EL)


Describes a study of relationships among understandings of the nature of science, beliefs about what is worth teaching and personal and professional identity. Teachers’ perceptions of the things that make science special, what is warranted in the curriculum and purpose in teaching as related to sense of self are discussed.

nas, knl, bft, cht, cur, phe (TE)


An attempt to determine whether the attitudes of students in inquiry-oriented instruction were significantly different than students in traditional classrooms. Results do not support the use of inquiry-oriented instruction as more valuable than traditional classroom in affecting attitudes about science and science education.

ats, inq, att (EL)


Science anxiety in students (n=166) was found to be related to high test anxiety, negative attitudes toward science, parents’ negative attitudes toward science, and female gender.

ats, bkg, gen (PS)


The aim of this study was to determine how collegiate geography graduates view their program experiences. Academics and non-academics agreed that communication, education and computers had the highest utility and relevance. Recommendations for future research and application are included.

car, cur, tec, esg (PS)


This study investigated whether reform directions are actually being translated into changes in undergraduate education. The conclusion is that colleges are more likely to display reform and that reform is most often visible in the laboratory.

ref, che, cur, lab (PS)


This ethnographic inquiry investigated the methodology of human thinking. Results indicated that cognitive constructs are influenced by interpersonal relationships, cultural background and primary language.

kns, lth, bkg (PS)


Naturalistic study of students completing a computer project in biology class found that students had less
Anxiety over grades, increased motivation, involvement, and self-reliance, and a greater sense of community during the production of the projects.


The purpose was to determine the professional development needs of Illinois science teachers. A survey was sent to 1000 teachers across the state. The results showed strong deficits in historical perspectives and the history and nature of science. Several recommendations are made including using the inquiry method in professional development, aligning the program with the Standards, and providing adequate time.


Persistence in science or science-related majors among African-American students was found to be related to internal locus of control, ability to employ passive resistance to uncomfortable environments, and emphasis on product of science education rather than the process.


Fourth-grade students who received video-assisted instruction on properties of matter scored significantly higher on multiple-choice assessment than students who did not receive such instruction. There was no significant difference between the groups on an open-ended questions exam.


Time constraints were found to be a more significant barrier to hands-on science instruction in elementary schools than teacher attitude and anxiety or lack of equipment and facilities.


The model explored was the professional development program for three science teachers for a period of two and a half years. The objective was to determine how teachers understood their practice and in what ways it changed as a result of the model. The results indicated that interaction of each principle of teacher learning must be considered in organizing professional development.


Student interest and achievement was increased (n=90) after students acted as researchers and conducted controlled experiments on Wisconsin fast plants.


Study found that field-independent subjects made greater gains in conceptual knowledge than field-dependent subjects, and that there were significant differences in conceptual growth between groups of students with low and high scores on overall metacognition for grade 6 and 7 students taught biology concepts using a guided inquiry approach with embedded explicit strategy instruction.

Hua, Hsiao-Peng. (1996). *Effects of the implementation of selected activities from Project WILD on fifth-grade children’s knowledge about, and attitudes and behaviors toward, wildlife and the environment in Taiwan* (The University of Texas at Austin). DAI-A 57(09), p. 3817. 1997. [AAI9705863]
Selected Project WILD activities were shown to positively affect fifth-grade children’s short-term knowledge about and attitude toward wildlife and the environment in Taiwan. Students exhibited responsible behaviors toward wildlife and the environment in Taiwan after participating in Project WILD activities.


Content analysis of twenty physical science textbooks published from 1954 to 1994 found European Caucasian males to be the dominant scientist stereotype.


A demonstration-enhanced chemistry lecture course was developed and tested. College students’ attitudes toward the class were positive and increasing the use of demonstrations was strongly recommended.


An exploratory study of problem-finding ability. Students were randomly assigned to control and treatment groups. A written instrument measured various factors such as prior knowledge, interest in science and creativity. The control group, no scaffolding, showed little or no spontaneous disposition to problem-find.


Qualitative, naturalistic investigation of the perceptions of seven college chemistry professors of constructivist innovations in introductory college chemistry. Perceived barriers to implementation of novel teaching methods were lack of knowledge of educational theory, large class size, heavy course content, shortage of time, and cost.


Model-revising problem solving is used to analyze strategies that students use when encountering anomalies that their genetic models do not explain. The students brought a repertoire of strategies, including many gleaned from early geneticists.


Study found that gender may not be a significant influence on the decision to pursue a science career and that factors influencing this decision can be better understood by taking seriously the temporal and contextual elements of the science pipeline.


This work describes the development, implementation and evaluation of a novel approach for communicating scientific information to the public. The exhibit encouraged visitors to view science as a problem-solving activity and contributed to the development of alternative strategies for process-oriented communication in science.


Eight teachers of elementary multiage classrooms reported that they felt math and language arts instruction were more important than science instruction and that equipment and supplies for teaching science were inadequate.

Students whose teachers received Gender Equity Strategies Training (GEST) significantly increased scores for positive attitudes toward science. Male students perceived gender bias less often than female students.

ats, gen, tpd, eqt (MS)


Normally-achieving and learning disabled students' understanding regarding the nature of scientific methodology and scientific content was assessed quantitatively by the examination of writing samples over thirteen weeks. Both groups increased performance significantly.

chs, nas, ped, kns (EL)


This study focused on the practical application of teaching portfolios in the middle school science classroom. Teaching portfolios were defined as the record of skills, materials and activities selected as relevant to teachers' needs. Results indicated a positive perception regarding the program and a strong connection between initial needs and classroom implementation.

tpd, mat, att (TE)


Qualitative study of teachers implementing an integrated, STS-oriented high school science course found that teachers had difficulty adjusting their views of themselves as discipline-specific teachers.

sts, bft, ped, cur (HS)

Kindfield, Peter Birns Atkins. (1996). *Student control of whole-class discussions in a community of designers*

The impact and context of teacher networks at two elementary schools were studied in an effort to determine whether teacher networks affect teachers' science instruction and sense of efficacy about implementing the California Science Framework with students who are English Language Learners.


ANOVA and Pearson's product moment correlation were used to analyze the beliefs of science teachers in regard to demographic factors, locus of control, attitudes and anxiety. Attitude showed the strongest contribution to variation in self-efficacy. Multivariate relationships of the variables was also examined.


Naturalistic study of two participants in an elementary science teacher inservice program revealed that the modeling of constructivist-based learning methods enabled a single inservice program to meet the needs of two diverse teachers. The study indicated that peer interaction was important in changing teaching behaviors.


This study determined whether an applied academics program provided equivalent academic achievement when compared to a traditional college preparatory program. Results suggest that student attitudes are not affected by either approach. The need for future research is discussed.


This study identified teacher concerns about a curricular change and explored relationships between concerns and implementation of the innovation. Results showed that most of the concerns focused on knowledge and understating of the curricular innovation and a need for a systemic staff development program.


The purpose of this collaborative, critical ethnographic study was to understand teacher culture during a science reform process, to determine barriers to reform, and to serve as an advocate during attempts to reduce these barriers.


Students who participated in the SEPUP program were significantly more likely to make responsible decisions about environmental issues and were more likely to transfer an evidence-based orientation to problems set in less scientific contexts as were non-participant students (n=288).


The objective of this study was to determine the effectiveness of a method of teaching which promotes a clinically-oriented approach. Analysis showed that students who were exposed to the alternative method did significantly better than those using the traditional
method. The need for future research is also discussed.

ped, cbi, lrg (PS)


Interviews and surveys were used to examine the scientific and alternate views of adults on the concept of decomposition. Adults had firmly held ideas about the decomposition of boxes and little understanding of the microbial role in decomposition.

alf, bio, lit (AD)


A cognitive profile inventory was administered to introductory level chemistry students and the course grades between control and experimental groups were compared. Significant differences were found by gender, major, and cognitive dominance. The results reinforce the theory that no one method will be best for all learners.

lsy, ach, gen (PS)

Kristjanson, Cheryl Roberta. (1996). *Voices from the other side of the room: A study on changing teaching strategies to include girls in math, science and technology* (The University of Manitoba). DAI-A 58(04), p. 1192, 1997. [AAIN16182]

Study found three factors to be critical in the success of females and other marginalized groups in learning science: a connection between the students and the teacher, a connection between subject material and the student, and a connection between the subject material and the real world.

eqt, gen, ped (SE)


A case-study approach was used to determine the effect on 12 alumni of a precollege intervention program. Eight of the twelve are pursuing careers in science or engineering-related fields and four are not in science or engineering fields.

car, cur (SE)


This project included the development of FINISTE, a network established to promote a broad spectrum approach to science teaching. Analysis showed that FINISTE was successful, due to factors including the way members were recruited, the commitment of participants, the usefulness of instructional methods presented, and the project organization.

tpd, nt, cur, ped (ALL)


Teachers' beliefs about knowledge influenced teaching, but concerns about control and time also helped determine each teacher's commitment to constructivist teaching. Detailed study of one constructivist lesson revealed three discourse structures and four discourse strategies.

cns, bft, cid, ped, phe (TE)


This project investigated the design and description of a global education model in order to determine if it could stimulate the construction of knowledge about the environment. It concluded that the pilot achieved many of its goals. Shortcomings and suggestions for the future are also discussed.

ene, kns, cns, cur, tec (SE)


Study attempted to identify problems encountered with conceptual understanding and problem solving in an undergraduate genetics program. Findings indicated that a solid understanding of meiosis is a
necessary but not sufficient requirement for students to solve a problem in applied genetics.

pbs, kns. alf, bio (PS)


Naturalistic study of the development of a pool of instruments for teachers to use as up-to-date authentic classroom assessment. The process was a model of curriculum development by a contractor under government supervision.

asm, kur. bio (SE)


This work addresses the teaching of evolution with clear and focused presentations of aspects which often prove confusing or counter intuitive. Two groups of students, one traditionally instructed and one using supplementary text and illustrations, were studied. The treatment group showed increased understanding.

evo, ped, mat, kur (SE)


This research investigated how students learn to explain from theory as opposed to examples in a conceptual scientific domain. Analysis showed that example group students engaged more in strategies such as hypothesizing and explaining while theory group engaged in monitoring and exemplifying.

lth, kns, cns, mat (PS)


Qualitative study of curriculum modulation found it to be an evolutionary, transformative process in which the text, teacher and learners interacted within a dynamic system to mutually construct outcomes and meanings in a high school chemistry classroom.

cur, ctd, cns, che (HS)


Evidence to support the experimental nature of the teaching of physics was found. A concrete example is presented in the form of the use of the measurement system in demonstrating the laws of mechanics in senior secondary school physics.

phy, ped, cdt (SE)


Students who received animated instructional materials performed significantly better than those viewing static visuals on problem-solving activities, but not on recall. Animation was shown to be especially effective for field-dependent students.

edt, lsh, pbs, lrg (PS)


This research attempted to determine if a difference existed between attitudes of seventh grade students and concerns of teachers in the Science 1 curriculum and the traditional life science curriculum. The ANCOVA did not indicate a difference in the attitudes of students toward science in either program. The concerns of teachers about Science 1 were different.

bft, ats, int, kur, ref (SE)


This study investigated the use of pictorial representations to enhance and assess student learning of molecular chemistry concepts. Results suggest that textual and pictorial test questions are equivalent in their ability to assess student understanding of molecular-level chemistry concepts.

rem, asm, che, cdt (PS, HS)

Study concluded that cross-age instruction involving hands-on activities is a valuable tool in the enhancement of elementary science and can have a positive impact on the learning experience of all students involved.


Elementary teachers' (n=16) beliefs about teaching and learning science, and the nature of science were ascertained. Beliefs aligned most closely with those elements of science education reform that were directly addressed by the program of reform in which teachers were involved.


This cultural history discusses how the images of nation, its problems and solutions have shaped policies and programs for education and training of scientists and engineers since World War Two. Also discussed is how policies and programs come to define images of scientists and engineers.


An investigation of how Vietnamese university students (n=39) responded to a social issues-oriented cell genetics course found that students showed interest in exploring science-related social issues and appeared to enjoy studying in a cooperative context.


This project was designed to give direction to the decision-makers of Texas to propel environmental education, adventure education and outdoor education in the most useful direction. The panelists determined that environmental and adventure education are sufficiently dissimilar to warrant formulation of a new model.


A case study was used to explore what students and instructor experienced in a course delivered on the Internet. Findings showed a positive evaluation of the course in terms of providing otherwise unattainable educational service, creating a collaborative learning environment and meeting needs of chemistry teachers.


Study found that Yemeni students were more likely to use Deep Approach and Achieving Approaches than Surface Approaches in their study, and that significant differences existed between genders. Students' perceptions of the classroom learning environment were related to educational level.


This qualitative study of three novice and three veteran biology teachers compared their beliefs about learners, society, schooling, and teachers' selves. A "reciprocal relationship" was found between teachers' beliefs and their experiences.

This thesis included teaching of a pilot laboratory section meant to incorporate an inquiry-based chemistry curriculum into freshman lab sections. An action plan for implementation was developed.

cur, lab, inq, che (PS)


Case studies of six women scientists determined that factors supporting their success were views of a "possible self," strong maternal role models, parental support, spousal support, expectation of financial responsibility, availability of spousal employment and individual interest in the science.

gen, car, bkg, eqt (PS)


The intent of these experiments was to give students the opportunity to acquire skills in working with laboratory instruments. The conclusion was that 92% of faculty and 70% of the students preferred the new type of experiment.

lab, sks, inq, che (SE)


Qualitative analysis of the integration of technology into a high school physics classroom found the combination of technology and collaborative work allowed for increased student learning.

edt, cpl, derog, phy (HS)


Three questionnaires were used to investigate the effect of gender-role identity, math self-efficacy, and career context on the expectations of gifted girls for math- and science-related careers. The relationship between expressiveness and career satisfaction expectations was the only gender difference found.

gen, obs, car (SE)


Different analogies selected from episodic, visual representation, and concrete were presented to each student. The effectiveness depends on the conceptual framework and strategies were employed by the learner. The more concrete analogy was more effective.

che, ped, ceg, kns, atf (SE)


Study found that student achievement (n=196) was higher for biology students taught with hands-on methods rather than lecture.

ach, hos, bio (HS)


Two-year study of 211 students in grades 3 through 8 found that females exhibited a slight preference for biological science topics, and males slightly preferred physical science topics for science fair experiments. At the middle school level, there was a significant shift toward biological science topics for both genders. Asian students showed strong preferences for physical science topics.

gen, eth, ats (EL)


The purpose of this study was to investigate the relationships among inservice training, geographic residence, marine science knowledge acquisition and student scores on the curriculum evaluation form. A
significant relationship was found between attitudes, teacher training and residence.

**cur. tpd. bkg. ats. kns (TE)**


The taught and learned curriculum in four CoVis earth science classrooms was analyzed. Students were more successful if they were given concrete feedback about how to engage in scientific inquiry.

**cur. inq. kns. esg (SE)**


Middle school students from the United States and Russia displayed similar perceptions of environmental concerns. Significant differences were found in several cultural factors and in perceptions of the difficulty of solving environmental problems.

**cul. bfs. ene. bkg. pbs. sts (MS)**


This study used a project-based curriculum in biology which focused on how biological concepts of species are developed. Qualitative methods revealed richer, more complex definitions of species.

**cur. ref. kns. bio (PS)**


Preservice elementary teachers who used a constructivist hypermedia program about global warming gained a more sophisticated understanding of the phenomenon of global warming and their views became more similar to current scientific understanding. However, initial alternative frameworks were not abandoned.

**ccg. cbi. knt. esg (TE)**


A methodology was developed to assess forty one high school science laboratories. Safety problems were identified and recommendations made to improve laboratory safety. The instrument used has been recommended for use in the workplace, especially agriscience laboratories.

**lab. asm (SE)**


This study is an analysis of the relationships between teacher competency, number of teaching strategies and student competency. A significant correlation was found between teacher competency, student competency and number of strategies. No correlation was found between number of strategies alone and student performance.

**tpd. knm. kns. stv (SE)**


Survey of science teachers (n=281) found no substantial difference in teacher perceptions of the 1990 California State Science Framework when compared to perceptions of the 1978 Framework. Concludes that school districts should not expect changes in frameworks to dramatically affect what occurs in specific districts and classrooms.

**ref. lft (K-12)**


Study found that six pilot Environmental Education school sites in China produced students who scored significantly higher on an environmental knowledge and attitudes scale than students from nine non-pilot schools.

**ene. cur. ats. kns (SE)**

Earth science literacy levels of preservice and inservice elementary and secondary teachers were found to be similar to those of the general population as reported by other researchers.

knt, esg, lt (TE)


Literature reviews and questionnaires found a definite need for the assembly of a new contemporary human adult skeletal collection for forensic anthropological education and research. Obstacles include issues of procurement, emotional factors, religious implications, legal and ethical concerns.

bio, bkg, res, stt (PS)


This study compared the effectiveness of three different educational environments on science achievement. Analysis showed home schooled students scored significantly higher than students in public or Christian schools.

ach, ped. (MS)


This work investigated problem solving skills and the use of a computer simulation to facilitate conceptual change. The results indicated that presentation of numerical data can help students use mechanical algorithms and that computer simulations can impact student cognition.

cbi, ecg, pbs, cpl (SE)


Two case studies were used to identify some conditions needed for successful implementation of writing-to-learn strategies in science classes.

ped, att, att. lrg (SE)


A teacher's beliefs regarding the objectives for environmental education were explored using a case study. Findings were that college education greatly influenced the teacher's beliefs and practices, and that she lacked necessary support structures.

ene, bft, bkg, tpd (SE, TE)


Year-long study of the development of the language of science in a sixth-grade bilingual classroom looked at structural elements of the classroom culture, language use and conceptual understanding, and teacher knowledge base.

cid, mce, knt, kns (MS)


This study determined the relationships among science achievement, science teaching efficacy and school climate in public elementary schools. The multiple regression analysis revealed many relationships including that achievement is higher in schools with a high sense of teacher efficacy.

ach, ped, cht (EL)


A descriptive study relating learning of science process skills among elementary students to the situated cognitive theory of Greeno. Readers are provided with a foundation for conceptualization of situated cognitive theory.

sks, lth, kns (EL)

This multiple-case study of biology graduate students examines how writing affects the process of becoming a biologist. In-depth stories about writing were created and the study helped to characterize writing’s role across and within professions.

bio, kns, car. sks (PS)


Students who attended a residential environmental education program showed significant score increases on affective, cognitive, and to some degree, behavioral items. Increases did not appear to be influenced by gender and/or ethnicity.

ene, nfd, lit. ats, bfs (MS)


A descriptive study of four seventh grade science classes was conducted in which assignments and student writing were analyzed in terms of Bloom’s Taxonomy. It was concluded that higher-level assignments are important to give students the opportunity to use higher-level thinking as they write.

ped. lrg, kns. lth (MS)


Study was an attempt to identify factors that cause students to leave math/science programs. The factors identified were academic involvement, educational practices of the institution, gender, and enrollment status. Cumulative grade point average did not have any causal link.

ats, gen, car. bkg (PS)


Qualitative study of constructivist practice in middle school science classes found that play is important in science curriculum, discussion skills are important, respect for all ideas is important, and teachers need sufficient time to implement the practice well.

cns, cur, ped. sks (MS)


A regression analysis with Black, Hispanic and White ethnic groups, gender, mathematics self-efficacy and ethnic identity entered as predictors was used to study math/science career interests. Results indicated that ethnic identity did not affect variance but all other factors did.

car, gen, chs. eth (SE)


The effects of computer courseware programs on learning achievement for college students in a physiology course were analyzed using descriptive statistics, ANOVA, multidimensional scaling, and stepwise regression. Students who used all three programs performed significantly better than other students; however, gender and GPA were the significant predictors of achievement.

cbi, ach. gen (PS)


A study of a program involving bringing in senior citizens and other adults from the surrounding community to engage in informal science experiences and environmental service projects. The program was found to be most effective in enhancing self-esteem. Other effects varied with each child. The program received the President’s Environmental Youth Award for 1994.

nfd, ntw. ene. chs (MS)

This qualitative study used a discursive approach to determine educators' beliefs about scientific literacy. The findings generated a theory on how educators learn science and indicated that despite a large availability of scientific information, non-professional interest in science prevents an increase in knowledge.

Olson, Eric Arne. (1996). Six complementary case studies of parents and children completing hands-on activities at home which were tied to the science education the child was receiving at school. (The University of Iowa). DAI-A 57(12), p. 5104, 1997. [AAI9715176]

An examination of the roles played by parents and children as they performed home activities that were linked to science instruction. The results indicated that parental interaction can be effective but care must be taken to minimize negative aspects such as misconceptions.


A performance-based instrument to assess the skills of high school physics students was developed and validated. Students performed poorly at taking safety precautions and recognizing sources of error. Gender, grade level, and type of physics course were significantly correlated with student achievement.


The science expressed in students' formal writing was compared with science ideas expressed during interviews and casual conversations with peers. Students' formal writing about science did not indicate the depth or scope of science thinking which was expressed orally by participants.


STEVI-B was translated, validated and applied into a Korean school context to allow for researching the self-efficacy beliefs of Korean prospective elementary school teachers.


The effects of Vee heuristic diagramming and concept mapping utilization during classroom and laboratory learning by college-level nuclear medicine technology students were investigated. Meaningful learning was evidenced by group performance gains, positive attitudinal preferences, and student misconception identification and remediation.


Literacy, linguistics, and science education reform documents were used to define scientific literacy and analyze classroom discourse and student learning. Social constructivism was the theoretical framework of the class and two case studies were used to determine extent to which students made sense of science content.


This study adapted and tested a model for museum exhibits that facilitated integrated experiential learning among families. The goal was engagement and cognition. Visitors showed longer interaction times for the new design. The model was a useful step in the development of a rubric for creation of educational exhibits.


The Learning Theory Evaluation instrument for evaluating instructional software programs in chemis-
try was developed and validated. The instrument allows educators to assess the potential effectiveness of software for facilitating learning.


An exploratory study suggesting that the gendered construction of the engineering academic context renders graduate school unattractive for women. A survey and in-depth interviews of 540 graduate students as to experiences, beliefs and expectations provided a reconceptualization of the underrepresentation of women and suggests implications for policy.


A comparison of rural and nonrural schools as to the science achievement of students and expenditure for equipment and supplies. Both groups perceived their equipment and supplies to be less than adequate. Nonrural students were found to have higher academic achievement in math and science but not in English and reading.


Language-rich techniques such as structured discussions with peers and teachers were used in a three-way study (low, medium, high) to help students develop conceptual learning. Results suggest that differences in conceptual learning due to language-rich teaching do exist.


Study found that science teachers with limited knowledge of distance learning technology found it difficult to produce videoconferencing sessions, and media specialists had difficulties motivating science teachers to learn about the new technology. A successful model is described.


Instruction with analogies was shown to be more effective than traditional methods of instruction of protein synthesis for eighth grade science students.


This research attempts to determine if a relationship exists between attitudes toward graphing and ACT mathematics scores and if there is a difference between graph construction ability for researcher-provided data and student-collected data. No significant relationship was noted except for ACT scores and graph interpretation scores.


Despite expressions of frustration and awareness of negative environmental factors, program and non-program teachers did not allow negative perceptions to limit their science teaching behaviors.


This research tested the hypotheses about student variables that affect performance on physics examinations. The Formula/Equation View construct was defined and an instrument developed to measure it. Significant correlations were found between the construct and performance on examinations.

Powell, Kathryn Marie. (1996). *Teachers' perceptions of their own learning: An exploration of biology teach-

The purpose of this inquiry was to explore teachers' perceptions of their personal sense-making as they participated in a summer institute. Intense workshops with demanding schedules were perceived as ways to acquire new skills and knowledge.

tpd, bft, knl, skn (TE)


African-American, Latina/o, and American Indian students considered at risk on traditional admissions criteria participated in an academic bridging program. Students performed academically and were retained at the same level as those who met higher traditional admissions criteria.

eth, ach, eqt, cur, car (PS)


A master's thesis which surveyed 33 girls before and after a two-week period of activities in biology and physical sciences. Results indicated that there was a similar interest in both biology and physical science.

gem, ats (MS)


Research explored the effects of a longer-term intervention designed to prepare a group of ten life science teachers to begin units of instruction with laboratory investigations. Length of professional background and viability of laboratory facilities had minimal impact on teachers' ability to employ the modeled approach.

lab, ped, chl, bkg, mat (TE)


This study tests the effectiveness of common tutoring models by analyzing the grades of tutored and non-tutored students. Gender and age effects are also measured. The results indicate that gender and age had a greater effect than tutoring and that more research is needed, especially in physics.

lrg, gen, ped, phy (PS)


The purpose of this study was to develop and evaluate a teacher training curriculum integrating the concerns of teachers, curriculum developers and subject area experts. Results strongly recommended two areas of training: providing teachers with an understanding of strategies for middle school and integrating chemistry, physics, earth/space and biology content.

tpd, cur, int (TE)


Qualitative analysis of male adolescent students' (n=93) decision-making about socio-scientific issues found that pupils use little scientific evidence in making decisions. Implications for pedagogy are discussed.

sts, sks, ped (SE)


An ethnographic methodology was used to study teacher and students' actions and interactions and the social forces associated with the community. Teachers can improve the quality of learning in their classrooms if they identify and reflect on the referents for their actions and interactions.

bkg, cid, lrg, ped (SE)

No significant difference in learning was found between sixth-grade students (n=66) who wrote and discussed chemistry activities and students who only wrote about them.

ped, cid, lrg (MS)

DAI-A 57(07), p. 2840, 1997. [AAI9639425]

Based on a constructivist methodology, this study explored how the staff of a museum believed science and scientists were presented in the museum. The staff believed the presentation was fun and exciting in order to attract visitors and provide economic stability.

nfd, cns, lrg (GEN)


Qualitative study of middle level students found that while students have some knowledge of environmental issues, their behavior does not mirror this knowledge.

kns, ats, ene (MS)


Nine teachers in three high schools were profiled as they attempted to implement alternative assessment strategies in senior high school science classes. Teachers identified current assessment approaches as insufficient in supporting the intent of a new curriculum initiative.

asm, cur (HS)


Study of problem tasks given to eighth-grade science students found that peer discussion may be important in students’ construction of knowledge and that peer discussion combined with writing may enhance the retention of science learning over time.

cid, cns, lrg, ped (SE)


The framework for studying teacher change as a result of professional development is reviewed from a multilevel perspective and the implications for evaluating teacher change is described. Leadership, institutional support, teacher proximity and collaboration are identified with change in middle school science teachers.

tpd, knn, att, ntw (ALL)


Study found a positive change in middle school students’ attitudes toward the environment, environmental literacy levels, and attitudes toward telecommunication after participation in the Global Thinking Project.

ten, ats, kns, tec, lit (MS)


Two general science classrooms which included ESL students were studied. The thematically organized, integrated science curriculum resulted in statistically significant gains in the reading scores of ESL students, while ESL students in the traditional class were unable to make these gains.

mce, int, ach, ped (HS)


This study used participant observation to understand students' views of success in two Midwestern public high school chemistry classes. Rather than deep understanding of chemical processes, students describe traditional strategies and task performances that become a rite of passage.

bfs, std, ach, chs, cse (HS)

Evidence is presented that everyday speech contains metaphors which organize the students' cognitive representations in ways that are very different from scientific accounts of heat and temperature. These metaphorical structures may lie at the root of student conceptions across many domains of science learning.

cid, kns, lth, cns, a1f (EL)


Meta-analysis of research detailing the effect of traditional and various non-traditional approaches to the laboratory component of instruction at the beginning college level found that non-traditional approaches significantly improved cognitive and nocoognitive student learning.

lab, ped, lrg, tns (PS)


The perceptions of 147 teachers of their teaching environment was studied via a questionnaire. Many negative factors were revealed including little in-service training, low salaries, slow promotion and class sizes. Suggestions for improvement were included.

bft. bkg, tpd (SE)


This study explores the relationship between teacher acceptance of evolutionary theory, teacher understanding of evolutionary theory, teacher understanding of the nature of science and their effect on the emphasis evolution receives in the classroom. A significant relationship was found between teacher acceptance and the level of instructional time allotted.

evo. knn. nas, bft (SI)


No significant differences in students' attitudes toward science and science careers were found between students receiving female gender affirming newspapers, male gender affirming newspapers, and gender-blended newspapers for six weeks. Females did improve scores from pretest attitudes.

ats, gen, car, nas (MS)


Statistics for degree attainment in traditionally male-dominated fields for both sexes from 1962-1989 were displayed graphically and analyzed visually. The largest gains in representation have been in autonomous, self-employed professions rather than positions in large organizations.

car, gen, his, eq (PS)


Student misconceptions in electrochemistry were identified. College-level chemistry textbooks were analyzed for vague or misleading statements relative to electrochemistry. Computer animation was shown to have little effect on conceptual change, but chemical demonstration-based conceptual change instruction significantly decreased misconceptions.

ccg, alf, mat, chi, ped (HS, PS)


This study explored the extent to which scientists and non-scientists share perceptions of hedging (linguistic elements) and how this is reflected in textbooks. Norms for hedging require attention in English and science courses from junior high through the university level.

mat, enc, bbs (PS)

Surveys and on-site visitations were used to analyze existing Advanced Placement science programs in Catholic schools. Thirteen guidelines for the implementation of an Advanced Placement science program were established.

*cur, cht* (HS)


This study examined the use of poetry reading and writing integrated with constructivist methods to teach science in the fifth-grade. The results indicated that the students developed both a knowledge of and a desire to learn more science.

*pdr, cns, int, ats, kns* (MS)


This qualitative study used "minds-on" science activities to investigate the science learning of very young children. The results indicate that both conceptions and reasoning were more complex than stated in previous studies.

*knk, pdr, lrg* (EL)


Characteristics of students and conceptual understanding of basic science was examined. The results were inconclusive and the researcher recommends much continued study of actual understanding of science.

*chs, kns, cpl, cgg, cid* (PS)


The study was designed to identify what conceptual knowledge was needed prior to solving an unfamiliar problem in order to create a meaningful solution to the problem de novo. The most successful solvings were accomplished by students from single-sex environments.

*knk, pbs, gen, ats, che* (HS)


Study was an empirical investigation into the impact of science courses and perspectives of science projected by instructors on science anxiety. It was concluded that the impact of a perspective upon a student may involve either ontological/epistemological or psychological interactions. Many possibilities for future research are indicated.

*phe, ats, nas* (EL)


Study compared the use of two symbol systems, algebraic notation and programming languages, in physics instruction. A theoretical and empirical basis for understanding the use of symbol systems' effect on students' conceptualization is provided.

*knk, lth, phy* (SE)


A functional relationship was not demonstrated between the use of write-on response cards or single-student responding and the disruptive behaviors of academically at-risk elementary science students.

*cid, pdr, cns, ats* (EL)


A theory for the design of computer-based simulations was empirically tested by observing and interviewing Korean high school students who worked with a
physics simulation. Observed strengths and weaknesses of the theory are discussed.


This research studied the bridge between the curriculum and its application to college physics. The Rasch Model of test item analysis, a factor analysis, and ANOVA were performed. Results include specific areas of the lab manuals that need revision and recommendations for effective Socratic dialoguing.


Study traced and described the chronological development of the national School Achievement Indicators Program from 1988 to 1996.


This study examined a structural equation model which tested the relationships between aptitude, science self-efficacy, science attribution and attitudes toward science. Males showed more positive attitudes and were more open-minded than females, but females had more positive attitudes about the normality of scientists.


High school biology students (n=87) attending a rural school in North Georgia were tested for the effect of a diversified instructional strategy on their measured conceptual knowledge and/or acceptance of evolution.


Sample programs from different areas of computer software in physics are critiqued based on their usefulness and cost.


The question of science as inquiry as opposed to traditional methodology was quantitatively studied. It was found that inquiry methods increased students' mastery of science content, critical thinking and laboratory skills but not process skills.


Elementary students' attitudes about science were more positive after participating in hands-on science investigations where there was direct interaction with professional scientists.


The advantages and disadvantages of the Intelligent Tutoring System in the education of engineering students is studied. The evaluation indicates usefulness to training of engineers and extension to other learning environments including the traditional classroom.


The content specific and general pedagogical strategies used by three pairs of first year preservice elementary teachers are described.

Stephen, Sandra Lee. (1996). *A comparison of ACT mathematics and science assessment scores of male and female examinees with similar situations and
aspirations (The University of Iowa). DAI-A 57(07), p. 2988, 1997. [AAI9640022]

Descriptive statistics were used to show that gender differences in ACT science and mathematics achievement can be reduced by as much as 50% when students are matched on ethnicity, family income, science and mathematics coursework, and intended college major.

gen. ach, bkg, chs. cth (HS)


A survey was used to determine which teaching methodologies and activities were being used and the amount of time spent on teaching science in grades K-8 during implementation of the Science Framework for California Public Schools in San Diego. Results showed a correlation between knowledge of the Framework and use of hands-on activities.

ref. ped, hos. kn (EL)


Study was a naturalistic inquiry of the explanation of teachers' goals and objectives for an environmental studies center. It also compared teachers' thinking about these programs and the development of responsible environmental behavior. Findings revealed that teachers' thought processes were rich in perspectives concerning knowledge, awareness, and behavior.

bft. ene. nfd. kn (EL)


This study quantitatively explores research questions related to processes and products of students creating dynamic models of stream ecosystems using learner-centered modeling software. It concludes that dynamic modeling is a viable classroom activity fostering engagement in cognitive strategies but more research is needed.

tec. ene. rem. irg (SE)


This study is a historical analysis of the significant events that led to the creation and evolution of the Texas Academy of Mathematics and Science (TAMS) from 1987 to 1992 and a description of the key individuals contributing to the development of the program.

his. cur (GEN)


Significant conceptual change occurred for high school students using computer simulation programs to study probability and randomness.

cbi, ceg (HS)


Sixth-grade students increased their understanding of physical science concepts due to hands-on instruction and computer-assisted instruction.

cbi. hos. lrg (MS)


A statistically significant, positive relationship between students' knowledge of wetlands concepts and attitude defensibility toward wetlands issues was found after an intervention emphasizing field study.

fsd, kn, ats. cne (HS)


Hands-on experiments using seeds of fast-growing plants did not significantly improve the attitudes of rural seventh grade students toward science or botany. No significant difference between the attitudes of male and female students was found.

hos. ats. lab. gen. bio (SE)

This study attempts to determine if exposure to an environmental activity such as radon testing has an effect on students' environmental knowledge and attitude. Results suggest no linear relationship between teaching of environmental knowledge and positive attitudes. Gender and age did seem to have a significant effect.

ene, ats, nfd, gen (SE)


A longitudinal case study of one grade eight science classroom in a multilingual, inner-city school context is used to argue that Bakhtin's theory of language provides new perspectives on academic language learning.

cid, lth, mec, lrg (MS)


Collective case study examined the links between the University of Iowa UPSTEP program and the teaching attitudes of graduates as beginning science teachers. The outcome suggests that several of the program features were linked to constructivist teaching exhibited by the new teachers.

tpd, cas, ped, chh (TE)


First-year students (n=48) in Vietnam studied general chemistry through an environmental, STS-suggested approach. The approach was shown to have a positive effect on students' interest and motivation toward studying chemistry, and on awareness of environmental issues.

sts, ats, kns, chh, ene (PS)


In 1840, more girls than boys were studying science, but by 1932 the situation had completely turned around. How and why this shift occurred is the primary puzzle this study sought to solve.

gen, his, bkg (TE)


Usefulness of Dewey's theory of inquiry in illuminating the pattern of scientific discovery while still accounting for objectivity of scientific truths in the methodological, effective, and relevant meanings of such terms is shown.

phc, nas, inq (GEN)


A qualitative study to explore the interrelationships between students' scientific epistemological beliefs, references for constructivist learning and cognitive structures with applications to improve science teaching. It was found that students with constructivist-oriented views recalled more information, showed more richness, and a higher precision of knowledge.

cns, kns, bfs, lrg (SE)


A survey was used to determine the inservice training needs of science teachers in public secondary schools in Bandung, Indonesia. The top ten needs were identified. They involved such things as delivering science instruction, content knowledge and student safety in laboratories.

tpd, bft, lab, kns (TE)

Collaborative group work did not produce significantly higher achievement in university chemistry students, but did in some cases improve students’ attitudes toward chemistry.

cpl, ach, ats, che (PS)


The focus of this study was to determine the linkages among home environment and self-concepts on mathematics and science achievement. Results showed that prior ability played a major role in influencing educational achievement and suggest that parental communication and family processes are beneficial to educational growth.

big, chs, ach (SE)


This single-site phenomenological case study examined the perceptions of the researcher, one teacher, his students, colleagues, and principal toward alternative assessment strategies and associated phenomena in a ninth grade biology classroom.

asm, bft, bfs, cur (HS, TE)


This study examined the use of the California Science Implementation Network Level I Professional Development Program. The recommendations include: Providing training for staff, teachers and principals about how to integrate additional opportunities; collaboration and collegiality; and that schools spend time and money on helpful elements.

tpd, atw, hos, bft (EL)


Kindergarten students who studied developmentally appropriate science concepts were able to communicate more effectively when "free exploration" time
was supplemented with a vocabulary lesson.

**sks, cid, kns, hos (EC)**


This study analyzed the visuals in children's science trade books identified as outstanding by the National Science Teachers Association in 1976 and 1993. Significant differences in the frequency and type of portrayal of males and females were found between content analysis categories within a single year and between years.

**gen, mat (EL)**


Written in the Finnish language, this study investigated the attitude change of 300 students toward the earth's situation and the future: natural resources and nature conservation. The results showed that change occurred in all groups regardless of therapeutic methods used.

**ete, ped, ats, bfs (SE)**


This investigation focuses on the relationship between OTL and achievement of 623 eighth-graders. It was found that OTL variables were significant predictors of achievement even when students' general ability level, ethnicity and gender were controlled.

**ach, gen, eth (MS)**


No significant difference in content knowledge was found between groups of students who were exposed to Science I before taking a Science II course and students who took a life science course before Science II. Significant differences in critical thinking and process skills were found between the groups.

**int, kns, sks (SE)**


This historical review of Say Yes to a Youngster's Future (tm) documents the program's growth, success, and impact on minority students.

**his, cur, mec (EL)**


This is an analysis of the psychological make-up of the junior and senior student population and what effect it may have on the drop-out rate. Over the three year period no significant effect was found for any psychological type, race or gender.

**chs, ach, eth, gen (SE)**


This study explored the perspectives of teachers towards the Texas Biology I End of Course Examination. Some of the major themes which emerged are: teacher confusion about the purpose, concerns about validity and alteration of the biology curriculum.

**att, asm, ref, cur, bio (SE)**


This quasi-experimental study investigated the relationship of videotaped laboratory presentations on learning chemistry. Results showed a high correlation between the use of videotape organizers and academic success.

Technology-based material on oceans was found to be successful at creating a dynamic learning environment in the middle school classroom. The technology played a significant role in presenting information, creating a simulation, and engaging students in role playing.

tec, cid, lrg, ped (MS)


Study found that females in mixed-gender cooperative learning groups were less openly critical of other students in groups than males were, and that females’ self-esteem could be negatively affected by dominant male behavior.

gen, epl, chs (SE)

Williams, Jennifer K. (1996). *The students have spoken. but are we listening? A study into students’ perceptions of science* (Pacific Lutheran University). MAI 34(06), p. 2146, 1996. [AAI1380855]

Survey of seventh-grade students (n=156) found that a majority perceived science in “school-centered” terms and many were unable to make connections between what they learned in science class to their daily lives.

nas, bfs, lit (MS)


Students who participated in the GLEP vessel experience (n=945) exhibited a highly significant increase in Great Lakes knowledge, significant increase in positive attitudes toward the Great Lakes (females), and no change in responsible behavioral intentions.

ats, kns, ene (EL)


The effectiveness of advance organizers presented through technology was investigated. Data from the experimental and control groups was analyzed by multiple analysis of covariance and follow-up univariate analysis of covariance. Conceptual knowledge seemed to be increased by technology. The need for future research was also indicated.

tec, ped, lrg, kns, osq (PS)


Pretests, post-tests, individual demonstration interviews, informal observations and discussions with students were used to determine understanding of optics. Results guided the design of two tutorial materials which are effective in addressing student difficulties.

kas, alf, lrg, mat (SE)


This study qualitatively investigated the impact of microcomputer-based laboratory activities on physics learning for students at various levels. Results indicated that learning was enhanced and motivation was increased for students using the Personal Science Laboratory package.

cbi, lrg, ats, phy (SE, PS, TE)


An examination of the chemical technology curriculum in Taiwan. Questionnaires were used and the data analyzed by ANOVA and Pearson’s correlation coefficient.

cur, che, tec (PS)


This thesis represents an exploration of the integration of Zen Buddhism and environmentalism. The viability of American Zen for addressing the environmental crisis is shown.

ene, his, phe (GEN)

The purpose of this study was to investigate the local item dependence effects on testlets in the tryout version of the Michigan High School Proficiency Test in Science by the Rasch partial credit model.

asm, ref (HS)


Parents' responses and attitudes toward an organized Family Science Night event were examined. Results showed that parents enjoyed the hands-on activities and wanted the program to continue.

ndl, hos, bkg (GEN)


Study found that preservice teachers were able to develop multiple and accurate representations that related science content to children's everyday lives as a result of a two-year, specially-designed elementary preparation program.

tpd, ped, rem, knl (TE)


Study was an investigation of students' understanding of optics, the development of multimedia activities and assessment of students' learning. The multimedia activities resulted in considerable improvement in students' understanding of optical concepts.

edt, kns, ccg, phy (PS)


A mail questionnaire and follow-up telephone interview were used to assess the needs of science teachers with regard to incorporating risk and Great Lakes education. Effectiveness of theories of reasoned action, planned behavior and trying education were also used. Teachers were very interested in incorporating these items.

ped, cur, sts, tpd, ene (SE)


An investigation of the relationship between misconceptions and change in misconceptions after traditional instruction. Interaction of achievement and sociological, physiological, and cognitive learning styles was also studied. A significant relationship between the Force Concept Inventory and final grade was found but no other significant relationships were found.

ccg, ach, lsy, ped, alf (PS)


An ecology unit was developed and implemented. Student achievement was measured. The results of student interviews showed a significant increase in understanding of human impact on the environment.

ene, cur, lrg (MS)
Dissertations by Institution

Acadia University
Forsythe
Arizona State University
Cavalier
Auburn University
Knight
Ball State University
Mendenhall; Rutledge
Boston College
Armstrong
Boston University
Coulter; Gama; Hakrem; Johow; Supamoo; Whitier
Carleton University
Carty
Christopher Newport University
Nester
The Claremont Graduate School
Froeb
Clemson University
Krause
Columbia University Teachers College
Bischoff; Callaway; Espinoza; King; Kivist; Laborde; McCoy; Runcie; Seminara; Tsai, C.
Dalhousie University
Harding
Drexel University
Hur
East Carolina University
Daniel; Dawkins
East Tennessee State University
Quinn
Florida Institute of Technology
Drechel; Erytlrnaz; Sager; Stocker; Witte
Florida International University
Alonso
The Florida State University
Reyes-Herrera
Fordham University
Anyannechi; Coza; O'Brien
Georgia Institute of Technology
Srisethanil
Georgia State University
Meiveene; Peiffer; Robinson; Venable
Gonzaga University
Crawley
Grand Valley State University
Maschewski
Harvard University
Colley; Eggers-Pierol; Jay
Helsingin Yliopisto
Kaitunen; Lavonen; Wallin-Oittinen
Idaho State University
Bauer; McDermott
Illinois State University
Franzen; Morey
Indiana University
Owens; Nguyen; Shon; Sirochman
Iowa State University
Sanger
Kansas State University
Bolick; Schroeder, P.G.; Stalling
Lehigh University
Waller
The Louisiana State University and Agricultural and Mechanical College
Guruswamy; Melendez
McGill University
Salonius
Memorial University of Newfoundland
Eddy, L.
Miami University
Carsen; Dangajnovic; Grim; Riley
Michigan State University
Almquate; Bronson; Castle; Cogan; Corlew; Coverdale; Dailey; Eicher; Fisher; Hazelwood; Hoekwater; Obieludan; Peasley; Rop; Williamson; Wu, S.; Yan; Zint; Zdeek
Middle Tennessee State University
Mauldin
National-Louis University
Pittman
New York University
Kos
North Carolina State University
Doolittle
Northern Arizona University
Klimbal; Mendoza
Northern Illinois University
Hillison; Olson, D. R.
Northwestern University
McGee
The Ohio State University
Chen, Chin-Chang; Good; Grener; Hensley; Miller; Shields
Ohio University
Gallaher
Oklahoma State University
Hardwick; Herman; Hildinger; Hunt
Oregon State University
Fan; Hale; Whittle
Pacific Lutheran University
Boyer; Rismiller; Williams
The Pennsylvania State University
Harry; Park; Popp
Prescott College
Yamauchi
Purdue University
Adams; Nagelhout
St. John's University
Cipriani-Sklar; Verna
Simon Fraser University
Davidge-Johnston; Hao; Lien; Tinh
Southern Illinois University at Carbondale
Tristan
Stanford University
Fontana; Helms; Midling; Moran; Perides
State University of New York at Albany
Back
State University of New York at Buffalo
Hines; Karmanzi; Osei-Anto
Stockholms Universitet
Chen, Y.
Syracuse University
Brophy
Temple University
Berman; Priestly; Rubin; Smith, D. A.
Texas A & M University
Hidy; Leeth; Lindenmeier; Powell
Texas Southern University
Washington
Texas Woman's University
Acker; Brown, L. M.; Burke; Cox; Edington; Green; Heath; Hinojos; Hinojosa; Jones, M. G.; Lerro; McDonnell; Nynan; Poc; Pratt; Riddle; Smith, D. P.; Taylor; Wall; Warren; Yarborough
University of Illinois at Urbana-Champaign
Caldwell; De Coste; Erdosine TOTH; Frazier; Langley; Schroeder, M. W.
The University of Iowa
Alexandra; Keng; Monhardt; Olson. E. A.; Servien; Stephen; Tilloson; Tsai, S.; Veronesi
University of Kentucky
Gilmore
University of La Verne
Keen; Nelson; Vigue
University of Lowell
Duffy; Forawi
The University of Manitoba
Cuthbert; Didack; Kristjanson; Rivard
University of Maryland College Park
Kelly; Keyser; Martof; Musial
University of Massachusetts
Habib; Koscher; Monaghan
The University of Memphis
Pinkerton, J.
The University of Michigan
Antony; Boylan; Crawford; Starr; Stratford; Zembal
University of Missouri - Columbia
Passmore; Plummer
University of Montana
Monroe
The University of Nebraska - Lincoln
Crowther; Duff; Koha; Liu; Schinzel; Zhang
The University of New Mexico
Thrall
The University of North Dakota
Johnson, M. A.; Schroeder, L. A.
The University of North Texas
Stride
University of Northern Colorado
Baxter; Lekhavat
University of Northern Iowa
Chen, Chang-Cheng
The University of Oklahoma
Gerber; Varghese
University of Pittsburgh
Edw. R. M.; Larreamendy-Journals; Levitt; Malvavib
The University of Regina
Bailey
The University of Rochester
Perez
University of South Carolina
George
University of South Florida
Miller-Shayvitz
University of Southampton
Koker; Ratcliffe
University of Southern California
Alters; Anakum; Belongia; Kennedy
The University of Southern Mississippi
Motsbee; Thomas; Webb; Zukoski
The University of Tennessee
Blough
The University of Texas at Austin
Barrett; Bissett; Byrd; Chang; Chiu; Filkins; Hua; Ogorcaly; Verdel; Westerlund; Whitson
University of Toronto
Barnett; Lang; Tiede
The University of Utah
McCormick
University of Victoria
Holden
University of Virginia
Klein; Kahla; Matkins; Thompson
University of Washington
Byrne; Wosilatt
The University of Western Ontario
Ross
The University of Wisconsin - Madison
Green; Johnson, S. K.
Utah State University
Eide
Virginia Polytechnic Institute and State University
Herc; Lee; Lucia; McClure; McKenzie
Walden University
Downing; Gork; Stevens
West Virginia University
Ditty; McEwen; Meadows
Western Michigan University
Brewer
Research Articles Published in 1996

John R. Mascazne. The Ohio State University

This section lists 215 articles in science education research that were published in 1996. Each entry is coded (see Key to Codes) with one to three major codes (in bold type) and up to three minor codes, as well as the grade level (in parentheses). Studies related to preservice or inservice teacher education are indicated by the t code for "teacher professional development" (tpd). The level designation that accompanies the teacher professional development varies, depending on the focus of the research. A general code, "TE," is used if the research focuses strictly on issues related to teacher education, but a second level code is added when appropriate to indicate the grade level(s) at which the intern or teacher participants teach. All entries are indexed by major codes at the end of the volume (see page 149). A list of the journals searched and the number of articles included from each is included at the end of this section (page 129).


Analyzes a senior secondary biology textbook in Nigeria, STAN Biology, for its misconceptions and alternative conceptions. Discusses how the classroom teacher might filter the conceptual problems before they are presented to students as knowledge.

mat, bio, alf, ceg (SE)


Examines the perception and knowledge of 205 adults regarding issues related to science and technology. Results indicate that some adults are not well informed about science and technology. Major differences exist among respondents on the basis of gender, and there exists a lack of knowledge about certain aspects of elementary science.

sts, tec, lit, gen, alf (AD)


Investigates how Greek secondary school students interacted in pairs and fours while discussing and attempting to explain physical phenomena. Results indicate that students progressed significantly more in their physics reasoning after participation in fours than in pairs.

cpl, ceg, cid, phy (SE)


Describes the extent to which an elementary teacher used teaching principles based on constructivism after attending an inservice program. Use of the new principles was influenced by his views of science and of learning, how he usually planned his teaching, and his confidence in his own understanding of the topic.

cns, tpd, ped, bft, phe, cht (EL, TE)


Describes a study which identifies what were considered new directions for science teaching and research in 1984 and compares those with actual developments. Considers possible future directions for research. One key implication is the need for more collaboration.

ref, res, htw (EL)


Describes and discusses an approach to teaching elementary thermodynamics which focuses on promoting and consolidating conceptual change in the classroom toward the accepted scientific view. Reports that this approach enabled a significant proportion of the student group involved to demonstrate understanding of the key ideas.

ceg, ped, phy, lrg (SE)

Article reviews research and theoretical perspectives in teacher education and multicultural education, and gives recommendations for how the two should overlap. Directions for future research in multicultural teacher education are also considered.

res, mce, tpd (TE)


Investigates 49 pre-service elementary teachers' conceptions of what causes the seasons using both a written procedure and a procedure that used models with verbal explanations. Results suggest that pre-service elementary teachers are likely to show a high frequency of alternative conceptions.

ali, knl, esg (TE)


Describes a case study of an advanced physics class that analyzes the implications of using computerized journalizing. Reports that this technique provides a vehicle for students and teachers to make their knowledge public, builds an atmosphere for valuing the conceptual understanding of others.

tec, ped, kns, phy (HS)


Explores the nature and extent of perceived challenge in learning and teaching science. Teachers (n=7) and students (n=37) in five secondary schools were the subjects of this study. Findings suggest that many students and teachers are unchallenged by science in school.

bfs, bft, curr, ref (HS)


Explores the current images that students have of scientists, student perceptions of science study in school, and student awareness of their use of science outside of school. Fifth grade students (n=117) were the subjects of this study that asked students to sketch scientists and school science.

bfs, nas, als (EL)


Explores introductory geology students' (n=186) understanding of earthquakes. Results indicate that: (1) the mass media seem to provide students greater details about the cause and impact than the actual experience itself; (2) students lack a broad understanding about plate tectonics; (3) introductory geology students have extensive misconceptions about earthquakes.

esg, kns, al. (PS)


Discusses the design of an Internet-based lesson plan development project. Examines strategies teachers used and their effect on lesson plan design, information gathering, and organization.

tec, ped, skt (K-12)


Analyzes two initiatives in Australian education that have attempted to influence the future directions of high school chemistry curricula; the concept of a national curriculum encompassing eight key learning areas and the reform processes of individual state governments.

ref, curr, che (HS)


Describes a case study of the social construction of knowledge when undergraduate students are engaged in collaborative analysis of repertory grids produced by themselves and their instructor. Results indicate that this approach motivates students to be responsible for their own learning.

cns, cpl, als, ped, esg (PS)

Summarizes a research study performed to assess curriculum changes in engineering education. Discusses the implications of the various curriculum strategies and initiatives and identifies the necessary socio-technological ingredients for world-class education of engineers.

cur, cul, ref, car (PS)


Many states are creating new curriculum frameworks as a strategy for improving science education. This article shows how these frameworks are organizing and presenting recommendations on science content. A recent Council of Chief State School Officers report analyzes related aspects, such as content/policy linkages on assessment, teacher education, and materials selection.

ref, cur, tpd, mat (HS)


Presents a case study of a high school student working as an apprentice in a university research laboratory. Examines communication between mentors and students and how it constrained or supported learning.

ntw, lab, cid, lrg (SE)


Examined the correspondence between teachers' student learning outcome goals and teachers' assessment practices of high school biology teachers (n=10) using interviews. Their assessment practices did not support their goals for students of developing higher order study skills.

asm, bio, lrg, sks (HS)


Reports on a study designed to identify and measure family learning in science museums. Findings indicate that families do learn from exhibits and the level of learning is related to specific observed behaviors. Grouping these behaviors as performance indicators provides a useful measure of exhibit learning.

ntd, bkg, lrg (GEN)


Reports on the stated preferences of first year high school students (n=499) about a range of science topics. Analyses of responses indicate that some topics were selected equally by boys and girls while other topics were selected predominantly by girls.

gen, cur, ats (HS)


Interviews and observations of a high school science teacher determined a high level of confidence and self-efficacy: concern for students; and conflicting perceptions about what it means to be a good science teacher. The primary conflict in perception was between teacher-as-facilitator and teacher-as-student-controller. Implications for teacher education are discussed.

bft, cht, skt, tpd, ped (TE)


Describes a research program that provides insight into the nature of phylogenetic problems and problem-solving methods and how these might be applied to teaching evolution. Contains a new description of the nature of phylogenetic problems and factors contributing to their difficulty.

evo, pbs, ped, bio (PS)


Reports on the views on problem-solving developed by prospective elementary teachers as a result of experiencing problem-centered learning in an integrated math-science methods course.

pbs, int, bft, tpd (TE)

Assesses the understanding that a sample of Oregon public school students (n=159) had of geology, physical and chemical characteristics, ecology and natural resources as related to a marine environment.

alf, kns. esq. bio (K-12)


Investigates whether children who visited an interactive science center were simply playing or whether they were learning as they played. Concludes that to maximize the benefit of such a visit, children need both preparation and follow-up activities.

nfd, trq. ped (EL)


Explores the experiences of preservice elementary teachers with science fairs, attitudes resulting from their participation in science fairs as students, and the importance of these past histories for their students.

att, bkg. cur (EL)


Analyzes science fair choices of 2149 students for diversity of topics and scientific merit and matches them with teachers' recollections of topics thought most likely to be chosen. Reports that teachers' recollections of topics seldom matched students' choices.

ats, bft. cur (EL)


Proposes a model for conceptualizing changes in novelty experienced by students in informal settings. Presents a case study and discusses patterns of verbal and non-verbal student behavior with reference to the level of novelty experienced. Reports that student behavior was found to vary with changes in the level of novelty experienced.

nfd, at. els (SE)


Interviews and surveys (n=120) using the Science Teaching Efficacy Beliefs Inventory of preservice elementary teachers' science teaching self-efficacy before and after planning and teaching a cooperative elementary science lesson at a local public school found evidence that early cooperative field experience had a positive influence science teaching self-efficacy.

cht, cpl, ped. tpd (TE)


Two cohorts of students with and without learning disabilities were followed for three years, and they and their teachers annually rated their capabilities and efforts in science. Some age differences in student self-evaluation were found. Comparison of student and teacher ratings suggests that teachers often have higher expectations for students than students have for themselves.

ats, att. els (MS)


Explores relationships among school students' (n=189) meaningful learning orientation, reasoning ability and acquisition of meaningful understandings of genetics topics, and ability to solve genetics problems.

pbs, kns. ith (SE)


Describes an investigation into the environmental attitudes of students in Hong Kong and their readiness to engage in pro-environmental behavior that could involve change in personal lifestyle. Students' general optimism towards technological development and the perceived importance of the benefits of modern
consumer goods were major factors that contradicted their concern for the environment. Gender was also significant.

ene, ats, tec, gen (HS)


Provides the results of a survey administered to high school students (n=379) in which they select the most and least preferred learning situations out of six. Results indicate that student preferences are largely influenced by their perceptions of the relevance and the psychological effects of contexts.

ats, lsy, lrg, bfs (HS)


The views of 40 primary students on ozone and its depletion were recorded through individual, semi-structured interviews. The data analysis resulted in the formation of a limited number of models concerning the distribution and role of ozone in the atmosphere, the depletion process, and the consequences of ozone depletion.

alf, kns (EC)

Clark, Margaret R. (1996). A successful university-school district partnership to help San Francisco's K-12 students learn about science and medicine. Academic Medicine, 71(9), 950-56.

The Science and Health Education Partnership was established in 1987 at the University of California, San Francisco, to support local school district efforts to improve science education. Components include instructional assistance to teachers and direct work with students. Emphasis has evolved from helping teachers and students to supporting systemic change. Lessons learned and advice for creation of new partnerships are discussed.

ntw, tpd (K-12)


Researchers studying attitudes toward computer careers interviewed 68 students in a university computer science course, 33 secondary school girls, and 19 women working professionally in computer-based careers. Both groups of students tended to stereotype computer-related careers as menial, isolating, and overly technical; this view differed sharply from positive attributes highlighted by the professionals.

car, ats, gen, tec (HS, PS)


Presents a case study of an unsafe situation in a science laboratory and its administrative consequences. Discusses issues related to laboratory safety and faculty evaluation.

lab, tpd (TE)


Describes an approach that uses an electronic bulletin board in a large class to promote cooperation and interactivity among students both inside and outside the classroom. Concludes that this approach facilitated student-student and student-professor interactions.

cli, ats, ntv, ped, cpl (PS)


Assesses the value of residential outdoor education programs through questionnaires and letters from teachers using two local education authority outdoor centers. Results indicate that residential outdoor experiences encourage success through increased motivation and confidence.

ene, fsd, nfd, ats, chs (K-12)


Questionnaires given to Mexican elementary students (n=60) revealed that the use of teaching strategies (exposition, examples, feedback, and positive reinforcement), the possession of pro-environmental competencies, and the exhibition of academic skills were significant determinants of the ability to distinguish environmental facts from opinions.

kns, ped, sks, ene (EL)

Evaluates the introduction of in-class cooperative learning in a large lecture college physics sequence. Results indicate that cooperative learning sessions helped the students achieve at a higher level than expected.

cpl, ach, ped, phy (PS)


Science teachers’ (n=168) beliefs about reforms and degree of implementation of reforms were measured. Teachers believed that most reform strands were “necessary” or “very necessary” to be an effective science teacher; however, 51% of respondents felt that constructivism was “not very necessary” or “unnecessary,” and used constructivist teaching practices less than once per week.

ref, bft, att, cns (TE)


Uses the Theory of Planned Behavior to examine factors that predict junior high and secondary students’ (n=303) attitudes toward participating in district science fair competitions. Beliefs about who would approve or disapprove of participation, and perceptions of control.

ats, bfs, cur (SE)


Uses teachers’ autobiographies and action research as data sources to present an argument for valuing subjective, reflective knowledge based on Habermas’ category of cognitive interest of emancipatory knowing. Explores the process of personal empowerment.

knt, bgk, eqt, cht (TE)


Investigates the patterns of students’ conceptual restructuring within the theoretical framework of biologic evolution. Results indicate that many conceptions in this content are closely interwoven, so that a change in one conception requires a change in many others.

evo, ccc, bio (HS)


Presents the results of the evaluation of the Introductory University Physics Project (IUPP). Evaluation data from four model curricula indicate that students perceive demonstrations as beneficial to learning.

ped, lrg, bfs, phy (PS)


Discusses the results of a study that examined the factors that influenced women science undergraduates to pursue and remain in scientific careers and demonstrated the critical role the faculty play in students’ decisions.

car, gen, bgk (PS)


Reports on the impact of the introduction of science materials with a technological approach in some junior secondary classes in Swaziland. Results indicate that contextualized activities are highly appreciated and are capable of maintaining girls’ interest.

tec, int, ats, gen, cht (SE)


Investigates the construction of understanding of the motion of an object down an inclined plane which takes place through the process of model building in an integrated algebra, trigonometry, and physics class. Discusses four major themes related to student learning through modeling.

cns, rem, lrg, int, lth (SE)

Describes the results of a survey designed to ascertain details of student teachers' knowledge and misconceptions about the greenhouse effect, acid rain, and ozone layer depletion. Results indicate familiarity with the issues but little understanding of the concepts involved.

**knf, alf, cnc (TE)**


Investigates preservice elementary teachers' science process skills and the questioning strategies used during a discovery science lesson. Results indicate that subjects with a high level of competency in the science process skills asked significantly more questions and demonstrated an increased use of divergent, high-level questions in their teaching performance.

**skt, inq, ped, tpd (TE)**


Describes a general course designed to demonstrate to students that physics is vital to their understanding of physiology, medicine, the human body, rehabilitation, and other health fields. Presents evidence that indicates that active group learning and connections to real-world applications help students learn and apply physics.

**pbs, ped, int, cpl, sts, lrg (PS)**


Reports research concerning the definition of variables by pupils aged 12 to 14 during investigative work. Findings suggest that an increase in the complexity of an investigation lowers the ability to identify relevant variables and substantive concepts.

**pbs, sks, cur, lab, ped (SE)**


Conceptions of grade 11 chemistry students (n=13) via interviews were grouped into six categories related to students' preferred explanations for solubility phenomena. Argues that an understanding of the typical conceptions used by students should form an integral component of chemistry teaching.

**che, alf, ccg, ped (HS)**


Analyzes the faculty rank situation of women at schools with departments approved by the American Chemical Society (ACS). Reports a leveling off in the proportion of women entering chemistry faculties and of those at the department head level.

**gen, car, che (PS)**


Analyzes Australian students public and private statements to themselves and their peers collected in the course of a multi-year study of teacher management of communication in cooperative learning groups. Data reflect how students perceived and responded to subtle features in the public enactment of the curriculum, the task, and the setting during the ongoing lesson.

**cpl, cid, ats, cur (SE)**


Qualitatively examines the development of four community college science professors as science educators while they prepared and taught a summer life science academy for K–12 teachers. Reports that the professors came to see their traditional lecture/lab approach to science education as inadequate with regard to most students.

**tpd, ped, bft (PS)**


Describes a sequence of five experimental courses in chemical engineering that are designed to meet the
needs of students with various learning styles. The courses use a variety of teaching methods and are designed to develop and enhance creative problem-solving. Isy.

cur, ped, pbs (PS)


Examines ways that teachers' knowledge about teaching and their educational situations grow when they are engaged collaboratively with other teachers in inquiry on their own practice.

knt, ntw, tpd, phy (HS)


Reports on the use of a HyperCard-based tool by preservice teachers to create and modify concept maps about science related subject matter. Data gathered from interviews, journals, and concept maps indicate that the concept mapping tool was easy to use and allowed teachers to better organize their cognitive frameworks.

edt, att, knt (TE)


Preservice teachers used a computer program to create concept maps of astronomy topics. Such practices could help teachers identify areas of inadequate content knowledge. The author recommends further research on whether preservice teachers will be motivated to acquire more content knowledge when they are made aware of their cognitive frameworks.

knt, alf, edt, tpd (TE)


ene, tpd, skt, sts, knt (TE)


Examines ways in which students collaborate to construct, use, and revise conceptual and strategic knowledge as they solve complex genetics problems. Concludes that students used three types of knowledge during model revision: knowledge of genetics, knowledge of the process of model revision, and knowledge of their own problem solving strategies.

pbs, cpl, cns, rem (SE)


Investigates high school students' beliefs about mathematics and science, including beliefs about mathematical and scientific truths, the value and importance of inquiry, gender equity and ability with respect to the pursuit of mathematics and science careers.

bfs, nas, cqt, car (HS)


Reports on a study that investigated the impact of a science teaching and learning program on families of children attending an Australian child care center. Findings show that science-based discussions in family contexts were common during the program and that parents gained greater insights into specific aspects of their child's learning.

nfk, lrg, bkg (EC)


Elementary teachers were taught to plan for science lessons using a generative learning model of instruction. Analysis of teachers' conversations during the planning revealed that teachers recognized three theoretical points of conflict between generative
learning and instructional process models. Implications for science teacher education are discussed.

lth, ped, tpd, asm, hos, cur (TE, EL)


Analyses operational knowledge of the weight concept of high school students after two educational levels: introductory and advanced physics. Results showed that apparent and true weight concepts are poorly assimilated by most of the advanced placement students.

kns, alf, ceg, phy (HS)


Analyzes environmental knowledge of high school students using a national probability sample. Indicates that students can recognize basic facts regarding environmental issues but are unable to apply this knowledge.

ene, lit, sks, sts (HS)


Uses the Science Process Skills Inventory (SPSI) to analyze student efforts at writing experimental designs. Results indicate that explicit, incremental development of the science process skills of formulating hypotheses and identifying variables may be a means to facilitate student success in designing science experiments.

sks, pbs, ped (MS)


Compares a broad cross section of high school biology laboratory manuals with respect to several standard features as well as the degree to which they engage students in scientific inquiry. Makes comparisons with respect to topics contained in the manuals, types of activities, lab exercises.

inq, lab, mat, bio (SE)


Analyses nine high school biology manuals to determine how well they promote the basic and integrated science process skills that are involved in scientific inquiry. Results indicate that the manuals seldom enable students to use their knowledge and experience to pose questions, solve problems, or investigate natural phenomena.

inq, lab, mat, sks (HS)


Reviews the development of the climax concept of succession, illustrates the misconceptions in current textbooks, and provides a conceptual model for an updated view of succession useful in teaching at the introductory level.

bio, mat, alf, ped, ceg (FS)


Environmental science articles submitted for extra credit by 281 of 677 students in introductory ecology courses were examined to find what types of magazines were used, the range of topics, and which type of student responded.

ene, ats, mat, cbs (PS)


Describes using computer-based interviews as a research technique for investigating how students think about physics. One program called Graphs and Tracks, designed for use as an instructional aid, displays motions of a ball rolling along a track.

res, cbi, kns (PS)


Assesses patterns of enrollment in science, science achievement, and attitudes of students in grades 3-12 representing the four major ethnic groups in Hawaii. Results indicate that more differences were accounted for by ethnicity and even grade than by gender and...
there was little interaction between ethnicity and gender.

eth, ach, ats. gen (K-12)

Greenwood, Anita. (1996). When it comes to teaching about floating and sinking, preservice elementary teachers do not have to feel as though they are drowning. *Journal of Elementary Science Education*, 8(1), 1-16.

A three-phase constructivist teaching sequence was used in a graduate level elementary science methods course to improve preservice teachers' knowledge of density and to provide a model for approaching the teaching of science.

cus, ped, tpd, knl (TE)


Explores high school students' (n=26) understanding of the meaning of technology and the differences between science and technology. Reports that most students had a good understanding of the general purposes of both science and technology.

tec, bks, nns (HS)


In 1994-95, an Arizona Math and Science Eisenhower Grant helped a Northern Arizona University-sponsored project train 20 K-12 Arizona science teachers in telecommunications applications and science curriculum integration. Preservice teachers also participated. Problems encountered were differences in teachers' workplace telecommunications experience and unreliable Internet access. Funded for a second year, the project retained 17 original participants.

tec, skt, tpd, int (HS)


Presents a case study that focused on students' perceptions of gender differences in instructional activity and discussion about that activity in physics classes. Data analysis indicates that although teachers may be unaware of gender inequities, students of both sexes are aware of such inequities.

gen, cid, eqt, ped, bks (SE)


Highlights some National Science Board's science and engineering indicators that confirm that those who teach college-level science appear to be doing something right. Presents ideas about how they can continue to improve.

res, ach, ats (PS)


Explores factors influencing teachers' (n=800) intentions to implement the four strands of the State of Ohio's Competency Based Science Model. Examines the influence of three constructs on teachers' intentions.

att. ref. bft (K-12)


Reports on a nationwide survey of elementary teachers about factors relating to the acquisition of science equipment and materials, including the amount of personal funds spent to enhance their science instruction. Reports that the average amount spent per teacher totaled $199 with the maximum amount being $2000 and a sizable group not spending any personal funds on science materials.

mat, cht (EL)


Describes the use of three questionnaires in assessing how students learn. Results of the study process questionnaire, the course experience questionnaire, and the learning style inventory indicate that lecturers need to change their teaching paradigm to one where the lecturer is closely involved in the learning context.

ped, lsn, hlt (PS)


Examines the reasoning behind views of atoms and molecules held by students (n=48); and investigates how mental models may assist or hamper further
Instruction in chemistry. Reports that students prefer models of atoms and molecules that depict them as discrete, concrete structures.


Administered questionnaires to 35 science teachers to test the hypotheses that teachers holding constructivist beliefs are more likely to detect alternative conceptions, have a richer repertoire of teaching strategies, use more effective teaching strategies for inducing conceptual change, and report frequent use of effective teaching strategies.


Explores the congruence of Palestinian science teachers' beliefs about knowledge and learning with the recent constructivist/conceptual change epistemological basis of science education and the factors that influence these beliefs.


To determine if different levels of graphic presentation affected understanding, 131 middle school science students with high and low spatial ability were shown programs teaching concepts of molecular diffusion with no graphics, static graphics, or animated graphics. Students with low spatial ability benefited from animated presentations. Spatial ability was a significant factor in short-term comprehension.


Explores pupils' (n=1675) perceptions of the subject of design and technology. Results show agreement between pupils across key stages and between genders. Findings indicate that pupils are positive towards key aspects of design and technology.


Nine preservice teachers designed, implemented, and interpreted research studies on gender equity issues. Benefits to the student teachers and the teacher education program are discussed.


Compares students' perceptions of laboratory classes in chemistry and biology using the Science Laboratory Environment Inventory (SLEI). Results indicate significant differences on the subscales of 'integration' and 'open-endedness'.


Describes the development of a coding scheme that represents students' ideas and its application to the analysis of interviews with urban students (n=8). Results indicate that decomposition is a linchpin concept for building an understanding of nutrient cycling.


Describes efforts aimed at reforming physics courses for first-year engineering and science students at Rutgers-The State University of New Jersey. Discusses the establishment and working of the Physics Learning Center (PLC) and its impact on the retention and performance of students.


Describes survey results sent to all state environmental education coordinators designed to reveal a generalized picture of environmental
education requirements, guidelines, resource materials, staff, and teacher education requirements in the United States.

ene, ref. tpd. mat (K-12, TE)


Analyzes students' attempts to answer examination questions involving stoichiometry and chemical equilibrium and reports that the majority of the students do not fully understand either concept. Concludes that the main difficulty with these topics is that they are highly abstract and first taught to students before they have reached formal operational stage.

kns. lth. alf. che (SE)


Reports on data on broad field science endorsements collected from the state science supervisors. Findings indicate that 61% of the responding states have one or more broad field science endorsements.

tpd. ref (K-12)


Assesses the capacity of elementary teachers from a large urban school district to provide quality mathematics and science instruction. Identifies strengths and barriers in instructional and assessment practices.

asm, ped. skt. cur. mat (EL)


Reports on a study conducted to identify cognitive factors associated with differences in predicting problem-solving success among high school biology students. Results indicate that successful prediction depends on several factors including a subject's procedural and declarative knowledge and stage of cognitive development.

pbs, kns. lth (HS)


Discusses the traditional approach to writing science textbooks, the situation preceding the National Curriculum, and the effect of the National Curriculum. Summarizes the historical content of current science textbooks including biographical narratives and human interest material.

cur, mat, his. ref (K-12)


Reports on a study of the implementation of the new science curriculum in secondary schools in Northern Ireland. Findings suggest that astronomy has caught the interest of many students. Concludes that these findings justify the inclusion of astronomy in the Northern Ireland Science Curriculum.

esg, ats. cur (SE)


Investigates the validity of an instrument used to identify factors perceived as stressful by secondary science students. Results indicate that students regarded the fear of scoring low marks in examinations as the most stressful factor and that perceptions of factors vary with location of students and ethnic groupings.

asm, ats. ach. chs. bkg. eth (SE)


Investigates how science education students (n=265) rank some identified science education program standards and discusses their perceptions of the desirability and achievement of the standards in Nigeria.

bft. ref. att (TE)

Reports on a longitudinal study based on Years 7-12 for girls' achievement in mathematics and science. The data suggest that year 9 is crucial for girls' perceptions of how they have performed in math and science in relation to boys' achievements in these fields.


Presents a case study of an educational partnership between an Albuquerque magnet elementary school and the New Mexico Museum of Natural History and Science. Descriptions of the school and museum are provided as well as the program's goals, current activities and products, outcomes, and future directions. The Proyecto Futuro program, a multiyear initiative for family science learning, is described.


Analyzes student discourse in four grade 12 lab groups working on microcomputer-based laboratories. Analysis reveals the role the computer plays in the group context and the ways that this context is shaped by the computer.


Investigates students' perceptions of selected aspects concerning the organization of and learning from fieldwork. Findings indicate that students either seek partners whom they regard as capable of making positive contributions to the fulfillment of learning tasks, or they opt for friendship groups.


Reports on a study that explored alternative ways of presenting chemistry in junior high schools through the use of an attitude survey taken by students (n=593). Analyzes and discusses student suggestions for curriculum, teaching strategies, and learning environments.


Teachers working in mentor-mentee relationships to collaboratively plan and reflect on science lessons developed an understanding of constructivism as a referent for science and mathematics teaching in terms of valuing students' knowledge and ideas, searching for new ways to assess students' ideas, and monitoring their own teaching process through continual reflection.


Analyzes perceptions of staff members concerning difficulties facing students in a first-year chemistry program. Results indicate that the staff have very different views of student difficulties and how they should be overcome. Suggests that it is important for staff to engage in conversation about such issues.


Assesses students' existing and developing decision-making ability against the background of a normative model of the decision making process. Results indicate that after a unit on household packaging waste the students' arguments about a decision-making situation improved in terms of validity and clarity of the criteria used.

Kramer, Pamella E.; et al. (1996). Engineering 'up front': Why 'hands on' engineering education works for women and girls. GATES, 3(1), 39-44.

Presents results from a research evaluation of the effects of a team approach and learning styles preferences in a new hands-on laboratory course in beginning engineering.

Kumar, David D.; Helgeson, Stanley L. (1996). Effect of computer interfaces on chemistry problem solving among various ethnic groups: A comparison of Pen-

Investigates the effect of Pen-Point and PowerBook computers on solving a multiple-step chemistry problem among White, Afro-American and Hispanic students. Results suggest that the Pen-Point computer has a more positive effect on the problem solving performance and attitude of students towards computers than the PowerBook computer.

cbi, pbs, eth. ats, tec (HS)


Examines Wisconsin teachers' perceived competencies in attitudes toward, and amount of class time devoted to teaching about the environment. Discusses the effects of Wisconsin environmental education mandates concerning preservice preparation in environmental education and K-12 environmental education curriculum plans.

en, cht, att, tpd (K-12)


Reports on a pilot study that investigated the procedures used by universities to select and interview science graduates applying for teacher training courses. Identifies important issues related to selection and recruitment procedures.

cht, eth, bkg, car (TE)


Discusses findings from two surveys of the contribution to environmental education of social studies, science, and health education in primary subject teaching and of geography and science teaching at the secondary level.

en, cur, int (K-12)


Presents results from Singaporean and Australian studies on the relationships between the cognitive variables and problem solving performance in three electrochemistry problems of different degrees of familiarity for comparisons. Idea association, problem translating skill, prior problem solving experience, specific knowledge, and relevant but nonspecific knowledge are significant determinants of problem solving performance.

pbs, cul, kns. sks, che (SE)


Draws on theories of student motivation to learn and conceptual change learning in science to describe patterns of student motivation observed in sixth-grade classrooms. Highlights the value of distinguishing motivation to learn from intrinsic motivation, and of distinguishing general motivational traits from situation-specific motivational states.

ats, ceg, chs (MS)


Uses base-year data from a nationally representative database (NELS:88) to identify important explanatory factors for gender differences in science performance. Documents a large advantage for boys on the subtest of physical science and a modest advantage for girls in life science.

gen, ach, cur, ped (MS)


Examined (n=36) teachers' perceptions and use of interactive videodiscs (IVD) in the teaching of science. Perceptions tended to be positive. Major barriers to IVD usage were limited equipment availability and lack of time to develop and implement IVD-based lessons.

edt, ped, ats, bfi (TE)


Compares classroom environment in a group which used multimodal computer-based activities with that
of a control group which used traditional science instruction strategies.


Studies the conceptual changes and factors affecting eighth grade physical science students nfl0 investigating elementary thermodynamics. Classifies three types of students regarding their learning methods: converging, progressing, and oscillating.


This study uses a conceptual problem-solving test to investigate the effect of a series of pictorial analogies on the concepts of density, pressure, and atmospheric pressure in Year 8 classrooms. Findings indicate that students taught with the pictorial analogies scored significantly higher than their counterparts. Low achievers were the most apt to benefit from this strategy.


Uses data from the National Center for Educational Statistics' Schools and Staffing Survey (SASS) to present a profile of biology teachers. Discusses background of biology teachers, preparation in the physical and life sciences, who does the preparation, and expected future trends.


Attempts to identify variables for predicting academic success in electronics and find a model for predicting success in each of three main types of electronics programs. Results indicate that student's success in math and science in high school is a good predictor.


Examines what 4th-grade students learned by using computer-based tools intended to help them...
understand sound and music. Findings provide critical information for future instruction with the goal of supporting learning about sound and music from such tools.


This study examined the perceptions of 90 gifted students in India about their choices of scientific disciplines for in-depth study. Males tended toward engineering; females toward biology. Gender differences that emerged from student responses are discussed, as are suggestions for fostering students' intrinsic motivation to choose nontraditional fields of study.


Examines pre/post tests, land use plans, and oral presentations in order to assess whether the Conservation Camp was successful in increasing the knowledge and abilities of young people to consider water quality impacts in land-use decisions.


Presents the results of an experiment that evaluated the efficiency of analogy in the conceptual restructuring of a science topic. The experiment involved a fifth-grade class studying water and heat flow. Discovered that analogy can act as an effective trigger for restructuring knowledge.


Examines results of Piagetian spatial research studies while focusing on the existence of gender differences in Piagetian spatial assessments. Results indicate that a majority of performance assessments did not demonstrate a significant difference between males and females.


Documents and interprets the use of an electronic mail discussion group in a graduate elementary science education course (n=13). Student feedback indicated that their interest in communication technology was piqued by the use of the discussion group and it enhanced communication and community formation.


The instructional strategy of an experienced teacher intending to teach the nature of science as well as science content material was analyzed. Pedagogical strategies and reasons for integration of nature of science into science content are addressed.


Explores the accessibility, use, and perceived needs toward computing technologies of elementary and secondary science teachers in two large rural school districts. Data analysis indicate significant differences in many areas between elementary and secondary teachers' responses.


Examines gender differences in fifth- and sixth-grade students' self-reports of confidence, motivation goals, and learning strategies in whole-class and small-group sessions. Overall, results reveal few gender differences and indicate that students report greater confidence and mastery motivation in small-group lessons.

Describes the results of the American Chemical Society Public Outreach Office's research program to measure the impact of the Kids & Chemistry program on both the children and the volunteer scientists. Highlights include objectives of the program, pretest research, focus group results, field tests, and pre- and posttest survey results.

ntw. lrq, ats. che (MS, SE)


Reports on two case studies of the Science Advisor (SCIAD) Program. Goals of this program include improving science and technology literacy and increasing the number of highly qualified scientists.

lit, ntw, car, tec (EL)


Surveyed secondary biology textbooks to ascertain how the topic of evolution functioned in the overall structure of the subject matter. Results indicated that there has occurred a marked increase in the role played by evolution in the generation of textbooks published during the 1990s.

mat, evo, his (SE)


Analyzes the extent to which students (n=92) understand teachers' evaluation criteria and the relation of that understanding with social class, social context of the school, teacher's conceptual demand, teacher's explicitness of criteria, and science achievement.

asm, bkg, cht. ach, ped (K-12)


Introduces Sense-Making, an alternative methodology which allows an insight into a person's perception of reality. Interviews science teachers following a viewing of Jurassic Park to investigate the relationship of the movie to their ontological view of science, society, and self.

lft, phe, nas. ms (IT)


Reports on a study, Project REMODEL, that implemented and evaluated innovations in lecture, laboratory, and assessment for students in the introductory sequence for undergraduate chemistry.

asm, ped, lab. che (PS)


Reports on a study in which a teacher used the collaborative development of a format-free computer database to facilitate the construction of knowledge by a group of students (n=3) during a science project.

cns, tec, cpl, ped (EL)


Reports on discussions with a year 10 group, following their first lesson on heat energy transfer, that revealed that they still had not realized that insulation acted as a barrier, instead they saw it as an active warming agent.

alf, phy (SE)


Analyzes the great diversity in problem-solving strategies used by students in solving a chemistry problem and discusses the relationship between these variables and different cognitive variables.

pbs, hsy. hh (PS)


Summarizes a report from the joint committee of the National Academy of Sciences and the National Academy of Engineering, Institute of Medicine that recommends a new model of Ph.D. education based on changes in science, engineering, the economy, and society in general.

ref, cur ms (PS)

Scientific Knowledge for Indian Learning and Leadership (SKILL) was implemented by South Dakota School of Mines and Technology in 1990 to improve the college readiness of American Indian students in math and science. Over 2,000 Indian students have participated in SKILL's academic-year programs, elementary summer programs, 4-week residential programs, and the 4-year NASA Honors Program.


Assesses public perception of selected strategies for increasing participation in city recycling programs: increasing the level of knowledge about recycling, using effective channels to inform the community about recycling, increasing the convenience of recycling, etc.


The Learning Cycle Test was developed to assess teachers' understandings of the learning cycle. Twenty-eight misconceptions were identified.


Examines how chemistry/science textbooks from different countries and written at different levels of education deal with physical and chemical change. Results indicate that the ideas concerning the teaching and learning of physical and chemical change evident in textbooks are not complete.


Investigates factors affecting students' ability to consistently apply the concept of adaptations. Individual interviews were conducted with 74 Year 10 students in Australia, of whom only 47% showed an understanding of the concept. It was found that the students were more likely to apply the concept to vertebrates.


Reports on a new phase in the research project, Development of Concern for the Environment and Formative Experiences of Educators, which involves the comparison of data in the United States and Great Britain. Compares practical activities engaged in by the respondents.


This research attempts to establish the level of success of environmental education at the primary level in Thrace, Greece. Questionnaires were completed by students (n=620) from the upper three grades of primary schools.


Describes a study that compares the achievement of biology students (n=48) under the conditions of self-regulation and a traditional approach. Concludes that higher measures of reported self-regulation were significantly associated with higher academic performance scores.


Studied the effectiveness of having science methods students design their own multimedia programs and then use those programs during a field-based teaching experience. Findings suggested that multimedia can be used effectively in preservice teacher education.

60

Evaluates an instructional method in general chemistry that attempts to bridge the gap between algorithmic problem-solving abilities and conceptual understanding of chemistry students and emphasizes conceptual problem-solving in the initial phase of a concept.

ped, pbs, kns, che (PS)


Reports on a survey of primary teachers on science curriculum development. Cites a plethora of planning terminology and lack of a government-agency model for a primary science plan as obstacles to curriculum planning. Presents a curriculum planning model derived from the rationale that curriculum should be learning outcomes-driven.

cur, tpd, ref (EC)


This paper first evaluates discipline classification schemes and general differences between disciplines associated with the natural sciences and those associated with the humanities. It then reviews research which either asked students how professors in those fields teach, observed teachers in their classrooms, or asked students to describe their reactions to professors teaching science and humanities classes.

bfs, ped, ats, nas (PS)


Explores 11-year-old children's approaches to the concept of volume using six tasks that were developed to identify commonalities in children's responses. Results suggest that children hold and use different conceptions in their effort to explain and compare aspects of volume.

kns, lrg (EL)


Examines the potential of global environmental issues as starting points for learning science by studying the preconceptions of children aged 12-13 about the nature, functions, and vulnerability of the ozone layer. Results indicate that children are familiar with the location and nature of the ozone layer but less informed about its magnitude and that of the holes.

e, kns, sts (EL)


The Ann Arbor Public Schools and University of Michigan partnership created the Foundations of Science (FOS) course, designed to integrate the high school science sequence into a three-year project based upon real-life science investigations. Specially designed software, information technology, and Internet resources were utilized. Student interest and abilities increased and FOS participation expanded throughout the district.

ref, cur, ats, ach, tec (HS)


Examines the influences on research design selection and success in competition of 22 finalists at the 44th International Science and Engineering Fair. Findings include: students are largely accurate in self-reports of design and interact with mentors on several levels, outside influences reflect shifts in motivation, and success reflects internalization.

res, cur, ach, tw (K-12)


Examines factors that influence personal science teaching efficacy and science teaching outcome expectancy in elementary teachers. Data collection methods included questionnaires and interviews. Results indicate that preservice and inservice experiences such as success in high quality science courses and workshops influence personal science teaching efficacy.

cht, bkg, tpd (TE)

Analyzes videotape data of a summer science camp for elementary school children and characterizes students' orientations when exploring natural phenomena as modes of engagement.


Analyzes the enrollment patterns in chemistry during the first part of this century. Shows that the early progress of women in the first two decades of this century was not sustained and that a decrease in women's participation in all fields of chemistry was seen in the next few decades.


Explores how different media of instruction affect the learning of chemistry in a Malawian school. Reports that teachers and pupils needed time to get used to the new language of instruction but that the new experience. However, the performance of students instructed in their vernacular language did not improve as much as expected.


Investigates the effect of the presence of context in physics problems by comparing the performance of physics students (n=8) on two sets of matched problems. Results indicate that the students performed better on the tasks with context.


Analyzes group discourse (n=24) during laboratory investigations in order to understand how students solve scientific problems and the ways social rules shape the development and articulation of arguments.


This interpretive study of a Year Six classroom in North Queensland, Australia focuses on how two contrasting groups of children designed ill-defined engineering structures. The collaboration processes within the research team are explored. Classroom-related findings are also reported.


Describes research that documents the falsification of laboratory results by chemistry and physics students. Discusses some factors that encourage students to fabricate results and why some students do not feel the need to falsify data.


Pilot study found that computer simulations can be used effectively for learning and concept development in science. The most important critical variables for productive learning were the teacher's conditional use of direct teaching and student interest in the subject.


Results are reported from surveys and interviews with 22 rural teachers who participated in "Reach for the Sky," an initiative that links reform in math and science education with telecommunications use. Topics include benefits and frustrations of using the Internet, math/science resources found on the Internet, and the impact of Internet use on classroom practice and student learning.


A pilot study of laboratory data logging in three secondary schools found that when computers were used students spent less time measuring, recording.
and reporting data and more time observing and discussing. Qualitative changes, however, were much more context dependent. Contextual factors were computer skill, physical nature of the topics under investigation, learning objectives, and learning style.


Investigates reasoning strategies students use in solving stoichiometry problems and explores the relation between these strategies and alternative conceptions, prior knowledge, and cognitive variables.


Describes a case study of an expert teacher's questioning strategies during an open-inquiry engineering curriculum in a Grade 4/5 classroom. Analysis provides evidence for the complexity of questioning that is characterized by the interactions of context and content.


Examines patterns of participation of women and under-represented minorities over the past 10 years in research and related activities at the National Science Foundation's Directorate of Biological Sciences. Discusses relative funding success of women and minorities, women and minorities in the pipeline, and current status of women and minorities.


Presents an analysis of the treatment of Newton's Laws and relativistic mass in the nine most popular college physics textbooks. Concludes that only two textbooks give a correct interpretation of relativistic mass and only one text gives a correct discussion of Newton's first law.

Article describes the implementation and refinement of portfolio assessment in an elementary science methods course. Findings were that preservice teachers were initially uncomfortable with the level of self-reflection required in the portfolios, and that the assessment techniques were not readily generalizable to the elementary classroom.

asm. tpd (TE, EL)


Presents a study of science teachers (n=5) who serve as cooperating teachers. Discusses the impact of gender-sensitive cooperating teachers on student teachers' teaching strategies, questioning patterns, and interactions during their teaching practicum.

tpd, cht (TE)


Discusses the results of research designed to determine if student science projects in Ohio meet the goals for science education as recommended by the American Association for the Advancement of Science (AAAS), the National Science Teachers Association (NSTA), and the Ohio Department of Education.

ref, cur (K-12)


Examines the changes in one student teacher's thinking about the nature of scientific investigations during her participation in an elementary science methods course assignment.

bft, nas. cht (TE)


Investigates the nature of small-group social interactions in the mediation of children's science learning. Reports that the teacher mediated the children's small-group science learning through discourse that negotiated children's status, actions, and meaning.

cid, cpl, lrg, pod (EC)


The Integrating Laboratory Instruction and Assessment (INLAB) project for changing teacher practice is described. Twenty-seven of thirty participants in the project were shown to have changed their assessment practices or understandings. Authors found that the establishment of an intellectual community of learners was important to the success of the project.

asm, tpd, ntw (TE)


Article describes the development of a research-based model of preservice and inservice elementary teacher preparation for enhanced science, mathematics, and technology teaching. The creation of collaborative partnerships, development of science and mathematics courses, selection of professional development schools, and project outcomes are discussed.

tpd, cur, ref, ntw, mnt (TE, EL)


Discusses a study of (n=59) urban teachers' perceptions of the use of various natural settings for environmental education. Teachers examined a set of black and white photographs depicting four different natural settings, and made a judgment as to whether particular subjects/lessons could be taught there.

ene, fsd, bft (TE)


Presents a 10-year study of 6205 students at Gustavus Adolphus College showing that female science majors enter college well-prepared, are strongly career
oriented, and report that they are content in their major, well-adjusted, and satisfied with their lives.

can, gen, cbs (PS)


Duplicates an analysis conducted 20 years ago on physics enrollment in New York State in an attempt to verify the exploratory percentage enrollment in physics path analysis model using data gathered for the 1990-91 school year.

asm, car (HS)


Reports on a longitudinal study which mapped the transition between primary and secondary school from a student perspective. Explores how this transition impacts the way students think about, learn, and enjoy science at school.

ats, bkg, Irg (MS)


Explores the comparative performance of various segments of the student sample in general chemistry courses relative to their scores on the mathematical SAT test. Results indicate that mathematical skill measured by the SAT scores is an important factor in determining grades.

ach, che, gen (PS)


Reports on research into the cognitive basis of children’s alternative conceptions regarding light and sight. Highlights three factors that were found to interfere with effective teaching in science and suggests ways teachers can modify their approaches to circumvent them. Discusses ambiguity and the role of language, experience and concepts, and everyday knowledge versus school knowledge.

alf, ceg, ped, kns (K-12)


Examines preschool elementary teachers’ constructs for analyzing their own conceptual change classroom practice. Reports that the candidates used six student-oriented and seven teacher-oriented evaluation criteria and the five most frequent categories were all student-oriented.

knt, ped, ceg, asm (TE)


Performed a variance analysis of the relation between the amount of time students spend experiencing hands-on science and science achievement. Reports that students who engaged in hands-on activities frequently scored significantly higher on a standardized test.

hos, ach (SE)


Achievement of elementary education majors in a Principles of Biology course was significantly improved when a recitation section was designed to provide an environment more conducive to personal needs, learning styles, and interest orientations of the students.

aem, ped, Irg, hgf, by (PS, TE)


Describes changes in students’ ideas about science classes, attitudes about science, and motivations for studying science in a classroom designed to support project-based science learning. Results suggest that providing students with the opportunities to collect and analyze their own data results in a change in students’ ideas.

ats, bfs, ped (ST)


Investigates different perceptions of resource provision, management, and use to support
investigative and other practical science. Findings indicate that overall schools are building up an increasingly broad resource base, reflecting the range of content required in the National Curriculum.

cur. mat. ref (K-12)


Argues that surveying what new students understand about the basics of a subject can be illuminating. Presents a case study of A-level chemistry students and suggests that although the details of what was uncovered are idiosyncratic, the paucity of understanding of fundamental concepts may be common.

alf. kns (SE)


Analyzes textbooks on thermodynamics with the aim of showing that several mental representations of this subject matter are present in scientific literature. Outlines divergent attitudes towards the definition of fundamental concepts and also towards the epistemological status of thermodynamics.

mat. phy. rem. nas. phe (SE)


Discusses innovations in testing methods in college-level science. Highlights previous efforts at reform, new thinking, new practices, and computer-generated exams and scoring systems. Reports on focus group interviews.

asm. ref (PS)


This study of the teaching of grade 11 chemistry indicates how an experienced teacher made sense of his teaching roles in terms of four cultural myths related to transmission of knowledge, being efficient, maintaining the rigor of the curriculum, and preparing students to be successful on examinations.

bft. phe. ped (HS)


Reviews research on the relationships between teacher metaphors and the teaching and learning of science. Portrays metaphors as a way in which knowledge about science teaching can be re-presented and as potential foci for discussions about enacted science curricula.

ped. res. tpd. ceg (K-12)


Article describes a project designed to recruit successful science majors into secondary science teacher education programs. Project methods, a participant case study, and a summary of how the project has informed efforts to recruit academically talented science majors into precollege teaching are presented.

car. tpd. chs (PS. TE)


Analyzes conceptions of energy of physics students in a pre-service teacher training program. Findings indicate that the students are considerably anthropocentric in their associations, their choice of pictures, and their alternative conceptions.

knt. alf. phy (PS. TE)


Examines student teachers’ understanding of the concept of force using a two-part written
questionnaire. Findings indicate that there is a serious
discrepancy between student teachers’ understanding of
force and the accepted scientific view.

**knt, alf, phy (TE)**

Tsai, Chin-Chung. (1996). The “qualitative” differences in
problem-solving procedures and thinking structures
between science and non-science majors. *School
Science and Mathematics, 96*(6), 283-89.

Explores the differences of problem-solving
procedures and thinking structures between science
and non-science Chinese graduate students. Discusses
differences in designing experiments, exploring new
questions, planning, assumptions, and validity.

**pbs, kns, car, lsy (PS)**

pupils’ age and the content of conversations generated
at three types of animal exhibits. *Research in Science

Reports on a study designed to reveal the contents of
the conversations of two main age groups of primary
children who visited three types of animal exhibits:
(1) at a museum; (2) live animals at the zoo; and (3)
animated dinosaurs and preserved animals. The results
raise concerns about whether effective science
education is occurring in these settings.

**nfd, cid. lrg (EC)**

Varelas, Maria. (1996). Between theory and data in a
seventh-grade science class. *Journal of Research in
Science Teaching, 33*(3), 229-63.

Presents and analyzes data focusing on: (a) how
teacher and students moved between theory and data
in a unit designed to engage seventh-grade students
mostly in the deductive direction of scientific activity;
and (b) how the dialectic of education was played out
in the classroom.

**pbs, ped, cid. nas (MS)**

Vaz, Arnaldo; Watts, Mike. (1996). A clash of cultures:
Physics and the primary scientist. *Early Child
Development and Care, 117*, 99-112.

Uses writings of Paulo Freire to discuss situation of
British primary teachers required to teach science
without specialized training. Cites interviews with
teachers that point to cultural clashes between
National Curriculum physics and primary practice.
Conflicts exist between facilitating child-centered
discovery learning and teaching, and children’s
developmental stages and piecemeal teaching.

**bft, ref, lrg, ped (EC)**

Vaz, M., et al. (1996). Student perspectives on the role of
formative assessment in physiology. *Medical Teacher,

Describes a study of pre-clinical students (n=91) that
explored their reactions to formative assessment.
Results indicate that the majority of the students
reacted positively to the assessment explaining that it
enabled them to self-evaluate.

**asm, ats (PS)**


Surveyed a sample of science education journals
based on information provided by their editors about
standing policy and practice with regard to
publications. Focused on the problem of
communication within and between the different
sectors of the science education community from
researchers to teachers.

**res, mat, ntw (PS. TE)**

Wade, Kimberly S. (1996). E.E teacher inservice education:
The need for new perspectives. *Journal of
Environmental Education, 27*(2), 11-17.

Reports on a survey that investigated inservice teacher
education (K-12). Results indicate that professional
development in environmental education is dominated
by activity-based curricula, is primarily science-
oriented rather than interdisciplinary, and is concerned
more with environmental content than educational
context.

**ene, tpd. cur. int (TE)**

approach toward the prediction of students’ science
achievement in the United States and Hubei, China.

Explores a possible model for the prediction of
students’ science achievement in China and the United
States based on the ninth-grade data base from Phase
I and the Second IEA (International Association for
the Evaluation of Science Achievement) Science Study
(SISS).

**sch, asm. cul (K-12)**

Wbaugh, Michael. (1996). Group interaction and student
questioning patterns in an instructional
telematics course for teachers. *Journal of
Computers in Mathematics and Science Teaching,
15*(4), 353-82.

**bft, ref, lrg, ped (EC)**
Provides details of a study that examined interactions and questioning patterns in the electronic communication exchanges of students (n=21) enrolled in a course designed to provide direction in using an electronic network as an instructional medium.

tec, cid, ntw. edt (PS)


Survey of 7 physics textbooks in use in the Caribbean and Britain found a gender imbalance showing frequent depiction of males, particularly as adults, which may have an adverse effect on the numbers of girls continuing their studies in physics.

gen, mat, eqt. phy (HS)


Examines relationships between structural characteristics of students' concept maps about chemical equilibrium and independent measures of their achievement in chemistry. Results indicate significant relationships between multidimensional scaling coordinates and test scores.

kns, ach (SE)


Explores the extent to which current professional education literature is publishing material on environmental education in the school curriculum. Results indicate that readers will not readily find information on how to infuse environmental education into the curriculum.

ene, res int. cur (K-12)


Explores associations between students' (n=1592) perceptions of their chemistry laboratory classroom environment and their attitudes towards chemistry. Findings indicate significant associations between the nature of the chemistry laboratory classroom environment and the students' attitudinal outcome.

bfs, ats, lab. che (SE)


Presents a qualitative case study of the Technology-Enhanced Secondary Science Instruction (TESSI) model. Reports that implementation resulted in significant changes in the educational beliefs and the teaching and learning practices of those involved.

bft, tec, phe. cur. ped (HS)


Analyzes the attitudes of students from age 11 to 16 (n=654) towards science careers and the effect of school science on those attitudes. Discusses the implications for teaching in the context of motivational factors.

car, ats. ped (SE)


Describes the Science-Technology-Society (STS) movement and the Iowa Chautauqua Model. Discusses the results of studies in Iowa that looked at the effect of STS upon students with learning disabilities. Results indicate that most students with learning disabilities are better served in classes employing the STS approach than they are in textbook-dominated classes.

sts, chs. cur (K-12)


Concludes that science teacher education has changed little in 30 years and describes four factors integral to future reform in science teacher education: defining leadership; forming partnerships; using what we know from research about learning, instruction and teaching; and building collaboratives.

tpd, ref, res. ntw, lth (TE)


The views of first-year biology students on an essay writing assignment were evaluated through a
questionnaire. Makes a series of recommendations to help students develop improved writing strategies, minimize the possible difficulties encountered, and allow the writing exercise to be an integral part of learning.

sks, bio, ats. ped (PS)


Discusses research on classroom-type settings and applications. Results indicate an association between knowledge and affect along with prominent gender differences.

res, cid, gen. cne, his (SE)


Describes students' initial thinking strategies and investigates the influence of learning environments on progress, transfer, and retention of students' thinking strategies.

kns, lsy, bio. bkg (SE)


Describes a study of freshman science majors (n=50) that explores the role of higher-order cognitive skills examinations in identifying misconceptions in chemistry. Discusses the use of such examinations in remediation via appropriate modification of teaching strategies.

alf, asm, lth. ped (PS)


Describes a study that explored the attitudes of students (n=501) and teachers (n=53) toward computers. Argues that the views of teachers and students concerning the integration of computers in science teaching should be taken into consideration in course design and implementation.

ats, att, tec. cur (HS)


Comparison of a culturally-sensitive activity-based outdoor science curriculum with a traditional textbook and classroom approach found that fourth-grade American Indian students in the activity-based group had significantly higher science achievement scores than those in the control group. There were no significant differences between Indian and non-Indian students receiving activity-based instruction.

eth, cur. fsd. cne, ach. mce (EC)
**Journals Searched**

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Research Papers and Monographs Produced in 1996
Andrea K. Balas, The Ohio State University

This section lists 76 papers and monographs in science education research that were produced in 1996 and abstracted for the ERIC database by the end of July, 1997. Each entry is coded (see Key to Codes) with one to three major codes (in bold type) and up to three minor codes, as well as the grade level (in parentheses). Studies related to preservice or inservice teacher education are indicated by the code for "teacher professional development" (tpd). The level designation that accompanies the teacher professional development varies, depending on the focus of the research. A general code, "TE," is used if the research focuses strictly on issues related to teacher education, but a second level code is added when appropriate to indicate the grade level(s) at which the intern or teacher participants teach. All entries are indexed by major codes at the end of the volume (see page 149).


TIMSS collected information about pupils' knowledge and understanding of mathematics and science, curricula, and teaching and learning practices. Data collection instruments included tests and questionnaires completed by schools, teachers, and pupils. This report summarizes the TIMSS results for Secondary 1 and Secondary 2 pupils.

res, kns, cur, ped, ach, gen (K-12, TE)


This study examined the relationship between transition from elementary to middle school and achievement gaps in math and science in eighth graders with (n=296) and without (n=1608) learning disabilities.

chs, ach, bkg (MS, HS)


This book documents a three-year science teacher research project that employed new teaching activities to respond to students' thinking, constructivist views of learning, and alternative conceptions. The theme is that teaching is practiced in a public arena and governed by rules and norms.

tpd, skt, ped, cns, cur (TE)


This report presents results of the National Assessment of Educational Progress (NAEP) 1994 trend assessments in science, mathematics, reading, and writing. NAEP used a 0 to 500 scale for each subject area. Comparisons of average scale scores are provided across the years in which trend assessments have been administered and among subpopulations of students.

ach, res, eth, bkg (K-12)


This collection of 20 papers is centered on the theme "Teaching, Learning, and Technology-Strategies to Motivate Life Long Learning."

res, stx, chl, lsy, tpd, ret (PS, TE, ALL)

res, asm, bio, che, phy (PS)

In this study teachers experienced the social construction of knowledge in a learning cycle activity. They agreed about the importance of the learners' preconceptions in learning science. In a survey conducted four months later, they described constructivism in terms of learners' preconceptions in science teaching.

**tpd, cns, ped, lrg, phe, lth (TE)**


A study followed 445 Wellesley College (Massachusetts) women students matriculating in 1991 through their college years to isolate factors associated with persistence in math and science. Data were gathered through three surveys (at orientation, at the end of the sophomore year, and before graduation) and in focus groups over the 4 years of the study.

**car, gen, ats, chs (PS)**


The implementation trial involved selection of curriculum priorities for assessing mathematics and science. This report details methods and results of an evaluation of the implementation trial. Sources of information included interviews, questionnaires, log sheets, and reports.

**cur, asm, tec, ntw (TE, EL)**

Davis, Cindy-Sue; et al. (1996). *The equity education. Fostering the advancement of women in the sciences, mathematics, and engineering.* San Francisco, CA: Jossey-Bass Inc. [ED 394 488]

This volume includes 10 reports that present findings and recommendations for advancing women in science, mathematics and engineering. Critical issues facing women in these disciplines are addressed.

**car, gen, eqt, cur (ALL, TE)**


An annual study of physical science graduate students' background characteristics and degree recipients' employment outcomes was conducted for 1995. The total pool of 1994-95 physics graduate students was 13,285 with non-U.S. citizens making up 43 percent.

**chs, phy, car, eth, gen (PS)**


A study examined the supervisory relationship between a non-native English-speaking doctoral student and a native English-speaking advisor, particularly in science, focusing on factors leading to effective or ineffective supervision. Adulce response to advisor guidance and assistance, and the roles played by the two participants.

**ats, att, eth, mec, bkg (PS, TE)**

Driver, Rosalind; et al. (1996). *Young people’s images of science.* United Kingdom. [SE 058 006]

This research project was undertaken to elicit and to describe the range and nature of school students' understandings of the nature of science. The study was a cross age study of three student age groups: 9, 12, and 16 years. Data from four different interview probes are presented and discussed.

**kn5, nas (K-12)**


This document is a collection of four papers dealing with science achievement and teaching and learning strategies. They include Quality in the Science Curriculum, Reading Achievement in Science, Portfolios and the Pupil, and Improving the Science Curriculum.

**ach, ped, lsy, asm, cur (K-12)**

This study provides research into the reform in school curriculum programs in Iowa for mathematics and science, as being implemented by the National Council of Teachers of Mathematics and the National Research Council.


The data presented in the statistical tables in this document represent all categories of direct federal science and engineering support to institutions of higher education in the United States. The 15 federal agencies included provide virtually all funding for S&E research and development at universities and colleges.


This book highlights the importance of science and technology education in the post-compulsory years. It contains an account of the changes in the societal and educational contexts that have led to post-compulsory education being conceived as a distinctive stage in the formal educational provision.


An analysis of data reveals that with respect to curriculum there are no standard schools; however, there are significant differences in teacher qualifications and teacher attitudes. The author's reflections on life as a middle-school science teacher are presented along with a discussion of the goals and activities of GIMS.


This paper reports the involvement of a grade 4 teacher in the project and analyzes her professional growth in the areas of self-efficacy and motivation. The subject showed no quantitative changes in self-efficacy; however, her pedagogical content knowledge and confidence to teach science in the concept areas covered by the broadcast were enhanced.


Models of the technology curriculum which have influenced local curriculum design are described and characteristics which distinguish the new curricula from previous forms of technical education are identified. The paper ends by identifying some of the practical problems that have emerged as educational systems attempt to implement technology studies.

Graduate education and postdoctoral training in the mathematical and physical sciences workshop. Summary report. (June 5-6, 1996). National Science Foundation. Arlington, VA. [ED 394 446]

This report presents the findings and recommendations of a workshop regarding the effect of international economic and technological changes on graduate student training in the physical sciences and mathematics.

car, cur, bkg, tec (PS)


An open-ended questionnaire was used to explore how graduate students define the teaching of science. Results indicated that after the seminar graduate teaching assistants changed their conceptions of good science teaching to include knowing pedagogical strategies.

bft, ped, bio, skt, phe (TE, PS)


This framework provides an overview of the emerging literature on the gender gap in science and seeks to contribute to the growing body of research emphasizing factors that have been shown to enhance women’s ways of knowing in science; thereby, transcending gender stereotypes in science.

gen, chs, bkg, lng, ach (ALL)


This report provides a description of the Dwight D. Eisenhower Mathematics and Science Regional Consortium Program’s early operations. In this first round of evaluation, the report seeks to describe the federal formulation of the program’s purpose, early organization of the Consortia, and work of the Consortia.

cur, tpd, ref (K-12)

Heidari, Fatemeh. (1996). *Laboratory barriers in science, engineering, and mathematics for students with disabilities*. Regional Alliance for Science, Engineering, and Mathematics: New Mexico State University. [ED 397 583]

This report addresses the barriers college students with disabilities face in the laboratory setting. The characteristics that should be considered for the design of innovative tools or for modifying existing equipment in the laboratory settings are examined. Factors are highlighted that should be considered before the modification of laboratories.

chs, lab, mat, cur (PS)


This is a study to determine if there is a pattern between specific learning styles and Myers-Briggs Type Indicator preferences. The learning style inventory used for the study, “The Teaching and Learning Styles Survey for Adolescents (TLC),” is based on Jungian style preferences.

lss, asm, chs (PS)


A study investigated factors affecting the development of positive attitudes toward environmental issues among college students, focusing on the direct and indirect effects of student background characteristics, institutional characteristics, and college experience and outcomes variables.

ats, gen, cne, bkg, cur, chs (PS)


This monograph presents seven papers on the research and pedagogical aspects of developmental education and implications for a definition of developmental education.

ref, res, lrg, eth, gen, cpl (PS)

This publication is based on data obtained by the National Center for Education Statistics from all accredited institutions of higher education. Findings indicate that the number of bachelor's degrees in science and engineering fields awarded to minority students showed robust growth in the early 1990s.

**car, eth** (PS)


Fifteen museum school projects are described, all of which received Museum Leadership Initiatives grants in 1994. The chapter “Conditions for Partnerships” describes factors that should form the foundation for partnership between museum educators and school educators.

**nfd, ntw, cur, ped** (TE)


The first interim report on the Eisenhower State Curriculum Frameworks Projects examines the progress grantee states have made in completing mathematics and science curriculum frameworks and developing new approaches to teacher education, certification, recertification, and professional development.

**cur, tpd, ref** (K-12, TE)


The handbook is based on the idea that efforts to improve instruction must focus on the existing knowledge base about effective teaching and learning. It gives school administrators and teachers a ready source of authoritative, practitioner-based information about research on effective teaching and learning.

**ped, lsy, lth, ach, knh** (K-12, TE)

Jewett, Thomas O. (1996). “And they are us”: *Gender issues in the instruction of science.* Illinois. [SE 059 543]

This paper reviews research concerning women's negative or ambivalent attitude toward science and how that attitude is often reinforced by teachers.

Research concerning the topic points to two main factors: parental and societal perceptions and teacher behavior and expectations.

**gen, bkg, ats, bft** (ALL, TE)


This report has been prepared to provide as consistent a database as possible on human resources for science in the specified European countries. Additionally, it provides data on population, education, and science and technology personnel.

**tec, ntw, bkg** (PS)


Middle school teachers were introduced to and practiced with prototype activities for use in life science classes. Preliminary results indicate that they recognized few barriers to teaching life science concepts in the areas of animal behavior and reproduction and life cycles using the WOWBug.

**bio, cur, ped, hos** (MS, TE)


This document contains the final program and abstracts of the 1996 National Association for Research in Science Teaching (NARST) Annual Meeting held in St. Louis, Missouri. The presentations are classified in strands. First authors' addresses and a participant index are also included.

**res** (K-12, TE)


This book provides responses to the questions: How does standards-based science instruction look? and How can teachers verify that students have attained learning? Answers emerge from data of the work of science teachers. Research findings in student cognition/learning, and the Standards.

**ped, ref, asm, lth, kns** (TE, K-12)

This monograph contains a description of the procedures used and results obtained from the study of Population 2 which included the two adjacent grade levels containing the largest proportion of thirteenth-year-old students at the time of testing.

**ach, asm** (SE)


The purpose of this study was to identify students enrolled in a university-level chemistry course designed for the nonscience major who had experienced the ChemCom curriculum in high school and to evaluate their success. ChemCom group did not exhibit a statistically significant difference.

**cur, ach, sis, che** (HS, PS)


This document concluded that SMSO and TIMSS offer an important opportunity to learn more about international variations in curriculum and instructional practice in mathematics and science. This data provide a rare opportunity to discourse about mathematics and science education, its analysis, and improvement.

**res, cul, ref, ped, phe** (K-12)


This brochure outlines what such international studies can help us learn about how this study was conducted, and what the United States and other countries might be able to glean from TIMSS. Included are a timeline for the release of the TIMSS data and directions about whom to contact for further information.

**res, asm, ref, kns** (TE, K-12)


Findings from a 4-year study of exemplary science and mathematics programs for middle school students with limited English proficiency (LEP) are presented.

**mce, cur** (MS, HS)


This paper provides details about Minnesota eighth grade achievement results compared to the results of the United States and other nations by mathematics and science content areas.

**ach, asm, cul** (K-12)


In this book, leading scholars address a range of issues, ideas, and research findings in the field of teacher education, examining specific disciplines, social foundations, and program structures, as well as school reform and diversity.

**tpd, cur, phe, ref, bkg** (K-12, TE)


This software is a database of more than 950 entries that describe projects, resources, and organizations dedicated to significantly improving K-12 mathematics and science education. The Guide was developed to share information about the ways in which schools, districts, and states are approaching mathematics and science education.

**ref, cur, ntw, mat** (K-12)


The study found some differences between science and humanities majors, although not as great as those
reflected in C. P. Snow's study of eminent physical scientists and literary intellectuals. The study did find that science majors reported greater progress in analytical skills while humanities majors report greater progress in interpersonal skills.

skz, chs, car (PS)


The impact of major trends is considered in the context of special education programming and the current reform movement, followed by a closer look at specific curriculum trends in major academic subject areas and their potential impact on special education. Each curriculum chapter is followed by a series of commentaries.

t, ref, chs, cur, eqt (EC, K-12)


This paper discusses four themes: the evolution of physics, the evolution of chemistry, the evolution of science education, and the impact of postmodernism on science education. The need for emancipation from the modernistic paradigm is highlighted in order to foster critical thinking and greater scientific literacy.

nas, phe, his, ref (K-12, TE)


The field test is designed to determine whether it is possible to implement a portfolio assessment model on a national level that will result in scores that are of sufficient reliability and validity that they can be used for decisions at the student level. An early decision by the ACT was to develop the assessment with the direct collaboration of teachers.

asm, res (HS, TE)


This project brings faculty together from all sectors of higher education across disciplinary lines with their administrative colleagues to explore what works in strong undergraduate programs. It includes information about the project, the institutions and people involved, important issues and activities, and future plans.

ntw, ref, cur (TE, PS)


This publication addresses issues and practical approaches needed for science educators. It shares ideas, insights, and experiences of individuals representing science education. Examples illustrate the utility of topics and address general issues and perspectives related to science education reform.

ped, tpd, ref (TE, K-12)


Local teams of teachers met to score student work, discuss and resolve discrepancies in scoring, and reach consensus on exemplars of work for each score level. Discussions explore the ways moderation meetings were intended to function and the ways they did function in reality.

asm, tpd, ntw, knt (MS, TE)


The paper examines the motives and interests of a female preservice science teacher and it contains her autobiographical stories. The themes that emerge from the stories—effective teachers, her own teaching, and gender—are also discussed.

gn, btw, cht, ped, tpd (TE, HS)


These conference proceedings include papers presented and summaries of presentations made at the
1996 Annual International Conference of the Association for the Education of Teachers in Science (AETS) held at Charleston, West Virginia.

res, tpd (K-12, TE)


This report summarizes the findings of focus groups in seven cities across the country, including the key findings of the literature review on parent involvement, and key recommendations for involving parents in science education.

res, bkg, ref (K-12)


Teacher Education Equitiy Project was designed to bring gender equity to teacher education. Early results indicate that the percentage of participants whose syllabi mentioned gender equity doubled, while those whose syllabi specifically targeted gender equity increased sevenfold.

gen, kn, eq, ref, tpd (TE, ALL)

Schirol, Jeff.; et al. (1996). Factors associated with longitudinal educational achievement, as measured by PLAN and ACT assessment scores. Iowa City, IO: American College Testing Program. [ED 403 298]

The findings show that, in a typical high school, eleventh- and twelfth-grade students who took upper-level mathematics or science courses had higher ACT mathematics, science reasoning, and composite scores than those who did not take these courses.

sks, ach, bkg, eth, gen (HS)


This report provides information on science and engineering degrees conferred in the aggregate United States over the period 1966-1994. Degree data are compiled for a 12-month period. Data are classified by total number of degrees, gender, major field, and age.

his, car, chs, gen (PS)


The data presented show trends in doctorate awards by science engineering field and recipient characteristics, institutions awarding doctorates, and post-graduation plans of recipients. The source of the data is the Survey of Earned Doctorates.

car, chs (PS)


This is the final report of an intensive review of the state of undergraduate education in science, mathematics, engineering and technology (SME&T) in America. The year-long review has revealed that significant change is occurring and that important and measurable improvements have been achieved in the past decade.

ref, cur. asm, ach (PS)


This study was conducted to investigate the perspectives of science teachers on classroom assessment. It was grounded in a socioconstructivist theory that posits that teachers construct personal understandings and beliefs within the contexts of their school cultures.

asm, bfr, cns, tpd, bkg (TE, K-12)


A quick review of research on the purpose of history of science education reveals a general consensus that it should support citizenship education and the inculcation of democratic principles. STS instruction satisfies these requirements through its focus on individual initiative, social responsibility, and the interdependence between society and technology.

cur, his, phe, res (K-12)

Shiohara, Mayumi, (Ed.); et al. (1996). Tales from the electronic frontier: First-hand experiences of teachers and students using the internet in K-12 math and
This document presents first-hand experiences of teachers and students using the Internet in K-12 math and science.


The document describes the basic premise on which the Scope, Sequence and Curriculum project was built. It describes the programs at various sites, ongoing efforts and results.


The project goals were to assess the reliability and validity of hands-on science testing and to investigate the cost and practicality of these measures for large-scale assessment. These measures provide researchers with a basic set of tasks for studying student performance.


This study evaluated the effect of summing as opposed to averaging ratings in situations when both polychotomous constructed-response and dichotomous selected-response multiple choice tasks were used to measure one construct and then placed on a common scale.


This information booklet describes the design and development of TIMSS, its coordination and schedule, and its components including student assessments, performance assessment, questionnaires, curriculum analysis, videotape observations, and case studies. Also highlighted are the research questions that guided TIMSS.


The underlying theme of this book illustrates how constructivist ideas can be used by science and mathematics educators for research and the further improvement of educational practice. Authors from various parts of the world describe their work investigating students' conceptions, improving teaching and curricula, and enhancing teacher education in science and mathematics contexts.


This evaluation report covers the fourth and last year of the grant's implementation. The new curriculum aimed to improve teaching skills in kindergarten through grade 12 with technology tools that are available but underutilized and to increase student performance in science using holistic interdisciplinary approaches with opportunities to apply concepts in real-world settings.


The teacher education program at William Woods University (WWU) in central Missouri has developed five partnership projects that have served as the impetus for the gradual restructuring of the university's education program into a more holistic, interdisciplinary experience for the preservice teacher.


The document describes the basic premise on which the SED&C project is built, the programs at various sites that have been part of the project's implementation, and the results and ongoing efforts at those sites. It also offers advice about how to implement and overcome major obstacles of an SED&C program.
What schools can do to improve math and science achievement by minority and female students. (1996). Washington, DC: Department of Education. [SE 059 538]

This pamphlet reviews survey data concerning the representation of minority and female students in math and science courses at the elementary and secondary level and attainment of postsecondary degrees in these academic disciplines. Information for improving interest and achievement in math and science is included.

car, eth, gen, ach, ats (ALL)


These proceedings include 13 papers in the areas of: mathematics, chemistry, physics, biology, and technology education, science education theory, science curriculum and instructional materials, science teaching methods and learning environments, evaluation and assessment in science, and science teacher professional development.

res (TE, ALL)


This study concluded that audio-visual discovery lab experiments can be used in teaching descriptive inorganic chemistry, but further research needs to be done to improve the quality and methodological design of audio-visual presentations. Data were collected for quantitative and qualitative analysis.

dit, lab, ach, ats, che (SE)
Index

Every dissertation, journal article, paper, and monograph listed in the preceding three sections has been categorized by one to three major codes. Each publication is indexed here according to the major codes, and the complete set of major codes for each publication is listed after each entry.

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Antony, Mary
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Bissett, Deron Layne
Blough, Roger
Byrd, Lanier Eldridge
Cavalier, Jamie C.
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Chen, Xiaoda
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Doolittle, Martha S.
Downing, Charles R.
Fan, Tai-Sheng
Fritz, Richard Allan
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Hines, S. Maxwell  ats, kns, ene
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Jones, Roberta Lynn  ats, bkg, gen
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Midling, Michael J.  gen, eth, ats
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Nguyen, Kim Sa T.  ats, gen, car
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Smith, Denise Patricia  ndw, ats
Stallings, Mark A.  ped, evo, ats
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Fawns & Salder  cpl, cid, ats
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Greenfield, Teresa A.  eth, ach, ats
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Kennedy, Eileen  ats, ceg, bfs
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Articles

Bunderson & Anderson  att, bkg
Carlisle & Chang  att, chs
Czerniak & Lumpe  ref, bfs, att
Ferry, Brian  att, kns
Haney, Jodi J., et al.  att, ref, bfs
Jegede & Okebukola  att, ref, att
Lane, Jennie, et al.  ene, chs, att
Zoller & Ben-Chaim  att, tec

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Dong, Yu Ren  att, eth
Fagan, Patsy J.  cur, ref, att

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Cipriani-Skilr, Rosemary  gen, bfs, ats
Cox, Julie C.  bfs, nas
Gsellaher, Janna Blair  gen, bfs, etq
Habih, Deborah Leta  mce, ene, bfs
Kelly, Christine M.  ene, bfs, ats
Mellane, Martha H.  cul, bfs, ene
Rop, Charles Jay  bfs, sks, ach
Schefer, Maria  mat, ene, bfs
Tsai, Chin-Chung  cnns, kns, bfs
Veronesi, Peter Dwight  ats, bfs
Williams, Jennifer K.  asm, bfs, bfs

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Baird & Peana  bfs, cur
Barman & Ostlund  bfs, nas
Czerniak & Lumpe  ats, bfs, cur
Di Stefano, R.  ped, lrg, bfs
Flemer, M. Jayne  bfs, nas
Griffiths & Heath  ats, bfs, bfs
Hendley & Lyle  lab, bfs, ats
Hofstein, Avi, et al.  bfs, ats
Kemp & Orion  fsd, cpl, bfs
Maitra & Kumar  bfs, car, chs
Pollio, Howard R  bfs, ped, ats
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Abimbola & Baba
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Bol & Strage
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Gibson, David J.
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Lindauer & Quitzsch
cht, bkg, bio

Lumpe & Beck
mat, lit, bio

Palmer, David
kns, bio, chs

Paterson, Craig P.
sks, bio, ach

Zeegers & Giles
bio, atm

Zohar, Anat
kns, lsy, bio

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Adams, Paul Eugene
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Alters, Brian J.
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Antony, Mary
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Armstrong, Kelli Jean
skg, bkg, ach

Berman, Warren
bkg, cms, tpd

Bolick, Margaret Ellen
att, atm, bkg

Boylan, Christopher
chs, bkg, ach

Carty, Paula Christine
ene, lit, bkg

Castle, Ann M.
ats, bkg, nfd

Chen, Xiaodra
cul, ach, bkg

Crowley, Paulette T.
ped, bkg, gen

Green, Barbara Jo
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Greene, Kathleen R.
gen, bkg

Hansen, Carol Ann
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Hidy, Patrick Keith
ts, bkg, gen

Johnstone, Rebecca
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Kartoff, Norma Moore
car, gen, bkg

Majtis, Juanita Joan
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McEwen, Malcolm K.
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Miller-Shaivitz, Patricia
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Monroe, Ronnie Lee
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Olson, Eric Arne
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Pinkerton, Jane
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Reyes-Herrera, Lilia
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Runcie, Bereta H.

Stephen, Ann M.

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Tubin & McRobbie
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Vaz & Watts
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Woodrow, J. E. J., et al.
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Cain, Mike John
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Doolittle, Martha S.
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Matkins, Juanita Joan
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Maitri & Kumar
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Woolnough, Brian E.
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Koscher, Elizabethann A.
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Miller-Shaivitz, Patricia
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Nagelhurst, Edwin R.
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Cuthbert, Paul David
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Back, Hyejoo cpl, cbi, ach
Blough, Roger cpl, ped, ach
Bronson, Janet Ruth cpl, ped, ach
Cavallar, Jamiereylo cpl, ped, ach
Coulter, Robert W. cpl, cbi, ach
Franson, Bruce Allen cpl, cbi, ach
Hakerem, Gita Dvora cpl, cbi, ach
Hale, Patricia Lauren cpl, cbi, ach
Kos, Ivo cpl, cbi, ach
Meadows, George R. cpl, cbi, ach
Monaghan, James M. cpl, ach
Obelodan, James B. cpl, cbi, ach
Sriranathil, Chaisak cpl, cbi, ach
Sparano, Paulus cpl, cbi, ach
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Magnuson, Shirley J. cpl, cbi, ach
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Cogan, Leland Scott cpl, cbi, ach
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Mahyoub, Ahmed A. cpl, cbi, ach
Martof, Norma M. cpl, cbi, ach
Morrow, Marilyn cpl, cbi, ach
Poe, Peggy M. cpl, cbi, ach
Priestley, Holly D. cpl, cbi, ach
Schoenzel, Dan D. cpl, cbi, ach

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Hale, Patricia L. cbi, cpi, cid
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Duch, Barbara J.  
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Student Knowledge (kns)  

Dissertations  
Bischoff, Paul J.  
Brennan, Carol A.  
Brewe, Steven D.  
Brown, Lillian M.  
Chin-Chang, Helen C.  
Coultier, Robert W.  
Cosza, Barbara  
Davidge-Johnston, N. L.  
Espinoza, Fernando  
Forari, S.A.S.  
Hidy, Patrick K.  
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Jay, Eileen S.  
Johnson, Susan K.  
Laborde, Ila M.  
Lai, Patrick Kwong J.  
Larreamendy-Joerns, J.  
McGee, Steven M.  
McKenzie, Woodrow L.  
Mendenhall, Gordon L.  
Mangelou, Edwin R.  
Nester, Karen M.  
Owens, Caroline V.  
Risimller, Jun C.  
Robinson, James W.  
Ross, James W.  
Schroeder, Michael W.  
Schroeder, Patricia G.  
Seminar, Laurie  
Sherin, Bruce L.  
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Articles  
Audet, Richard H., et al.  
Barrow & Haskins  
Brody, Michael J.  
Cavallo, Ann M. L.  
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Corral-Verguido, V., et al.  
Galili & Kaplan  
Grayson & McDermott  
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Harst & Milken  
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Lucas & Roth  
Mason & Sorzo  
Palmer, David  
Pelps, Amy J.  
Potari & Spilotropoulos  
Potts, A., et al.  
Rohas de Astudillo y Nizao  
Taber, Keith S.  
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Wilson, Jan  
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Papers  
Achievements of Sec., res., kns, cur  
Driver, Ralston, et al.  

Teacher Knowledge (knt)  

Dissertations  
Adams, Paul Eugene  
Bailey, Penelope Anne  
Carnes, G. Nathan  
Dawkins, Karen Robbins  
Gama, Joao Pereira  
Harry, Vickie Diane  
Helms, Jennifer Victoria  
Hoban, Garry Francis  
Knight, Jane G.  
Mendenhall, Gordon Lee  
Miller, David William  
Moran, Carol Eleanor  
Powell, Kathryn Marie  
Roberts, Lily Lee Corina  
Rutledge, Michael Lorne  
Atwood & Atwood  
Dove, Nancy T.  
Dove, Jane  
Feldman, Allan  
Ferry, Brian  
Ferry, Brian  

Odom & Settlage  
Stoffelt & Stefanow  
Trumper, Ricardo  
Trumper & Gorsky  

Papers  
Gins & Watters  
Sanders, Jo  

Laboratory (lab)  

Dissertations  
Baxter, Louise Marie  
Dailey, Joseph G.  
Duff, Larry Albert  
Eicher, Robert D.  
Grim, Nancy Carol Lee  
Jones, Melody Gelane  
Mascalzewski, E. A.  
Mauldin, Penny Lynne  
Melendez, Julio A.  
Ossei-Anto, T. A.  
Priestley, Holly Delk  
Rubin, Susan Finlay  
Sirochman, Rudy F.  
Thompson, Brian R.  
Tsai, Shuh-Wang Colin  
Whitson, Joseph David, Jr.  

Papers  
Achevement of Sec., res., kns, cur  
Driver, Rosalind, et al.  

Articles  
Bleicher, Robert E.  
Clerc, Jeanne  

Germann, Paul J.; et al.  
Hofstein, Avril; et al.  
Nakahle, Mary B.; et al.  
Richmond & Striley  
Ritchie & Rigano  
Rogers & Wild  
Wong & Fraser  

Papers  
Heidari, Parviz  
Young & Hoffman  

Science Literacy (lit)  

Dissertations  
Cary, Paula Christine  
Diduck, Alan Paul  
Miller, David William  
Nelson, William A.  
Olson, Daniel Raymow  
Peasley, Kathleen Lynne  

Articles  
Ahiakwo, M. J.  
Gambro & Switzky  
Lumpe & Beck  
Mekal, J.G., et al.  

knt. lrg, lth  
kd., ltd, ceg  
knt. alf  
knt. alf, phy  

tpd., knt., ch.  
gen. knt., eq.  
asm., ltd, lab  
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asm., ped, lab  
lab., cid, pbs  
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lab., tec., bkg  
bf., atq, lab  
ch., lab, mat  
ed., lab  

st., sec., lit  
el., sks  
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lit., tnp., car
Learning, Comprehension (lrg)

Dissertations
Alimuqate, Humood A. ped, lrg
Baxier, Louise Marie asm, lrg, lab
Brennan, Carol Ann ped, kns, lrg
Brophy, Geraldine A. edt, lrg
Byrne, Christine M. edt, lrg
Covarsdale, Gregory A. tec, cur, lrg
De Miranda, Michael A. ped, lrg, lth
decoste, Donald J. cid, ped, lrg
Donnelly, Anne E. lrg, chs, sks
Egger-Pierola, C. M. mce, lrg
Erdoes-Toth, Eva inq, lrg, sks
Fisher, Jodie Lynn hos, lrg
Gutwill, Joshua Paul rem, lrg
Hakerem, Gita Dvorah edt, lrg
Hinojos, Kristine Kay ebi, lrg
Hoban, Gary Francis tpd, kn, lrg
Hoekwater, Michael Scott lrg, ped, as
Holden, Trudy Georgene lry, inq, lrg
Keng, Hsi-ao-Teong sks, lrg
Kos, Ivo ped, cbi, lrg
Mahyoub, Ahmed A. chs, cti, lrg
McClure, Patricia Head ed, cpl, lrg
Nester, Karen Marie lrg, ped, kns
Passmore, Gregory Gene lrg, ach, ceg
Peiffer, Bernadette M. nd, int
Perez, Catherine Herzog ed, asm, lrg
Pinkerton, K. David ped, cdl, lrg
Pittman, Kim Marie ped, lrg
Reynolds, Mary Allison lrg, gen, ped
Reyes-Herrera, Lilia bkg, cdl, lrg
Riddle, Jill K. T. ped, cdl, lrg
Riley, Dana Maria ndf, cns, lrg
Rivard, Leonard Paul cns, cdl, lrg
Rubin, Susan Finlay fab, ped, lrg
Schoeder, Michael W. kns, ped, lrg
Smith, Deborah Ann inq, lrg, sks
Taylor, Violette J. cbs, hos, lrg
Vargas, Vielsamma rem, ed, lrg
Whitson, Joseph D., Jr. cbs, lab, lrg
Whitney, David Bryant tec, cdl, lrg
Witt, Michael Richard tec, ped, lrg
Wosilait, Karen kns, alf, lrg
Wu, Shezhang cbi, lrg
Zydeck, Roya-leanne M. cni, cur, lrg

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Bo & Strage em, bio, lrg
Brooke & Solomon nfd, lrg, ped
Choi & Song lry, lrg
Di Stefano, R. lry, lrg
Doerr, Helen M. ped, lrg, bds
Flee, Marilyn cns, rem, lrg
Hays, Timothy A. ndf, lrg
Linfield, Rachel Sparks asm, lrg
Lucas & Roth lrg, kns, nas
ebi, lrg, esa
Man & LaBarge ne, lrg, fsd
Messmore, Ann B. ntw, lrg, ats
Odum & Settleage lth, kn, lrg
Potari & Spilitopoulou fsd, cld, lrg
Rath & Brown mat, ped, lrg
Reinhart, Barbara cid, cpl, lrg
Sheppardson, Daniel P. ats, bkg, lrg
Speering & Rennie chs, cme, lrg
Stahlhein-Smith & Sharrman chs, lrg
Tobie & McRobbie ndf, cld, lrg
Turnell, Sue Dale bfr, ref, lrg
Vaz & Watts

Paper
Higbee & Dwinell, (Eds.). ref, res, lrg
Learning Style, Cognitive Style (lsy)

Dissertations
Callaway, Judith Ann lry, ed
George, Gleda Poston lry, ach
Holden, Trudy G. lry, inq, lrg
Krause, Lois Breur ach, ceg, lgy
Lee, Sookyung ed, cpl, lrg
Zukoski, Ann Therese lry, inq, lrg

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Felder, Richard M. ceg, lgy
Hargreaves, D.J. ach, lry
Kramer, P. E., et al. ach, lry
Lewis, Eileen Loh ceg, lgy
Meece & Jones lry, lsg, ceg, lgy
Niaz, Mansoor ceg, lgy
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Ediger, Marlow ach, lry
Herbst, D. L., et al. lry, ceg, ach
Improving student...
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Bischoff, Paul Joseph kns, lth
Chekuri, Nageswar Rao kns, lth
Crawford, Barbara Ann ceg, lth
David-Johnston, N. L. kns, cpl
De Miranda, Michael A. kns, cpl
Gama, Joao Pereira kns, lth
Hidy, Patrick Keith kns, lth
Larramendy-Joerres, J. kns, cpl
Musial, Linda Malatesta ntw, lth
Olson, Daniel Raymond ndf, kns, lth
Ross, James William cid, lth
Sheerin, Bruce Lawrence lth
Tiede, Katherine Doris lth

Articles
Cavallio, Ann M.L. lbs, kns, lth
Flick, L. B. lbs, kns, lth
Hogan & Fisherkerll lth, res
Huddle & Pillay lbs, kns, lth
McArthur & Wellner gen, lth
Odum & Settleage lbs, kns, lth
Zoller, Uri. lbs, kns, lth

Improving student...
Learning Style, Cognitive Style (lsy)

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Callaway, Judith Ann lry, ed
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Krause, Lois Breur ach, ceg, lgy
Lee, Sookyung ed, cpl, lrg
Zukoski, Ann Therese lry, inq, lrg

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Choi & Song ach, lry
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Lewis, Eileen Loh ceg, lgy
Meece & Jones lry, lsg, ceg, lgy
Niaz, Mansoor kns, lry, ceg
Zohar, Anan ceg, ach, lgy

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Ediger, Marlow ach, lry
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Improving student...
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Bischoff, Paul Joseph kns, lth
Chekuri, Nageswar Rao kns, lth
Crawford, Barbara Ann ceg, lth
David-Johnston, N. L. kns, cpl
De Miranda, Michael A. kns, cpl
Gama, Joao Pereira kns, lth
Hidy, Patrick Keith kns, lth
Larramendy-Joerres, J. kns, cpl
Musial, Linda Malatesta ntw, lth
Olson, Daniel Raymond ndf, kns, lth
Ross, James William cid, lth
Sheerin, Bruce Lawrence lth
Tiede, Katherine Doris lth

Articles
Cavallio, Ann M.L. lbs, kns, lth
Flick, L. B. lbs, kns, lth
Hogan & Fisherkerll lth, res
Huddle & Pillay lbs, kns, lth
McArthur & Wellner gen, lth
Odum & Settleage lbs, kns, lth
Zoller, Uri. lbs, kns, lth

Improving student...
Materials, Equipment (mat)

Dissertations
Eide, Kathleen Yvonne L. me, mat
good, Beverly A. mat, int
grenier, Dorcen Elaine ere, mat
hunt, Randy Francis S. mat, eth
keyser, Janice Olexia trd, mat, att
Langley, Raymond G. evo, ped, mat
Pinkerton, Jane ach, bkg, mat
Sanger, Michael James ceg, alf, mat
Scheffer, Maria mat, ene, bfo
Walter, Patricia Letheke gen, mat

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gibson, David J. ene, mat
Hardy, Garry R.; et al. mat, eth
Irwin, A. cur, mat, his
Lumpe & Beck, Judy mat, lit, bio
McGinnis, J. R., et al. mat, tec, bfo
Moody, David E. mat, eth
Palmer & Treagust mat, che, alf
Reinhart, Barbara phy, mat, alf
Sawicki, Mikolaj mat, ped, lth
Summerfield, John mat, ref
Tursiani & Vicentini phy, mat
Viglietta, Luisa res, mat, ntw
Whiteley, Peter gen, mat

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Multicultural Education, Bilingual Education (mce)

Dissertations
Eide, Kathleen Y. L. me, lrg
eide, Kathleen Y. L. me, mat
fontana, Rose Marie G. mce, ped
Gork, Martha Ann cns, me, ndf
Habib, Deborah Leta ref, mat
King, Virginia Crihari ref, mce
Kobil, Susan Beth att, ref, mce
Kohn, Carroll Edward cns, mat, ndf
Roesingh, Hetty me, int, ach
Tiede, Katherine Doris  cid, lth, mce

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Tobin & McRobbie  che, mce, lrg

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Minicucci, Catherine  mce, cur

Nature of Science, Philosophy of Science (nas)

Dissertations
Bauer, Karen Lyn  ats, nas, att
Dawkins, Karen Robbins  nas, tpd, knw
Dreschel, Thomas Walter  bft, nas, ref
Forawi, Safian A. Said  nas, ped, knw
Helms, Jennifer Victoria  nas, knw, bft
Karnazin, Karen Sue  css, nas, ped
Levin, Karen Elizabeth  bft, ref, nas
Rutledge, Michael Lorne  evo, knw, nas
Serinaz, Rachel Kathryn  phe, ats, nas
Williams, Jennifer K.  nas, bft

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Fleener, M. Jayne  bft, nas
Griffiths & Heath  tec, bft, nas
Lucas & Roth  lrg, knw, nas
MacDonald, Douglas  ped, nas
Murphy, Tony P.  bft, phe, nas
Shapiro, Bonnie L.  bft, nas

Papers
Driver, Rosalind, et al.  kns, nas
Pushkin, David B.  nas, phe, bhs

Nonformal & Informal Education (nfd)

Dissertations
Alterm, Michael John  car, nfd
Castle, Ann M.  ats, bgg, nfd
Frazier, Richard Alan  nfd, fsd, ped
Gerber, Brian Lynn  nfd, bps, ped
Gork, Martha Ann  cns, mce, nfd
Green, Barbara Jo  nfd, hos, bgg
Johow, Veronica  nfd, edt, pbs
Lindemeyer, Donna K.  one, nfd
Nelson, William A.  one, nfd, lit
Ogorzaly, Molly C.  nfd, tpd, nfd
Peiffer, Bernadette M.  lrg, nfd, int
Riley, Dana Maria  nfd, cns, lrg
Stockier, Ann  bft, one, nfd
Thall, Debra Nalene  ats, nfd
Ulmann, Karla Ann  one, cpl, nfd
Yarbrough, Rebecca B.  nfd, hos, bgg

Articles
Borum, Minda et al.  nfd, bgk
Brooke & Solomon  nfd, lrg, ped
Burnett, John et al.  nfd, cdf
Cooper, Geoff  ene, fsd, nfd
Fleer, Marilyn  nfd, lrg
Judd & Judd  ntw, nfd
Tunnicliffe, Sue Dale  nfd, cdf, lrg

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Hirzy, Ellen Cochran  nfd, tpd, cur

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Chiu, Ching-Hui  tec, ntw, ats
Davis, Kathleen Sue  gen, ntw
Hardwick, Ellen  ntp, tec, cur
King, Virginia Cribari  ref, ntw, mec
Kikutani, Hantu Oulevi  ref, ntw, mec
Ogorzaly, Molly Conner  nfd, ntw, ene
Smith, Denise Patricia  ntw, ats
Vigne, Margaret Ann  ntw, tpd, hos

Articles
Bleicher, Robert E.  ntw, lab, cdf
Clark, Margaret R.  ntw, tpd
Collins, Michael A. J.  etb, ats, ntw
Feldman, Allan  knw, ntw, nfd
Hirzy, Ellen Cochran  nfd, ntw, cur
Josephson, Jean M.  tec, ntw
Kirkwood & Symington  tfd, nbd, tpd, nt
McGinnis, J. Randy  tec, ctd, ntw
Messmore, Ann B.  ntw, lrg, ats
Mexal, J. G., et al.  ntw, lrg, lit, ntw
No author given  eth, ntw, ach
Rubba, P. A., et al.  tpd, ntw
Shapardson & Adams  asm, ntp, ntw
Vigillette, Luisa  res, mat, ntw
Waugh, Michael  tec, ctd, ntw

Papers
Hirzy, Ellen Cochran  nfd, ntw, cur
Johnson, Jean M.  tec, ntw
NSTA awareness kit...  ref, cur, ntw
Report on Project...  ref, cur, ntw
Roberts, Lily, et al.  asm, ntw
Tutt & Newbold  tpd, ntw, int

Problem-Solving, Science Reasoning (psb)

Dissertations
Bissett, Doron Layne  chs, ach, pbs
Breuer, Steven D.  kns, rem, pbs
Burke, Sherry Ann  atk, skt, pbs
Chang, Chun-Yen  ped, pbs, ach
Chekuri, Nageswar Rao  pbs, rem, lth

Cozza, Barbara  kns, pbs
Forsythe, Claire Therese  cpl, pbs
Gerber, Brian Lynn  nfd, pbs, ped
Jay, Eileen S.  kns, pbs, ats
Johnson, Susan K.  pbs, kns
Jehow, Veronica  nfd, edt, pbs
Koker, Mark Hampton  ene, pbs
Lai, Patrick Kwong J.  kns, pbs
Lee, Sookyung  cdt, sty, pbs
Monaghan, James M.  cbs, cgs, pbs
Seminara, Laurie  kns, pbs, gen

Articles
Brewer, Steve  evo, pbs, ped
Briscroe & Stout  pbs, int, bft
Cavallo, Ann M. L.  pbs, kns, lth
Duch, Barbara J.  kns, pbs, ped
Duggan, Sandra, et al.  pbs, sks, cur
Finkel, Elizabeth A.  pbs, cpl, cns
Germann, Paul J., et al.  sks, pbs, ped
Hurst & Milken  pbs, kns
Kumar & Helgeson  cbs, pbs, eth
Lee, Kari-Wah L., et al.  pbs, cul, kns
Niaz, Mansoor  pbs, lsh
Phelps, Amy J.  pbs, kns
Rennie & Parker  phy, pbs
Richmond & Stirley  lab, cdp, pbs
Ritchie & Hampson  cpl, pbs
Rohas de Asudillo & Niaz  pbs, alf, kns
Tsai, Chin-Chang  pbs, kns, car
Varelas, Maria  pbs, ped, ctd

Pedagogy (ped)

Dissertations
Almuqate, Humoud Ahmed  ped, lrg
Anayanechi, Marie E. C.  cns, ped
Barrett, Evelyn Parks  ach, ped, int
Blough, Roger  cbs, ped
Boyer, Steven Eugene  ats, att, ped
Bromma, Carol Ann  ped, kns, lth
Brown, Joy Ellen Pracht  bft, ped
Carey, Dianne Lynn  rem, res, ped
Cavalier, Jamie Carolyn  ped, cbs, ach
Chang, Chun-Yen  pbs, pbs
Crowley, Paulette T.  ped, bkg, gen
Dailey, Joseph G.  lab, cbs, ped
De Miranda, Michael A.  ped, lrg, lth
Decostie, Donald J.  ctd, ped
Duffy, Maryellen  cns, cdp, cpl
Eryilmaz, Ati  ped, cbg, phy
Fontana, Rose Marie  mce, cdp, ped
Forawi, Safian A. Said  nas, ped, kns
Frazier, Richard Alan  nfd, fbd, ped
Gerber, Brian Lynn  nfd, pbs, ped
Harry, Vickie Diane  kns, bft, pbs
Hinojosa, Susan Anne  lhrs, att, ped
Hoekwater, Michael Scott Irg, ped. ats ped, ats, cur ped, cns, ped. bft
Hurl, Chihyun cns, ped. bft masor, gen ped
Johnson, Mark Andrew chs, nas, ped ped, cbi, lrg
Karmanzi, Karen Sue cgs, gen ped
Kos, Ivo eqn, gen ped
Kristjanson, Cheryl R cns, ped. bft
Langley, Raymond G evo, ped. mat
Lavonen, Jari Matti J ped, hos ped, phy
Lerev, Susan Jane che, ped. ceg
McCoy, Sara Henry ped, att. ats ped, phy
McNair, Robert Glenn ped, att. ats ped, phys
Monhardt, Rebecca M ped, phy, ceg
Morey, Marilyn ach, ped
Nester, Karen Marie ped, att. ats ped, phy, ceg
Nyman, Jeffrey Scott ped, phy, ceg
Pinkerton, K. David ped, phy, ceg
Pittman, Kim Marie ped, phy, ceg
Prestley, Holly Delk ach, ped
Quinn, Mary Allison ped, phy, ceg
Riddle, Jill K. T ach, ped
Rubin, Susan Finlay ped, phy, ceg
Schroeder, Lucia Ann ped, phy, ceg
Schoedel, Michael W ped, phy, ceg
Sheets, Lynne Marie ped, phy, ceg
Stillings, Mark A ped, phy, ceg
Starr, Mary L ped, phy, ceg
Stevens, Marilyn H ped, phy, ceg
Tillotson, John Ward ped, phy, ceg
Wallin-Ottinen, T. M ped, phy, ceg
Wittl, Michael Richard ped, phy, ceg
Zembal, Carla Marie ped, phy, ceg
Zint, Michaela Theresa ped, phy, ceg

Articles

Appleton & Asoko cns, ped. ped
Arnold & Millar ped, phy, ceg
Audet, Richard H., et al. tec, ped, cns
Batte & Hawkins tec, ped, cns
Brewer, Steve evo, phy, ceg
Brooke & Solomon nfd, lrg, ped
Cannon & Scharmann, L. ceh, cpl, ped
Corral-Verduco, et al. kns, ped. cgs
Di Stefano, R. kns, ped. cgs
Downing & Gifford ped, bft, phy, ceg
Duch, Barbara J. skt, inq, ped
Fedock, P. M., et al. pbs, phy, ceg
Felder, Richard M. lsh, phy, ceg
Flick, L. B. lsh, phy, ceg
Germann, Paul J., et al. lsh, phy, ceg
Greenwood, Anita cns, ped. cgs
Hargreaves, D.J. cns, ped. cgs
Huiniker, DeAnn ped. cgs
Kennedy, Eileen cns, ped. cgs
Keys & Golley cns, ped. cgs
Kortland, Koos cns, ped. cgs
Lehman & Brickner cns, ped. cgs
Lin, Huan-Shyang, et al. ped, ats, cur
Masor & Sorzio ped, ats, cur
MacDonald, Douglas ped, ats, cur
Nakleh, Mary B., et al. ped, ats, cur
Phelps, Amy J. ped, ats, cur
Polio, Howard R. ped, ats, cur
Reinhard, Barbara ped, ats, cur
Robers, Nancy, et al. ped, ats, cur
Roth, Woff-Michael ped, ats, cur
Sprod & Jones ped, ats, cur
Stalheim-Smith et al. ped, ats, cur
Stofflet & Stafanen ped, ats, cur
Stratford & Finkel ped, ats, cur
Tobin & Tippins ped, ats, cur
Varela, Maria ped, ats, cur

Papers

Bell & Gilbert ped, ats, cur
Chang, Wen-Hua ped, ats, cur
Ediger, Marlow ped, ats, cur
FY 96 awards. Teacher ped, ats, cur
Hammrich, Penny L ped, ats, cur
Improving student ped, ats, cur
Layman, John W., et al. bio, cur, ped
Rhoto & Bowers. (Eds.) ped, ats, cur
Shinohara, (Ed.) ped, ats, cur
Treagust, (Ed.) ped, ats, cur

Philosophy, Epistemology (phec)

Cautter, Robert W. vih, kns, phe
Harding, Patricia Alice vih, kns, phe
Lucena, Juan Carlos vih, kns, phe
Serianz, Rachel Kathryn vih, kns, phe
Tristan, Jayne A. vih, kns, phe
Yamauchi, Jeffrey Scott vih, kns, phe

Articles

Hashweh, Maher Z. bft, phe, cns
Murphy, Tony P. bft, phy, cns
Tobin & McRobbie bft, phy
Woodrow, J. E.J., et al. bft, phy, cns

Dissertations

Murray, Frank B. (Ed.) ped, ats, cur
Pushkin, David B. ped, ats, cur
Shim, Mee-Hye ped, ats, cur
Stassenberg, Arnold A ped, ats, cur
Vos, Kenneth E. (Ed.) ped, ats, cur

Physics (phy)

Dissertations

Eryilmaz, Ali ped, ats, phy
Guruswamy, Chitra ped, ats, phy
Hsu, Le Van ped, ats, phy

Lavonen, Jari Matti J. phs, ats
Popp, John David phs, ats
Sherin, Bruce Lawrence phs, ats
Smith, Chad Stephen phs, ats

Articles

Holton & Horton phs, ats
Rennie & Parker phs, ats
Sawicki, Mikołaj phs, ats
Tatistini & Vicentini phs, ats
Trumper & Gorsky phs, ats

Paper

Dodge & Mulvey chs, phy, cur

Reform, Educational Change

Standards (ref)

Dissertations

Barnett, John cur, ats, ref
Belonga, Cynthia M. cur, ats, ref
Downing, Charles R. cur, ats, ref
Dreschel, Thomas W. cur, ats, ref
Gilmore, Patricia Jones cur, ats, ref
Herman, Carolyn Ann cur, ats, ref
Hillison, Susan E. T. cur, ats, ref
Kees, Gerald Lee cur, ats, ref
King, Virginia Cribari cur, ats, ref
Koba, Susan Eth cur, ats, ref
Levitt, Karen Elizabeth cur, ats, ref
McKenzie, Woodrow L. cur, ats, ref
Mendola, Charles P. cur, ats, ref
Peasley, Kathleen L. cur, ats, ref
Slevinsky, Karen cur, ats, ref
Stevens, Marilyn H. cur, ats, ref
Westerlund, Julie F. cur, ats, ref
Yan, Jean Wequin cur, ats, ref

Artsicles

Appleton & Symington ref, ats, ref
Beasley, Warren ref, ats, ref
Bieniawski & Bieniawski ref, ats, ref
Blank, Rolf K. ref, ats, ref
Czerniak & Lumpe ref, ats, ref
Hane, Jodi L. ref, ats, ref
Holton & Horton ref, ats, ref
Holtz, Robert E. ref, ats, ref
Jegede & Okebukola ref, ats, ref
No Author Given ref, ats, ref
Phipps, Roy ref, ats, ref
Pryor, Amanda Z., et al. ref, ats, ref
Rogan, John M. ref, ats, ref
Schneider & Lumpe ref, ats, ref
Shroyer, M. G., et al. ref, ats, ref
Summerfield, John ref, ats, ref
Tobias & Raphael ref, ats, ref
Vax & Watts ref, ats, ref
Yager, R. E., et al. ref, ats, ref
### Teacher Professional Development (tpd)

#### Dissertations

- **Alexandra, Sandra A.**
  - tpd, skt
- **Bolick, Margaret Ellen**
  - bkg, cns, tpd
- **Carnes, G. Nathan**
  - knl, tpd, sqg
- **Chen, Chang-Cheng**
  - tec, tpd
- **Cisneros, Baltazar**
  - tpd, int, cur
- **Crowther, David T.**
  - cur, att, tpd
- **Dawkins, Karen R.**
  - nas, tpd, knl
- **Duff, Larry Albert**
  - lab, tpd, skt
- **Eddy, Larry**
  - att, tpd
- **Fontana, Rose M. G.**
  - mce, tpd, ped
- **Hillson, Susan E. T.**
  - tpd, ref, his
- **Hoban, Garry Francis**
  - tpd, knl, lrg
- **Jones, Roberta Lynn**
  - ats, gen, tpd
- **Keyser, Janice Olexia**
  - tpd, mat, att
- **Klein, Elizabeth Shiner**
  - cns, tpd
- **Kuitunen, Hannu Uolevi**
  - tpd, ntw, cur
- **McEwen, Malcolm Keith**
  - tpd, bkg
- **Mendenhall, Gordon Lee**
  - tpd, knl, knl
- **Powell, Kathryn Marie**
  - tpd, sft, knl
- **Ramirez, Reynaldo Jr.**
  - tpd, cur, int
- **Roberts, Lily Lee Corina**
  - tpd, knl, att
- **Rucine, Berea H.**
  - bft, bkg, tpd
- **Starr, Mary L.**
  - tpd, ped
- **Tillotson, John Ward**
  - tpd, cns, ped
- **Tsai, Shuh-Wang Colin**
  - tpd, bft, lab
- **van den Berg, Ellen**
  - tpd, cur, cns
- **Vigue, Margaret Ann**
  - tpd, ntw, hos
- **Zembla, Carla Marie**
  - tpd, ped, rem

#### Articles

- **Appleton & Asoke**
  - cns, tpd, ped
- **Atwater, M. M.**
  - res, mce, tpd
- **Clark, Margaret R.**
  - ntw, tpd
- **Clerc, Jeanne**
  - lab, tpd
- **Fedock, Patricia M. et al.**
  - tpd, ped, bft
- **Feldman, Allan**
  - knl, ntw, tpd
- **Fien & Rawling**
  - ene, tpd, skt
- **Flick, L. B.**
  - lth, ped, tpd
- **Greenwood, Anita**
  - cns, ped, tpd
- **Gunn, Cathy L.**
  - tec, skt, tpd
- **Hines & Mussington**
  - res, tpd
- **Holtz, Robert E.**
  - ene, ref, tpd
- **Hudson, Sharon P.**
  - tpd

#### Papers

- **Keys, C. W.**
  - cns, ped, tpd
- **Peters & O’Brien**
  - ed, tpd
- **Phipps, Roy**
  - cur, tpd, ref
- **Ramey-Gartner, L. et al.**
  - cht, bkg, tpd
- **Rogan, John M.**
  - tpd, tec, ref
- **Rubba, P. A. et al.**
  - ss, tpd, ntw
- **Sandler, B. R. et al.**
  - eqt, gen, tpd
- **Scantlebury, K. et al.**
  - tpd, cht
- **Settiage, J. Jr.**
  - asm, tpd
- **Shepardson & Adams**
  - asm, tpd, ntw
- **Shroyer, M. G. et al.**
  - tpd, cur, ref
- **Tobin & Tippins**
  - ped, res, tpd
- **Tomanek. D.**
  - car, tpd, chs
- **Wade, Kimberly S.**
  - ene, tpd, cur
- **Yager, R. E. et al.**
  - tpd, ref, res