Bibliography of SEPUP-Related Research

The following are references to research publications and papers about SEPUP, the Science Education for Public Understanding Program at the Lawrence Hall of Science, University of California, Berkeley.

This paper describes some of the education politics related to developing issue-oriented curriculum such as SEPUP’s Science and Sustainability and Issues, Evidence, and You. It suggests that more influence on the development of science curriculum should come from “societal experts,” who are knowledgeable about the public’s interaction with science- and technology-related problems, rather than academic scientists.

This book discusses how to align classroom assessment with the national standards. As an alternative to the traditional single-letter grade system, it recommends SEPUP’s assessment system which can be used both for formative or summative assessments.

The article gives background on health risks education. It recommends SEPUP as a model program for health risk assessment because of its instructional modules for students and communities.

Describes the development of psychometrically calibrated progress maps that describe student performance on embedded assessments in SEPUP’s year-long course Issues, Evidence and You.

This paper refers to SEPUP as an exemplary curriculum that has student-student interactions, uses real-life activity based instruction, and uses oral and written reports and technology.

The article describes the positive experiences which SEPUP materials provide for both teachers and students.

This article gives a general description of the SEPUP modules as well as new SEPUP’s projects that were being developed at the time of publication.

This study evaluated SEPUP’s modules such as “Toxic Waste: A Teaching Simulation and Chemical Survey” and “Investigating Groundwater: The Fruitvale Story.” It assessed the changes in student beliefs about science, the use of evidence in scientific reasoning, and students’ understanding of the subject matter.


The paper discusses the impact of SEPUP curriculum on teachers and students in Cleveland. It found that SEPUP promoted positive teaching strategies and professional behaviors for teachers.


This study reports differences in student attitudes and knowledge about chemicals between SEPUP and non-SEPUP students, favoring SEPUP. Survey data suggests SEPUP has a positive effect on teachers, including increased use of hands-on strategies, more collaboration with peers, and increased enrollment in in-service methods courses.


This dissertation used SEPUP to investigate the influence of various factors, such as perception and use of evidence, values, and beliefs, on student decisions about environmental issues and problems. In a controlled study, students using SEPUP were found more likely to use evidence in their decision-making than their non-SEPUP peers.


This paper provides a summary of research findings on the effectiveness of SEPUP from 1988–1998, including improved student attitudes towards science and enhanced content knowledge and teacher effects.


This study evaluated the effectiveness of SEPUP Health Risks module, and it concluded that student understanding of basic environmental health risk concepts, such as sampling, acute and chronic toxicity, and dose-effect relationships, was significantly increased with the use of a short (3-week) teaching module. The study involved 585 students in eight states.


The SEPUP course, *Issues, Evidence, and You* is provided as an example of a science program which effectively integrates multiple methods of assessments and provides continuous feedback on students’ progress.


Review of NSF study (see below, under NSF) in which SEPUP is listed as a science program that meets the national science content standards, engages students in science, has an excellent assessment component, and encourages teachers to improve their instruction.

This article describes the experience of a middle school science teacher/reformer who field tested SEPUP units for its middle school courses and found the assessment system to have a positive effect on her teaching and her students’ learning.


SEPUP courses, such as *Science and Life Issues*, are recommended as exemplary science curricular materials which meet the following criteria: engage students in inquiry, are personally relevant to students, use technology to enhance learning, meet the needs of diverse students, enable all students to achieve, and support peer learning.


Describes programs to implement inquiry-based middle school science education in Lemon Grove, CA and Charleston, SC using SEPUP materials. Includes discussion of SEPUP assessment system and change of emphasis in teaching and curriculum, and evaluates evidence of change in targeted classrooms in these districts.


This paper describes the development of a middle school Ecology unit aligned to the Next Generation Science Standards, incorporating three-dimensional lessons and assessments.


Provides a description and example of how embedded assessment extended response questions for middle school students are written, tested, and revised.


This paper provides a summary of student learning from the 2008-2009 field test of Science and Global Issues: Biology, SEPUP’s high school Biology program. The paper examines the challenges in student learning of concepts related to evolution and natural selection.


In this evaluation of NSF-sponsored comprehensive curricular materials for middle school, SEPUP is cited as an outstanding example of embedded assessment at the middle school level with engaging materials that provide good opportunities for student-designed inquiry—an exemplary model of using personal and social issue as the pedagogical driver for learning and applying important science concepts.

This article describes SEPUP as a science program that develops scientifically literate individuals who can make informed decisions and who understand the interrelationship among science, technology, and society.


In this article, SEPUP modules are described as supplementary materials that provide content in ways that are creative and rigorous and that make it relevant to student. They also are instrumental in developing students’ problem solving and thinking skills.


The paper discusses the results of a study in which students used “Convince Me,” a software program which facilitates students’ reasoning about hypotheses and evidence on social issues.


The “Convince Me” program is a computer-learning environment that helps students to create, manage, and evaluate arguments. This paper presents describes students’ interactions with the program.


This paper provides an independent study and assessment of how effectively the *Science and Sustainability* course manages to integrate the study of scientific concepts with the study of issues of global citizenship, both in theory (by evaluation of the textbook) and in practice (by analyzing teacher evaluations from S&S field test centers).


This dissertation studies teacher professional development among teachers who used only the SEPUP middle school course, *Issues, Evidence and You*, and those who used both the course and its embedded assessment system. The results of the study show that teachers using both the course and its assessment system increased their uses of alternative assessment strategies. Also, teacher change was facilitated by the leadership, institutional support, and peer support provided by the Assessment Development Centers in schools that were field-testing the SEPUP materials.


In this paper, the findings are presented from a 2-year project that studied the effects of the embedded assessment system in the SEPUP course, *Issues, Evidence, and You*. The results showed a positive change in teacher assessment practices and student achievement.

This paper describes the SEPUP assessment system and provides a summary of factors influencing teacher professional development.

Roberts, L., Sloane, K., & Wilson, M. (1996). Local assessment moderation in SEPUP. Paper presented at the annual meeting of the American Educational Research Association, New York, NY. Assessment moderation is a procedure in which teachers (or scorers) meet to reach a consensus on scores on student work. This paper discusses the process of moderation among teachers using the SEPUP curriculum.


This paper provides a detailed discussion of SEPUP's system of embedded assessment in its year-long course, Issues, Evidence and You.


This study evaluated the effectiveness of SEPUP's year-long course, Issues, Evidence, and You. It looked at student achievement and attitudes toward science and found that students using this course were more likely to provide scientific evidence for their reasoning and to believe that science was more relevant to their lives.


This paper reports on gains in student achievement as a result of a two-year integrated science sequence in Los Angeles Unified School District. In many of the participating schools, the integrated science sequence was based on two SEPUP courses: Issues, Evidence and You and Science and Sustainability.


This article describes the partnerships between SEPUP's Chemicals, Health, Environment and Me (CHEM) program and ten school districts to build teacher leadership and to improve science learning. The results suggest that teaching, content knowledge, confidence, leadership, and district programs were enhanced in 8 of the 10 districts.


This study describes the decision-making process of Science and Sustainability high school students who analyzed scientific evidence about issues of technology and society using a computer program called Convince Me.


This dissertation investigated how students' decision-making skills and attitudes toward science changed over one year. A 10th grade Science and Sustainability class was compared to one which also used the computer program, Convince Me.

This panel summary describes the ESTL professional development project’s approach to instigating educational reform. It is part of a larger paper called “The Learning Sciences in Schools: Strategies for Working with Teachers and Instigating Reform.”


The paper was designed to help teachers use assessment as a learning tool. It also provides background on the SEPUP assessment system and discusses how SEPUP assessment scoring guides (rubrics) are used in classrooms.


This paper specifically addresses the issues behind fine tuning task-specific scoring rubrics for extended answer questions administered to seventh grade students.


This article describes the development of the Changes in Attitude about the Relevance of Science (CARS) questionnaire. This questionnaire was used to determine changes in attitudes toward science among students using the Science and Sustainability field test.


This article describes how SEPUP uses current issues and guided inquiry in Science and Sustainability to motivate and help students learn to design their own experiments and become proficient in making evidence-based decisions.


This paper discusses the development of CEPUP / SEPUP as a model Science, Technology, and Society (STS) curriculum. The SEPUP model fully integrates science content around personal and societal decisions about issues involving science and technology.


The article discusses the goals of Lawrence Hall of Science to improve science and mathematics education for all students through research, teaching, and public service.

Thier, H. D. & Peterson, L. (1988, Spring). Child’s Play. Chapter One, 2(1), 46–48. This provides an overview of the development and goals of the Chemical Education for Public Understanding Project (CEPUP) at the Lawrence Hall of Science in Berkeley, California during its first years.


Thier, H., Giralt, F., Medir, M., & Grau, F.X. (1994). A holistic approach to ChE education: Professional and issue-oriented approach. Chemical Engineering Education 28(2), 122–127. This study describes how a professional and issue-oriented approach was used in a Chemical Engineering college class instead of the traditional lecture-based approach. Results showed that compared to traditional courses, with this approach students were more open and interactive with one another and they handled new learning situations better.

Thier, H.D. & Daviss, B. (2001). Developing inquiry-based science materials: A guide for educators. Teachers College Press. New York, NY. This is a practical research-based book that provides a comprehensive guide to designing activities for K–12 students. It thoroughly describes the process of curriculum development, from the initial idea and pursuit of funding through development, field testing, revision, and publication of a final product. Principles for designing guided inquiry materials are also discussed. Examples are provided from several curriculum development programs, including several SEPUP projects.

Thier, H.D. & Hill, T. (1988). Chemical education in schools and the community: The CEPUP project. International Journal of Science Education. 10(4), 421–430. This paper gives an overview of the CEPUP project such as the goals and approach. It describes the development of instructional materials and the dissemination of the program.

Thier, H.D., & Siegel, M. (1997). Risk education in secondary school science. Paper presented at the Annual Meeting of the Environmental Occupation and Health Safety Institute, New Brunswick, New Jersey. This paper describes the importance of risk education and how to develop materials that align with the National Science Education Standards. It also reviews current risk curriculum.

Thier, M. (1997, Spring). The CHEM tool kit for curriculum integration. CSTA Journal. 26–36. This article discusses the importance of integrating issue-oriented science programs like CHEM-2 into the classroom curriculum. It describes the components of the CHEM-2 program as effective methods to engage students in critical science thinking that is relevant to their lives.

Willcox, M., Howarth, J., Jackson, W., and Nagle, B. (In Press). Designing and Field Testing a Middle School Ecosystem Unit for the NGSS. To be presented at the 2017 annual meeting of the National Association for Research in Science Teaching (NARST), San Antonio, TX.

This paper describes the development and field-testing of a middle school Ecology unit aligned to the Next Generation Science Standards, incorporating three-dimensional lessons and assessments.

Willcox, M., Jackson, W., Howarth, J., and Kastel, D. (In Press). Designing an NGSS-aligned middle school ecosystems unit using the Five Tools and Processes for NGSS. To be presented at the 2017 annual meeting of the National Association for Research in Science Teaching (NARST), San Antonio, TX.

This paper describes the use of the Five Tools and Processes for developing a middle school Ecology unit aligned to the Next Generation Science Standards.


This article describes how to use issues and inquiry to design lessons that address science standards. The characteristics of issue-oriented classrooms, selecting good issues, and the use of SEPUP’s evidence and trade-offs scoring guide are discussed.


The book discusses SEPUP as an effective educational design which bases curriculum on research, integrates technology into the curriculum, and pilots course materials in real classrooms, as well as providing teacher professional development.


This paper describes a method of integrated classroom assessment and scoring (the BEAR method) which is curriculum centered and allows coordinated assessments at the classroom, school district, statewide, and national levels.


This report gives evidence of student achievement after using SEPUP’s course, *Issues, Evidence, and You*. The pre-test and post-test results showed that the average SEPUP student showed improvement in providing evidence and using trade-offs in scientific arguments.


Describes the collaboration of curriculum developers and assessment researchers in developing the SEPUP/BEAR Assessment System.


This article describes the principles that guided the development and implementation of the BEAR (Berkeley Evaluation and Assessment Research) Assessment System that was created for SEPUP’s middle school course, *Issues, Evidence, and You*. 