

NAEP SECONDARY ANALYSIS GRANT ABSTRACTS

Projects Funded in Fiscal Year 2002

Grantee: University of Texas at Austin
P. Investigator: Hua Hua Chang
Project Title: Improving the DIF Detection Procedures for NAEP Data Analysis

This project will develop and test a new approach to the analysis of differential item functioning (DIF) in NAEP. The new approach will improve the method of matching examinees to pooled booklet scores and reduce the noise in local DIF detection while keeping measurement error in global DIF testing low. The project will develop new software to perform the revised DIF analysis and test both the approach and the software using simulated data and actual NAEP data.

Grantee: Vanderbilt University
P. Investigator: Laura Desimone
Project Title: Preparation, Professional Development and Policy in Mathematics: Does it all add up?

This project will investigate the links between state policy, teachers' participation in professional development, classroom instruction, and student achievement in mathematics using the NAEP 2000 4th and 8th grade mathematics data

Grantee: Educational Testing Service
P. Investigator: Henry Braun
Project Title: Using State NAEP Data to Examine Patterns in 8th Grade Mathematics Achievement and the Efficacy of State Education Policy Initiatives.

This project will investigate the persistent gap in mathematics achievement between White and Black students using NAEP 8th grade mathematics data for 1992, 1996 and 2000 from a selected group of states. The project will explore the relationship between White and Black students' mathematics achievement and their home environment, family context, and opportunity to learn, and attempt to determine to what extent these relationships are accounted for by the characteristics of the students' schools. In addition the project will conduct an in-dept review of educational policy initiatives in the late 1980s and 1990s and propose links between the policy findings and patterns in student achievement revealed by the statistical analysis.

Grantee: Iowa State University
P. Investigator: Susan Lubienski
Project Title: A Closer Look at Mathematics Achievement and Instructional Practices: Examinations of Race, SES, and Gender in a Decade of NAEP Data

This project will use the national NAEP mathematics data from 1990 through 2000 to investigate the trends and inequities in mathematics achievement and instructional practices, and propose approaches to alleviating inequities found. The study will look at both overall NAEP mathematics achievement and achievement on each of the mathematics sub-scales and attempt to determine whether reform-based practices are reaching all students.

Grantee: United Negro College Fund Special Programs Corporation
P. Investigator: Kendrick Curry
Project Title: The Trickle Down Effect: How Teacher Quality and Recruitment Practices Affect the Achievement of African American Students in a 3-State Metropolitan Area

This project will use the 2000 NAEP state mathematics data to investigate the relationship of state reform policies to teacher quality and recruitment and attempt to determine whether these factors affect student mathematics achievement in three states surrounding a large metropolitan area. The project will pay special attention to the impact of reform policies on African American students and teachers

Grantee: Educational Testing Service
P. Investigator: Claudia Gentile
Project Title: Reading Test Design, Validity, and Fairness: A Re-Analysis of Data From the 200 Fourth-grade Reading Assessment

This project will improve our understanding of how the constructed-response and multiple choice NAEP reading items function by determining: what aspects of reading comprehension are assessed by each type of item, and whether or not these two item types provide all students with an opportunity to demonstrate their reading abilities. The project will re-analyze fourth grade reading data from the 2000 NAEP and use both qualitative and quantitative methods to answer these important questions.

Grantee: Educational Testing Service
P. Investigator: Matthias von Davier
Project Title: A Tool for Improved Precision Reporting in Secondary Analysis of National and State Level NAEP Data

This project will evaluate recently developed models for improving NAEP's estimation of subgroup proficiency distributions and integrate them with a new model designed to make it possible for state policy analysts and other education researchers to estimate NAEP population parameters which are as precise as published NAEP estimates. The project uses simulation studies to test the new analysis model and develop software based on the new model which can be made available to secondary analysts of NAEP.

Grantee: University of Wisconsin
P. Investigator: Norman Webb
Project Title: Informing State Mathematics Reform Through State NAEP

This project will attempt to develop a comprehensive approach which states can use to evaluate growth in student achievement over time. The project will use both cross-sectional and cohort analysis to produce a state improvement indicator. This indicator will be designed to reflect both achievement growth and gaps in achievement growth. The project will propose precise rules for assigning states to achievement groups using confidence intervals for a range of classification parameters including: overall increase in achievement, decrease in percent of students below basic, increase in percent students at proficient or above.

Grantee: Boston College
P. Investigator: Laura O'Dwyer
Project Title: Estimating the Full NAEP Population Distribution: Imputing Scores for Excluded SD and LEP Students Using Hierarchical Linear Modeling Techniques

State and Federal regulations regarding students with specialized learning and language needs have always required that some students be excluded from NAEP. This necessary practice results in a NAEP sample that is less than optimally representative of the total US population. One approach to solving this problem is to impute scores for excluded SD and LEP students and proceed to estimate the full population distribution. This study will extend recent research on the imputation of scores for excluded students by using multilevel modeling to increase the accuracy with which scores for excluded students can be imputed.

Projects Funded in Fiscal Year 2001

Grantee: Rand Corporation
P. Investigator: David Grissmer
Project Title: Analyzing State NAEP Data to Address Educational Policy issues in K-12 Education

This project will expand earlier research by David Grissmer using NAEP state data by adding the 2000 fourth and eighth grade math data to the existing 1990 – 1998 trend line, and by including new variables such as Head Start participation, and descriptions of the assessment systems in the participating states to the models. The project will attempt to determine whether score gains across states apply to differing localities within those states; to determine whether some states are more successful than others in reducing the black-white score gap; and to determine whether level and targeting of resources by states is linked to gap reduction.

Grantee: LMP Associates, Inc.
P. Investigator: Lawrence Rudner
Project Title: Scoring Content Essays Using Bayesian Networks

This project will conduct basic research on the feasibility of using artificial intelligence systems based on Bayesian networks to evaluate and score extend response assessment items. If this approach proves feasible, programs could be developed which would reduce the cost and improve the speed and accuracy with which NAEP scores extended response items.

Grantee: University of Maryland
P. Investigator: Clare Von Secker
Project Title: Science Achievement in Social Contexts: An Alternative Method for Analysis of NAEP Data

This project will explore the compensatory impact of four classes of social and psychological “protective factors” on fourth, eighth, and twelfth grade achievement in science. Particular emphasis will be placed on attempting to determine the effect of these factors on disadvantaged students. The study hypothesizes that protective factors may help to clarify why some disadvantaged populations seem particularly vulnerable while others seem surprisingly resilient.

Grantee: University of Rochester
P. Investigator: Richard Niemi
Project Title: Components of Knowledge in the NAEP 1998 Civics Main and Trend Assessments

This project will conduct in depth analyses of the 1998 civics assessment data. The project intends to determine what specific aspects of fourth, eighth, and twelfth graders' knowledge of government, politics and civics have increased or decreased over the past decade and to identify variations in subgroup knowledge in each of the domains—content, skill, disposition, and context--specified in the 1998 civics framework.

Grantee: American Institutes for Research
P. Investigator: Daniel Sherman
Project Title: Application of Small Area Estimation Methods to NAEP

This project will apply small area estimation methods to NAEP to determine the extent to which these methods can be used to develop statistics for domains such as school districts, counties or other geographic areas for which sample sizes would otherwise be too small to create reliable statistics. A key outcome of the project will be an indication of how accurately achievement can be estimated in relatively small domains given available data and potential improvements in precision that could be obtained under alternative sampling schemes.

Grantee: Educational Testing Service
P. Investigator: Claudia Gentile
Project Title: Evaluating the creative in Creative Writing

This project will explore a method for evaluating the creative aspect of students' creative writing by analyzing the data from the 1998 NAEP Classroom-based Writing Study. While standards-based reform efforts have encouraged the teaching of creative writing, no rubrics exist to help define and evaluate the creative component of students' writing. This project will use the personal narratives, fictional stories and poems collected in the classroom writing study to develop rubrics that classroom teachers can use to respond to and encourage students' creative writing.

Grantee: Act, Inc.
P. Investigator: Matthew Schultz
Project Title: Describing Achievement Levels with Multiple Domain Scores

This project will characterize the NAEP eighth grade mathematics data in terms of multiple domain scores and reference these domain scores to the NAEP achievement levels. By defining domains in terms of both the categories of the NAEP mathematics framework and the instructional sequence of the content in the framework, the project will attempt to develop domain scores which allow educators and policy makers to identify instructionally relevant patterns of achievement in the NAEP data.

Projects Funded in Fiscal Year 2000

Grantee: Synectics for Management Decisions, Inc.
P. Investigator: Gary Huang
Project title: Local School District Spending and Student Achievement: A synthetic analysis of the data from NAEP and CCD

This project will combine eighth grade mathematics data from three NAEP assessments with school district background information from CCD for the same years and examine the extent to which student achievement is related to districts' control over expenditures for instruction.

Grantee: Datametrics Research, Inc.
P. Investigator: Donald Rubin
Project title: Improving the Robustness of NAEP Statistical Methods

This project proposes to improve the statistical estimation of NAEP parameters by expanding the current NAEP imputation model to permit heterogeneous variances in key reporting subpopulations. The project will modify the EM algorithm utilized by NAEP and extend it to fit the expanded model. The validity of reporting based on the current NAEP model and the expanded model will be evaluated using both real and simulated assessment data.

Grantee: Rand Corporation
P. Investigator: David Grissmer
Project title: Using the State NAEP Scores to Estimate and Explain the Pattern of Score Gains and Differences Across States by Racial/Ethnic Group for Urban, Suburban, and Rural Areas

This project will extend state comparison research conducted by the principal researcher by: (1) estimating score trends for racial/ethnic groups using the state-by-state NAEP data from 1990 through 2000, (2) estimating differences in scores for students from similar family backgrounds by state within racial/ethnic group, and (3) estimating the effect of educational resources on the achievement of students from different racial/ethnic backgrounds and from urban/suburban and rural communities.

Grantee: University of Pittsburgh
P. Investigator: Clement Stone
Project title: Evaluation of a Wald Test for Assessing the Significance of a Fit Statistic Based on Posterior Expectations in Item Response Theory Models

In order to improve our ability to validate NAEP items, this project will evaluate a Wald test for determining the statistical significance of goodness of fit statistics which take into account the dependency that exists in distributions used to estimate NAEP item parameters. The project will use real and simulated NAEP data to evaluate the performance of the Wald test, and will develop software for testing the fit of NAEP items to their estimation model using the Wald test to determine the statistical significance of those fit statistics.

Grantee: Advance Research & Data Analysis Center
P. Investigator: Jamal Abedi
Project title: Assessment of NAEP Accommodation Strategies for Students with Limited English Proficiency

This project proposes to investigate six issues surrounding NAEP's first provision of accommodations for students with limited English proficiency who participate in the assessment. The issues include: (1) the effectiveness of NAEP's accommodations, (2) the validity of accommodated test results, (3) the differential impact of accommodations on students with different backgrounds, (4) the impact of linguistic complexity of the original test item on the effectiveness of accommodations, (5) the effect of teacher and school characteristics on the effectiveness of accommodations, and (6) the feasibility of implementing NAEP's accommodations in a full assessment setting.

Grantee: William Carey College
P. Investigator: Read Diket
Project title: Implications of the 1997 NAEP Visual Arts Data for Policies Concerning Artistic Development in America's Schools and Communities

This project proposes an in-depth analysis of the data from the 1997 Arts Assessment in order to: (1) document constructs embedded in the visual arts data, (2) examine regional differences in the light of these constructs, (3) document variations on the constructs for students in the higher and lower quartiles of the responding and creating subscales, and (4) report relevant findings to local, regional and national decision makers in the arts education community.

Grantee: University of Georgia
P. Investigator: Sue Sloop
Project title: Impact of State Education Policy on Student Achievement: Evidence from the NAEP 1996 Mathematics State Assessment for Georgia and North Carolina

This project will use hierarchical linear models to identify factors that affect students' NAEP mathematics performance in a "low performing" Southern state, and study the differences these models highlight when applied to the NAEP mathematics data from a "high performing" Southern state with a similar student population.

Projects Funded in Fiscal Year 1999

Grantee: University of Massachusetts - Amherst
P. Investigator: Hariharan Swaminathan
Project title: Impact of Errors in Item Parameter Estimates on the Estimation of Ability in NAEP

This project has two major components. It will: (1) investigate the impact of errors made in the estimation of item parameters on the accuracy of the proficiency score distributions used for reporting NAEP results, and (2) develop and study a procedure for creating proficiency score distributions which takes into account the errors in parameter estimation which occur during the estimation procedure.

Grantee: Rand Corporation
P. Investigator: David Grissmer
Project title: Analyzing State NAEP Data to Identify State Educational Policies/characteristics which Cost-effectively Increase Achievement

This project will use the most recent NAEP data available to study why some states are making much larger gains in math and reading than other states, and why students with similar family characteristics score so differently across states. This work will expand the case studies of specific states previously conducted by the applicant to include six additional states selected for their particularly high or low growth rates in achievement or their high or low estimated achievement scores for students from comparable backgrounds.

Grantee: American Institutes for Research
P. Investigator: Jon Cohen
Project title: A Hypertext Textbook for NAEP Statistical Methods

This project proposes to develop an on-line, hypertext textbook covering existing and emerging NAEP statistical methods that can be deployed as part of the *AM* statistical package. The hypertext textbook will be a component of the *AM* software's help system. The textbook will allow users to immediately access explanations of the major components of the NAEP design and of the new estimation procedures on which the *AM* software is based. By helping researchers understand NAEP's underpinnings, this tool may significantly expand the NAEP user community.

Grantee: Educational Testing Service
P. Investigator: Barbara Storms
Project title: Analyzing Classroom Writing Assignments: Lessons Learned from the 1998 NAEP Classroom Writing Study

This project will use the 1998 NAEP classroom writing study data to identify the key features of classroom writing assignments which appear to lead to high-level student writing performance. The goal of this work is to develop a model of writing assignments and general classroom writing practices that will be useful to school administrators, curriculum specialists, and classroom teachers.

Grantee: University of Southern California
P. Investigator: Eddie Ip
Project title: Assessing the Psychometric Effects of Item Clustering Around Passages in NAEP

This project will investigate the impact of the effects of clustering items around reading passages on the estimation of NAEP proficiency scores. In addition identifying and measuring local dependency in the NAEP data, the study will develop an alternative estimation model which accounts for local dependency, and compare the ability of the new and the existing NAEP estimation models to estimate the latent structure of data which simulate the NAEP long term trend reading assessment.

Grantee: University of Maryland
P. Investigator: John Guthrie
Project title: Effects of Integrated Instruction and Reading Time on Reading Achievement in Middle School: A Policy Analysis of the NAEP Data

This study will combine data from the 1994 NAEP reading teacher questionnaire and the 1994 student reading background questions to form constructs representing integrated instruction in reading, and student engagement with reading. The study will then investigate the relationship between these constructs and student reading achievement and attempt to develop a model of optimal instructional time and student reading time that could potentially reading achievement.

Grantee: Educational Testing Service
P. Investigator: Eiji Muraki
Project title: Application of Multiple-Group Generalized partial Credit Model to NAEP Linking Procedures

One major objective of the NAEP is the measurement of trends in student performance across time. To achieve this, results of different assessment cycles are linked across time periods. The methodology used to equate scores during this linking can introduce error into the estimates of student ability. This study will investigate the amount of uncertainty introduced into the NAEP ability distribution estimates by the linking strategy currently used in operational NAEP and explore several other strategies which have been proposed for operational linking.

Projects Funded in Fiscal Year 1998

Grantee: American Institutes for Research
P. Investigator: Donald McLaughlin
Project title: Item-based Linked Scaling of NAEP and State Assessments

This project proposes to use and evaluate a score-based linking method known as the “variant-item technique” to calibrate state assessment items directly onto the NAEP scale. If successful, this project will develop a more precise procedure for using a state’s assessments to measure achievement on the NAEP scale. This project will: (1) estimate the precision of item-based linkages, (2) assess the impact of systematic school-level variation on linkage accuracy, (3) assess the extent to which background information may be needed for a neutral scoring of state assessment items on the NAEP scale, and (4) characterize state assessment items that carry more and less weight in estimating the NAEP construct.

Grantee: Datametrics Research, Inc.
P. Investigator: Neal Thomas
Project title: Assessing the Contribution of Background Data for Primary NAEP Reporting

Extensive background information is used in all NAEP estimation procedures, but a relatively small number of these background variables are used in primary reporting. This study proposes to estimate how much accuracy is gained (or lost) in the primary reporting of NAEP by including (or excluding) extensive background data. The study will estimate how many additional students would need to be sampled to retain the current accuracy of NAEP reports, if the background data are not used when forming primary reports. These estimates will result in a clear assessment of the costs/benefits of using background variables in primary NAEP reporting.

Grantee: CTB/McGraw-Hill
P. Investigator: Richard Patz
Project title: Comprehensive Methodology for the Analysis of Rater Errors & their Impact on NAEP

This project proposes to develop methodology that will: (1) use the second ratings or “double reads” of NAEP open-ended items to obtain more information about students; and (2) to more appropriately quantify the error due to the rating process when open-ended items are used. The project will use a hierarchical rater model and an adaptation of an item-bundle modeling approach both of which were developed by the principal investigators. Software to implement these new procedures will be developed and publicly shared.

Grantee: Temple University

P. Investigator: Jeremy Finn
Project title: Taking Mathematics in High School: Is Opportunity Equal?

This project will use the 1994 NAEP Transcript study data in an attempt to examine the factors that affect mathematics course taking patterns--factors that promote course taking among some students while limiting the opportunities of others. The specific objects of the project are: (1) to identify mathematics course-taking patterns among high-school students; (2) to characterize the relationship of mathematics course-taking with family characteristics and school-related outcomes; (3) to identify inequities in course-taking according to the characteristics of students or their schools; and (4) to examine "alterable" school policies and practices that impact on students' course-taking decisions.

Grantee: University of Maine
P. Investigator: Jeakyung Lee
Project title: Understanding Rural Student Achievement: Identifying Instructional and Organizational Differences between Rural and Non-rural Schools

This study proposes to examine the factors that have contributed to the recent improvement in rural student achievement and to identify the sources of the achievement gaps between rural and non-rural students. The study hypothesizes that rural schools, as compared to their non-rural counterparts, have both facilitative (e.g., small classes, supportive ethos, and safe/orderly climate) and constraining (e.g., lack of well-trained teachers and instructional resources and low availability of advanced courses) conditions which mediate the impact of their locational "disadvantage" on student achievement.

Grantee: University of Maryland
P. Investigator: John Guthrie
Project title: Effects of Reading Time and Instruction on Reading Achievement: A Policy Analysis of the NAEP Data

This study proposes to use the NAEP data to investigate the relationship between time spent reading and student reading achievement. Both the direct hypothesis, assumed by many standards-based school reform movements--that increased reading time relates directly to higher reading achievement--and more complex hypotheses involving the mediating affects of classroom instructional practices will be investigated.