

Research Abstracts (short)
CLTW Research Forum
April 26-27, 2007

Arranged in Alphabetical Order by First Author

AN EDUCATIONAL ETHNOGRAPHY OF TEACHER DEVELOPED SCIENCE CURRICULUM IMPLEMENTATION: ENACTING CONCEPTUAL CHANGE BASED SCIENCE INQUIRY WITH HISPANIC STUDENTS

Eric Brunsell, Montana State University Doctoral Fellow

Theme III Culture and Learning: Connection between culture & learning for students from diverse groups and Professional Development on culture and learning

Abstract: This presentation describes a study that was conducted to determine the role of professional development in helping teachers understand how science inquiry can be used to improve the instructional quality for students in a predominantly Hispanic, urban neighborhood. This qualitative study involved five teachers in grades 5,6 and 8.

LOST IN TRANSLATION? MULTICULTURALISM IN AMERICAN ENVIRONMENTAL EDUCATION PROGRAMS

Jennifer Cox, University of Montana Master's Fellow; Blake Ingram, University of Montana Master's Fellows

Theme III Culture and Learning: Connection between culture & learning for students from diverse groups and Theme V: Research on Connections between Program Evaluation, Public Policy and Achievement gaps

Abstract: Are foreign exchange students able to translate and apply the knowledge and skills gained in American environmental education programs to their native culture? The reason for this type of study is to hopefully increase the ability for EE programs to affect change in diverse populations. A literature review will be the starting point to answer this question.

A FOCUS OF THE PLACE NAMES PROJECT TO BUILD CROSS-CULTURAL RELATIONSHIPS: A VIEW OF ECOLOGY

Jeff Crews, University of Montana Doctoral Fellow; Michael Munson-Lenz, University of Montana Masters Fellow

Theme III Culture and Learning: Connection between culture & learning for students from diverse groups and Professional Development on culture and learning

Abstract: The focus of the Place Names Project (PNP) is to build cross-cultural relationships between traditional Bitterroot Salish, and Pend d'Oreille world views and science using geospatial technologies. The curriculum generated from PNP will engage students in learning how culture affects one's view of ecology through personal and familial connections.

OPENING MATHEMATIC ACHIEVEMENT SYSTEMATIC REVIEW DATABASE TO OTHER CLT-WEST DOCTORAL FELLOWS FOR RESEARCH PURPOSES: A ROUNDTABLE PRESENTATION

James J. Dugan, Colorado State University Doctoral Fellow

Theme II Teaching and Learning Approaches to Reduce Achievement Gaps and Theme I Defining/Understanding Critical Dimensions of Achievement Gaps

Abstract: Presentation will provide a short summary of the systematic review on interventions in secondary and post-secondary mathematics with at-risk students nearing completion. The objective is to explore the level of interest of other CLT-West campuses to gaining access to the research database of 3,800 citations published between 1990 and 2004.

A SYSTEMATIC MAPPING REVIEW OF INTERVENTIONS IN SECONDARY MATHEMATICS WITH AT-RISK STUDENTS – OVERVIEW

James J. Dugan, Colorado State University Doctoral Fellow

Theme II Teaching and Learning Approaches to Reduce Achievement Gaps and Theme I Defining/Understanding Critical Dimensions of Achievement Gaps

Abstract: Presentation summarizes a systematic review on interventions in secondary and post-secondary mathematics with at-risk students. Study goal was to identify interventions most effective for improving mathematics achievement while reducing the achievement gap. Five potentially effective interventions were identified: pedagogical/instructional interventions of cognitive/metacognitive strategies, cooperative learning, and peer tutoring; technology-based interventions; and school restructuring interventions.

ASSESSING THE IMPACT OF THE EXPEDITIONARY LEARNING MODEL ON A NEW SCIENCE-MATH OPTIONS SECONDARY SCHOOL FOR UNDERSERVED STUDENTS

Mike Ellison, Portland State University Doctoral Fellow

Theme II Teaching and Learning Approaches to Reduce Achievement Gaps: Presenting science and math content in “real world” contexts; Theme IV Research on Connections between assessment strategies and achievement gaps

Abstract: My dissertation research will be assessing the impact of the Expeditionary Learning model on a new science-math options secondary school for underserved students opening in a Portland, Oregon-area suburban district in fall 2007. The learning model will be presented, along with research plans for assessing the impact of the model.

COSMOS: A GROUP-MENTORED STRAND TO INTRODUCE MICROBIOLOGY TO HIGH SCHOOL SENIORS

Josephine Ebomoyi, University of Northern Colorado Post Doctoral Fellow

Theme II Teaching and Learning Approaches to Reduce Achievement Gaps: Presenting science and math content in “real world” contexts

Abstract: Using the instructional model proposed by Bybee, 1993, a strategic group-mentoring approach was used to introduce microbiology to a group of high school seniors. Students' performance, attitude and perceived benefits of the six week cooperative learning experience was evaluated. The theoretical frame work of the study is the constructivist theory.

SCIENCE INQUIRY GROUP PROFESSIONAL DEVELOPMENT PROGRAM

Irene Grimberg, Montana State University Research Faculty

Theme II Teaching and Learning Approaches to Reduce Achievement Gaps: Professional Development strategies to reduce achievement gaps

Abstract: Design and implementation of a professional development science program that addresses the characteristics and needs of teachers of Indian American reservations in Montana.

A PD experience of two and half years is documented describing the program, rationale, and curriculum. A reflection on this experience and suggestions for future work are discussed.

TEACHERS' EXPECTATIONS OF STUDENT PERFORMANCE

Ricarda Hanson, Montana State University Doctoral Fellow

Theme III Culture and Learning: Connection between culture & learning for students from diverse groups and Theme I Defining/Understanding Critical Dimensions of Achievement Gaps

Abstract: This presentation will present results from a teacher validation study that was conducted with the Iowa Tests of Basic Skills (ITBS) and the Iowa Tests of Educational Development. Classroom teachers were asked to indicate their perceptions of students' reading and math proficiency levels prior to reviewing tests. Results will be presented that compare teachers' predicted proficiency levels with the actual proficiency levels based on test results.

THE USE OF COMPUTER ALGEBRA SYSTEMS IN A PROCEDURAL ALGEBRA COURSE

Jonathan Harper, Montana State University Doctoral Fellow

Theme II Teaching and Learning Approaches to Reduce Achievement Gaps: Use of technology to reduce achievement gaps; Discourse as a tool to reduce achievement gaps

Abstract: An introductory, undergraduate algebra curriculum was redesigned using computer algebra systems (CAS). CAS was used as a tool to facilitate classroom discourse and promote deeper understanding of procedures. The first implementation of this curriculum is nearing completion. Preliminary findings, assessment instruments, and plans for final data collection and analysis will be presented.

A SYSTEMATIC MAPPING REVIEW OF INTERVENTIONS IN SECONDARY MATHEMATICS WITH AT-RISK STUDENTS: INSTRUCTIONAL INTERVENTIONS – TECHNOLOGY-BASED INTERVENTIONS

Laurie Hillman, Colorado State University Doctoral Fellow; Dora Gonzales, Colorado State University Doctoral Fellow

Theme II Teaching and Learning Approaches to Reduce Achievement Gaps and Theme I Defining/Understanding Critical Dimensions of Achievement Gaps

Abstract: This presentation summarizes data on technology-based interventions. The overall study goal was to identify interventions most effective for improving mathematics achievement while reducing the achievement gap. This intervention was supported by twenty-one empirical studies with fourteen of the twenty-one yielding positive effect size estimates.

OCKLEY GREEN MAGNET SCHOOL: IMPACTS THAT A CONTEXTUALIZED SCIENCE CURRICULUM HAS ON STUDENTS' LEARNING AND ENGAGEMENT

Sybil Kelley, Portland State University Doctoral Fellow

Theme III Culture & Learning: Connection between culture & learning for students from diverse groups; Theme II Teaching and Learning Approaches to Reduce Achievement Gaps and Theme I Defining/Understanding Critical Dimensions of Achievement Gaps

Abstract: This research investigates the impacts that a contextualized science curriculum has on students' learning and engagement. This work takes place in the 6th grade of an urban middle school. Primary sources of data will include student work samples, interviews and focus groups, and an analysis of state science test scores.

MASTERY WITH MEANING: ACCESS TO MATHEMATICS ONLINE

Paul Kennedy, Colorado State University Co-PI and Research Faculty; Wade Ellis, Colorado State University Doctoral Fellow, Department of Mathematics, Westvalley College, California; Janet Oien, Colorado State University Masters Fellow; Jerry Overmyer, Colorado State University Doctoral Fellow

Theme II Teaching and Learning Approaches to Reduce Achievement Gaps: Presenting science and math content in “real world” contexts; Use of Technology to reduce achievement gaps and Theme IV Research on Connections between Assessment Strategies and Achievement Gaps

Abstract: This session will detail current existing programs using online learning for precalculus courses, review related research and report on recent and further research efforts in the PACe precalculus mastery program at Colorado State University.

TEACHERS SELF-EFFICACY AND THEIR RELUCTANCE OR INCLINATION TO UNDERTAKE PROFESSIONAL DEVELOPMENT

Karen Koski, University of Northern Colorado Doctoral Fellow

Theme II Teaching and Learning Approaches to Reduce Achievement Gaps; Professional Development strategies to reduce achievement gaps

Abstract: Why are some teachers inclined to participate in professional development while other teachers are reluctant? This study looks at individual teacher factors that may influence their participation in professional development. Colorado middle and high school teachers were surveyed to try to uncover the individual factors that may make a difference.

MATHEMATICS TEACHERS’ PROFESSIONAL GROWTH AS A RESULT OF MENTORING EARLY CAREER TEACHERS: A ROUNDTABLE DISCUSSION

DeAnna McAleer, Montana State University Doctoral Fellow

Theme II Teaching and Learning Approaches to Reduce Achievement Gaps; Professional Development strategies to reduce achievement gaps; Discourse as a tool and Use of technology to reduce achievement gaps

Abstract: I am currently in the initial stages of designing a study to investigate the mathematics mentor teachers’ professional growth as a result of participating in the eMSS program, an online, content specific mentoring and induction program. The purpose of this session is to gather ideas and feedback about potential research questions and methodology for this study.

THE DEVELOPMENT OF A SUSTAINABLE, HIGH QUALITY PROFESSIONAL DEVELOPMENT MODEL FOR THE CLTW FACULTY– A ROUNDTABLE DISCUSSION

Alyson Mike, Montana State University Doctoral Fellow

Theme V: Research on Connections between Program Evaluation, Public Policy and Achievement gaps

A roundtable discussion will be utilized for feedback, comments, and suggestions as to what the ongoing PD should look like for faculty as well as what changes students would like to see in the CLTW courses.

PRE-SERVICE TEACHER EXPERIENCES IN MULTICULTURAL SETTING

Zoe Mohesky, M. Ed., University of Montana Masters Fellow (*not presenting*)

Georgia Cobbs, Ph.D., University of Montana Co-PI and Research Faculty

Theme III Culture & Learning: Connection between culture & learning for students from diverse groups

Abstract: To determine the benefits of an introductory field experience immersion course for 21 pre-service teachers (PTs), an intensive two-week course took place in classrooms (grades 5 - 12) on the Flathead Indian Reservation during three winter sessions. Using qualitative data collected from the PTs' journal entries, themes emerged pertaining to the teaching profession, classroom management, special needs, and diversity.

DEVELOPING A PROFESSIONAL LEARNING COMMUNITY AMONG MATHEMATICS TEACHERS ON TWO MONTANA INDIAN RESERVATIONS

Karma Nelson, Montana State University Doctoral Fellow and Professional Development Teacher Leader

Theme II Teaching and Learning Approaches to Reduce Achievement Gaps: Professional Development strategies

Abstract: The author will share a process and findings of developing a professional learning community among mathematics teachers in a bounded system using an ALRR (ask, listen, respond, reflect) approach. In addition to the presenter's own description of the process, the study reflects the voices of 24 teachers during a three year period.

A SYSTEMATIC MAPPING REVIEW OF INTERVENTIONS IN SECONDARY MATHEMATICS WITH AT-RISK STUDENTS: INSTRUCTIONAL INTERVENTIONS – COOPERATIVE LEARNING

Jerry Overmyer, Colorado State University Doctoral Fellow

Theme II Teaching and Learning Approaches to Reduce Achievement Gaps and Theme I Defining/Understanding Critical Dimensions of Achievement Gaps

Abstract: This presentation summarizes data on pedagogical/instructional interventions in cooperative learning strategies. The overall study goal was to identify interventions most effective for improving mathematics achievement while reducing the achievement gap. This intervention was supported by ten empirical studies with nine of the ten yielding positive effect size estimates.

A SYSTEMATIC MAPPING REVIEW OF INTERVENTIONS IN SECONDARY MATHEMATICS WITH AT-RISK STUDENTS: INSTRUCTIONAL INTERVENTIONS – COGNITIVE/METACOGNITIVE STRATEGIES

Shelly Parsons, Colorado State University Doctoral Fellow

Theme II Teaching and Learning Approaches to Reduce Achievement Gaps and Theme I Defining/Understanding Critical Dimensions of Achievement Gaps

Abstract: This presentation summarizes data on pedagogical/instructional interventions in cognitive and metacognitive strategies. The overall study goal was to identify interventions most effective for improving mathematics achievement while reducing the achievement gap. This intervention was supported by fourteen empirical studies with thirteen of the fourteen yielding positive effect size estimates.

METACOGNITION AND A LEARNING PORTFOLIO AS A TEACHING TOOL: WHAT ARE THEY THINKING AND HOW DO WE KNOW?

Shelly Parsons, Colorado State University Doctoral Fellow

Theme II Teaching and Learning Approaches to Reduce Achievement Gaps: Discourse as a tool to reduce achievement gaps and Theme IV: Research on Connections between assessment strategies and achievement gaps

Abstract: Join me as I take you on a journey of student learning with the elements and application of a Learning Portfolio in mathematics courses. I will share examples of student discussions and personal reflections that demonstrate growth as a learner of mathematics and as a lifelong learner. I will share the evolution of my version of a Learning Portfolio over the last 5 years in courses like Elementary Statistics, College Algebra, Trigonometry, and Calculus

“WHAT WOULD VYGOTSKY DO?” AN EVALUATION OF MIDDLE SCHOOL SCIENCE PROFESSIONAL DEVELOPMENT

Barbara Patterson, Colorado State University Doctoral Fellow

Theme II Teaching and Learning Approaches to Reduce Achievement Gaps: Professional Development strategies; Theme III Culture and Learning: Professional Development on culture and learning

Abstract: At Colorado State University, we asked middle school science teachers in the Center for Learning and Teaching in the West professional development workshops to describe how their students benefited from their CLTW professional development experience. I coded the responses to the surveys looking for themes in reference to the Vygotskian theory regarding the student’s individual zone of proximal development.

WHAT IS CULTURALLY RELEVANT? CULTURALLY VALID CURRICULUM AND ASSESSMENT FOR LOW-INCOME HISPANIC STUDENTS.

Barbara Patterson, Colorado State University Doctoral Fellow

Theme III Culture and Learning: Connection between culture and learning for students from diverse groups and Theme II Teaching and Learning Approaches to Reduce Achievement Gaps: Broad curricular, scheduling & structural changes to reduce achievement gaps

Abstract: This study, conducted with the Rocky Mountain Bird Observatory program - Birds across Borders, will attempt to define what “culturally relevant” means to improve achievement in science classes for low-income Hispanic students. Students from Colorado and Michoacan, Mexico will participate in bird banding and bird migration studies using culturally relevant curriculum that engages students in a field setting.

USING SMART BOARD TECHNOLOGY TO LEARN ALGEBRAIC CONCEPTS.

Karen Peterson, University of Montana Doctoral Fellow

Theme II Teaching and Learning Approaches to Reduce Achievement Gaps; Theme III Culture and Learning; Theme IV Research on Connections between Assessment Strategies and Achievement Gaps

Abstract: This research focused on student’s motivation, engaged time, and conceptual processing to learn algebraic concepts using smart board technology. This study is in response to an ongoing problem with students living in the 21 century being hypertext minded and unmotivated and disengaged by traditional pedagogy. The control class will be taught the beginning algebraic concepts with a hands-on kit and no technology while the experimental group will be taught using smart board technology, manipulating the pawns, scale etc. The method of assessing student’s motivation will be done by formal observations of motivation,

time on task, and student's work, which includes computations, and constructed response questions. Results of the study will show that the use of smart boards will increase motivation, engaged time and conceptual processing of algebraic concepts introduced in fifth grade.

INSTRUCTIONAL INTERVENTIONS AND THE ACHIEVEMENT GAP IN SCIENCE

Chris Romero, Colorado State University Doctoral Fellow

Theme II Teaching and Learning Approaches to Reduce Achievement Gaps: Other standards- and research-supported strategies to reduce achievement gaps; Broad curricular, scheduling and structural changes to reduce achievement gaps

Abstract: The purpose of this paper is to analyze existing research on instructional interventions that have an impact on the achievement gap in science between mainstream and nonmainstream students.

MULTICULTURAL EDUCATION IN PRESERVICE AND INSERVICE TEACHER TRAINING PROGRAMS

Chris Romero, Colorado State University Doctoral Fellow

Theme II Teaching and Learning Approaches to Reduce Achievement Gaps: Preservice Preparation strategies to reduce achievement gaps; Professional Development strategies to reduce achievement gaps; Broad curricular, scheduling and structural changes to reduce achievement gaps

Abstract: The purpose of this paper is to identify and describe preservice and inservice teacher training programs that impact teacher attitudes toward diverse students different from themselves.

MASTERY OF RATIONAL NUMBERS: A CONNECTION AND GATEWAY TO HIGHER MATHEMATICS

Rena Seegmiller, University of Montana Doctoral Fellow

Theme I Defining/Understanding Critical Dimensions of Achievement Gaps; Theme II Teaching and Learning Approaches to Reduce Achievement Gaps: Other standards- and research-supported strategies to reduce achievement gaps

Abstract: Secondary students' lack of rational number understanding often becomes an obstacle, severely limiting the quantity and quality of their math classes. This research will explore high school students' intuitive or street knowledge of rational numbers as a connection and gateway to higher mathematics.

THE BENEFITS OF ACTION RESEARCH AND ITS IMPACT ON CLASSROOM TEACHING PRACTICE

Sarah Segal, Montana State University Doctoral Fellow

Theme VI: Research on Leadership Development in STEM Education

Abstract: Action research is a methodology that appears to be valuable as a problem solving tool. For the teacher in the classroom, it can provide opportunities for reflection and improvement, being a testing ground for improving the teacher's practice. The purpose of this study is to better understand these claims about the benefits of action research and its impact on their teaching practice.

ABSENTEEISM IN AT-RISK, POST-SECONDARY STUDENTS, THE IMPACT OF PROVIDING COURSE LECTURE NOTES ELECTRONICALLY.

Richard K. Stiff, University of Montana Doctoral Fellow at Chief Dull Knife College

Theme II Teaching and Learning Approaches to Reduce Achievement Gaps: Other standards- and research-supported strategies to reduce achievement gaps; Use of technology to reduce achievement gaps

Abstract: The purpose of this study is to weigh the impact of providing access to lecture notes electronically, on the attendance of the students in Science courses at Chief Dull Knife College. Comparison will be made of Science majors to non-majors, as well as freshman courses and sophomore courses. Studies at traditional campuses have demonstrated an increase in absenteeism, but have not been done with the non-traditional students associated with tribal colleges.

THE EFFECT OF FACILITATOR TRAINING ON THE DEVELOPMENT AND PRACTICE OF PARTICIPANTS IN AN ONLINE INDUCTION PROGRAM FOR TEACHERS OF SCIENCE AND MATHEMATICS

Peggy Sue Taylor, Montana State University Doctoral Fellow

Theme VI Research on Leadership Development in STEM Education

Abstract: Training for eMSS facilitators is designed to improve the quality of dialogue among participants in the program. The intervention consisted of three components: 1) an online training institute prior to beginning of the program year, 2) placement of facilitators in positions within the discussion areas of the program, and 3) ongoing online support for practicing facilitators. Comparisons of dialogue before and after the intervention indicated a significant improvement in dialogue quality in the discussion areas of the program. Case studies of facilitators' practices revealed areas of the training that impacted the skills and strategies that facilitators used in efforts to foster increased and improved dialogue. Survey results indicated that participants gained a better understanding of what constituted quality dialogue in terms of the eMSS program and how better to foster quality dialogue in an online environment.

TEACHERS' BELIEFS AND RESEARCH FINDINGS ON EFFECTIVE TEACHING STRATEGIES FOR AMERICAN INDIANS IN MATHEMATICS

Raquel Vallines Mira, Montana State University Doctoral Fellow

Theme II Teaching and Learning Approaches to Reduce Achievement Gaps: Other standards- and research-supported strategies to reduce achievement gaps and Theme III Culture and Learning: Connection between culture and learning for students from diverse groups

Abstract: The main purpose of the study I am proposing is to add the voices of four dedicated teachers (Indian and non-Indian) to the conversation about effective strategies for American Indians in mathematics. I intend to do this by identifying the beliefs of four dedicated teachers with particular focus on three teaching strategies (contextualized Instruction, teaching through modeling, and joint productive activity) while giving them the chance to also express their views about other practices that may be of importance to them.

SOCIAL NETWORKING TECHNOLOGY HELPS TO CLOSE THE ACHIEVEMENT GAP FOR NATIVE AMERICAN STUDENTS

Diane Woodard, University of Montana Masters Fellow

Theme II Teaching and Learning Approaches to Reduce Achievement Gaps: Use of technology to reduce achievement gaps; Preservice Preparation strategies to reduce achievement gaps

Abstract: This study looks at the use of social networking technology, such as Myspace, to reduce achievement gaps. Would setting up a virtual social environment, similar to MySpace, increase engagement in academics, and therefore reduce achievement gaps for Native American students in Montana? The virtual environment will model the native American culture and provide on-line activities that enhance the existing curriculum.