Mining GEMS to Advance Teaching, Research, and Outreach in the Treasure State

Tricia Seifert, Sarah Schmitt-Wilson, Art Bangert, Fenqjen Luo, Carrie B. Myers, and Tena Versland
Collaborative for Continuous Improvement in Education: Montana GEMS Data and the K-16 Pathway

**Research**
Building knowledge around important state & national issues to inform policy and practices

**Teaching**
Enhancing data literacy (awareness & analysis) across the undergraduate & graduate curriculum

**Outreach**
Providing data literacy & analysis PD to teachers in support of p-12 continuous improvement
Teaching: Teacher Education Courses

• Goal: The goal of the program is to increase MSU TEP completers ability to use effectively incorporate data driven decision-making though the use of GEMS data throughout the TEP curriculum.

• Backwards design focusing on objectives

• Measure of students ability to incorporate DDDM
Teaching: Teacher Education Courses

• Phase I GEMS Course Implementation:
  • **EDU 101US:**
    – Data Driven Decision Making: An Introduction
  • **EDU 222/223IS:**
    – Research in Education: How We Can Use GEMS
  • **EDU 211D**
    – Diversity in Montana Schools: What We Can Learn From GEMS
  • **EDU 370**
    – Data 101: Organizing Data and Basic Analysis
Teaching: Teacher Education Courses

• **EDU 382**
  – Using GEMS Data to Explore Proficiency of Montana Students

• **Practicum I and II**
  – Using GEMS for providing Context for our Practicum Experience
    • Content: Click it, Before you visit using [School Profile](#)

• **Student Teaching**
  – A Demonstration of how we can use GEMS and Incorporate Data Driven Decision Making into our educational practice
    • Content: Click it, Before you visit using School Profile

• **Possible Phase II courses:**
  – ELA Methods:
  – Mathematics Methods:
  – Science Methods:
  – EDSP 306
School Profile

Growth and Enhancement of Montana Students
gems.opl.mi.gov

GEMS > Schoolinfo

GEMS - School Profile

Longfellow School

Go To District Profile

Data Definitions & Explanations

CRT & ESEA
School Characteristics
Programs & Course Offerings
Accreditation

Criterion-Referenced Test

No new achievement data for reading or math is available for 2013-14 since all students participated in the spring of 2014 in the field test for a new assessment to be administered in the spring of 2015.

CRT Reading Proficiency Level
CRT Mathematics Proficiency Level
CRT Science Proficiency Level

IDU22858Feb2017_.pdf
Schoolart1981.pdf
Understanding_this_.pdf
Canonandtakan30_.pdf
StoneDissertation.pdf
Garcia968.pdf
RuralCommunityC_.pdf

Show all
Teaching: Graduate Statistics Courses

• GEMs Data will be used to create data analysis examples for Educational Statistics I and II.
• Educational Statistics I is an introductory statistics course for masters and doctoral level students
• Topics covered include: Descriptive statistics (means, standard deviations), Correlation, Regression, t-tests (comparing means), one way ANOVA and nonparametric statistics.
Educational Statistics I Example Analyses

• What percent of Montana schools are classified as AA, A, B and C? (Descriptive Statistics)
• Do Class B and C 8th grade students schools differ on mean 8th grade reading scores? (t-test)
• Is there a relationship between 12th grade absentee rates and ACT scores? (correlation).
• Do 4th grade students enrolled in class AA, A, B and C class schools differ on average smarter balance reading scores? (One Way ANOVA)
• Is there a relationship between Dual Credit Enrollment and High School Size? (Chi Square)
Educational Statistics II Example Analyses

• Is there a relationship between eleventh grade absentee rates, gender, GPA and ACT scores (multiple correlation).
• What is the influence of absentee rates, gender, GPA on ACT scores (Multiple Regression).
• What is the influence of absentee rates, gender, GPA on High school graduation (Logistic Regression).
• Is there a difference between 4th grade male and females enrolled in Class AA and Class C schools on mean CRT science scores?
• Do 8th grade students enrolled in class AA, A, B and C schools differ significantly on mean CRT Reading, Math and Reading scores (MANOVA).
This graph created from GEMS website describes 8th graders’ distribution of mathematics scores across years in Montana and in U.S.

Complete the tasks on the next page.
1. To create the graph on the previous page, what raw data sets have to be obtained and what descriptive analysis steps in your statistics tools have to be conducted?

2. Use histogram graph to represent the same distribution shown on the previous page.

3. Is there a difference in mathematics scores between 8\textsuperscript{th} graders in Montana and the U.S.? What statistics analysis has to be conducted to answer this question? Show all the statistics analysis steps needed to answer this question.

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National Assessment of Educational Progress (NAEP) Dashboard

https://gems opi mt gov/StudentAchievement/Dashboards/National\%20Assessment\%20of\%20Educational\%20Progress/National\%20Assessment\%20of\%20Educational\%20Progress.aspx
Graduate Content Courses

• EDLD 534 Data Driven Decisions
  – Course designed for Educational Leadership Students.
  – Use data from graduate students’ own classrooms and schools to learn about the application of Correlation, Regression, ANOVA and its usefulness in decision-making.
  – Making data relevant.

“ We need to go beyond generalities. My students’ data determine what I do every day. I care most about data that impact the decisions I make tomorrow.”

Melissa, 2017
Dual Enrollment and College Outcomes for Students Attending 4-Year Institutions in the Montana University System: Evidence from GEMS

Carrie B. Myers, Department of Education
Scott M. Myers, Department of Sociology
Montana State University
Bozeman, MT
Purpose of Research

• Research shows that students who enter college with dual enrollment (DE) credits tend to have more favorable outcomes
  – Enrollment, retention, time-to-degree, GPA, graduation (MUS)

• Our research will examine this link according to:
  – DE course characteristics?
  – Which students benefit the most?
  – These contexts have yet to be thoroughly researched
Delineation of DE Course Characteristics in AIM

• Dual credit v. dual enrollment
  – HS and college credit v. college credit only

• Taught at high school v. postsecondary institution
  – Taught by high school teacher v. postsecondary instructor

• Whether taught through distance learning
Which Students Benefit from DE?

- Demographics & Stratifying
  - Race, gender, SES proxies

- HS Academics (MUS data)
  - ACT, percentile rank in HS class, GPA

- College Academics
  - Major, MUS institution
Future Research: Institutional Characteristics

• Each MUS institution has unique IPEDS number

• Merge IPEDS data to student records

• Annual collection of institutional-level data
  – E.g., expenditures, selectivity, student body demographics, retention and graduation rates
“How Do Teachers and Administrators Use Data in Montana’s Schools?”

• Sub – Questions:
  – How are teachers/administrators effectively using data?
  – What are the barriers that prevent effective data use?
  – What policies/procedures might enhance data literacy?
  – What kind of professional learning is needed to enhance data literacy for continuous improvement.

• Survey Sent May 2017
  – 550 responses (population approx. 10,000)
  – 95% confidence level,
  – margin of error + or- 4.5 points
Post Needs Assessment

• Disseminate the findings.
  – MDUC, MCEL/MEA, MASS meetings, etc.
  – Publications – state level partners and beyond

• Focus Group to Analyze Data for PD
  – Tailored PD for Different Groups (New teacher induction programs, advanced users, administrative teams)
Professional Learning Venues

• Montana Behavior Initiative
  – 3-5 Data Literacy Modules/Sectionals offered throughout the week at MSU.
  – Facilitated by MSU faculty/Grad Students
  – Credit for courses??
Induction & Outreach Across MT

• Data Literacy Training on PIR days, early release days, etc.
  – Professional Learning Tailored to District Needs
  – 15 days/year in K-12 Schools
  – Paid for by GEMS Data Grant/MSU
Webinars

• MSU/GEMS – “Data Chats”
  – Based on Material from Data Lit modules
  – Offered various times - “sack lunch seminars,” early morning/afternoon faculty meetings, evening interactive chats - WEBEX
  – Recorded webinars/videos for use any time