Blue Ribbon Data Analysis and Probability

Report of Project

Eisenhower Professional Development Program
EPDP-02-WVU-3

Institute for Math Learning
West Virginia University
Morgantown, WV

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Project Director

December 2002

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Twenty-three mathematics educators participated in the Blue Ribbon Data Analysis and Probability Institute during the summer and fall of 2002 at West Virginia University (WVU) through the Eisenhower program. Two additional participants, a preservice graduate student and a HSTA mathematics educator were able to participate in workshop meetings but did not receive materials purchased with Eisenhower funds. Of those participants 14 chose to use the opportunity to gain graduate level mathematics credit through WVU. The purpose of this institute was to provide professional development to mathematics educators, with the specific goal of improving the quality of teaching Data Analysis and Probability. The framework for the professional development was a week long institute with two follow up sessions. The institute had the following goals:

- Affirm and strengthen the content knowledge and methodology of teaching Data Analysis and Probability.
- Strengthen technology skills that enhance and are an integral part of the learning of mathematics.
- Work with activity based examples.
- Establish a regional mentoring environment for both newer teachers and seasoned professionals.
- Learn the appropriate way to integrate technology, graphing calculators and computers, into the classroom.
- Help align the content in higher education courses for teacher educators with the State and National recommendations.
- Correlate the concepts taught in high school mathematics to real-world applications.
- Learn from leaders with specialized expertise as well as from peers.

The project director was Dr. Laura J. Pyzdrowski, Ed. D, Assistant Professor of Mathematics in the Institute for Math Learning at West Virginia University. The assistant for the project was Dr. Lalah Larew, Fairmont State College. Educational consultants were James Lang from the Department of Mathematics, Valencia Community College, Orlando, Florida , and Matt Winking, Professional Development consultant from Key Curriculum Press.

The Eisenhower funds were supplemented with money from a NASA mini grant.

Recruitment of Participants

A recruitment flyer was prepared and posted on the Blue Ribbon Mathematics Partnership Committee Web Site: www.blueribbon.ws. An application form was also prepared an posted on the site. (See the attachments for a copy of the flyer and application form.) The blue ribbon hosting counties and institutions were contacted to submit names of sponsored participants.

Once all Blue Ribbon affiliated participants were accepted, vacancies were filled on a first come, first to get in basis. Several late applicants from participating counties were placed on a wait list. Two participants attended the project and paid the registration fee with personal funds; however, only the 23 accepted participants from West Virginia educational institutions were awarded stipends and given instructional materials. The project director and assistant did not receive stipends, but did receive instructional materials.

Participants

The following educators participated in the institute:

Boden, Gale Frankfort High Mineral	**Jackson, Linda** Pre-Service Teacher	**Munza, Diana** Fairmont Senior High Marion
Browning, Robert Keyser High Mineral County	**Knaggs, Stacy** Monongalia University High	**Nedrow, Michael** Garrett Community College Garrett (WVU HSTA teacher)
Butcher, Jeanina Fairmont Senior High Marion	**Larew, Lalah** Fairmont State College	**Neptune, Andrea** North Marion High Marion
Campbell, Rusty 118 Rosewood Ave. Fairmont, WV 26554	**Marino, Katherine** Liberty High Harrison	**Nines, Melvin** Hampshire High School Hampshire
Cunningham, Chris WVU Parkersburg Wood	**Martin, Darlene** Grafton High Taylor	**Plunkett, Holly** University High Monongalia
Edwards, H. Allan WVU Parkersburg Wood	**Mason, Larry** North Marion High Marion	**See, Cheryl** Tygarts Valley Randolph
Elliott, S. Nelson North Marion Marion	**May-Gerard, Linda** HSTA Preston County	**Snyder, Carol** Tygarts Valley Randolph
Harlow, Brenda Buckhannon-Upshur High Upshur	**Meck, Allan** Hampshire High Hampshire	**Stewart, Carol** North Marion High Marion
Pyzdrowski, Laura WVU	**Westfall, Mary Lynn** East Fairmont High Marion	**Yoho, Karen Ann** Marion County Technical Center Marion

Program

Summer Institute Schedule

The institute covered the content of an algebra based introductory statistics course using the TI-83 Plus divided into four major themes: 1) Univariate Data Analysis, 2) Bivariate Data Analysis, 3) Data Production and 4) Sampling Distributions, and Statistical Inference. Simulation was used to demonstrate sampling distributions. List manipulations were used to demonstrate the least squares concept and the meaning of r-squared. There were examples of class generated data in addition to some data sets provided in the course materials. There were discussions about teaching certain statistical concepts and the role of technology. Teachers had hands on instruction using the TI83 plus and projection equipment.

The primary source for instructional material was : *Intro Stats*, by Richard DeVeaus, Paul Velleman and David Bock, Addison Wesley, 2002. In addition, James. Lang customized a workbook for the sessions. Since Addison Wesley donated the text books, participants were also provided *Workbook Statistics* from Key Curriculum Press as a classroom resource.

Fall 2002: Follow - Up: Two one day follow- up sessions.

Session 1: Key Curriculum Fathom Workshop

Participants will be lead through *Fathom* basics and more complex investigations ranging from exploratory data analysis to curve fitting to sophisticated inference by a Nationally recognized mentor teacher. Participants will explore open-ended investigations which have three parts: Conjecture, in which participants hypothesize, or make a prediction, or propose a model for some phenomenon; Measurement or Analysis, in which participants record the data if necessary and analyze the data to see if their conjecture is true; and, Comparison, in which participants explicitly compare their conjecture to the results of the analysis, possibly developing a new conjecture.

Session 2: Sharing Best Practices

Participants will present lessons developed for use in the classroom and/or professional development and make recommendations for the alignment of content in higher education courses for teacher educators with State and National recommendations. A web site will be created to make the lessons available to all interested mathematics educators.

Evaluation

Journals

Each participant was asked to respond to six journal entries (See the appendix for responses.) Teacher participants used handheld technology, computer software and presentation equipment. Overall, they felt that their technology skills were strengthened and would be able to integrate new material into the classroom. They enhanced the content knowledge of data analysis and probability and had the opportunity to work in a hands on environment with activity based examples. They also had time to work with peers. The educational consultants were rated very well and were seen as expert presenters. Participants reflected about the content of teacher preparation courses and gave ideas for future professional development opportunities.

Pre/Post Test
Each participant was asked to take a content/skill pre and post test (See appendix.) The tests were developed and graded by consultant. The mean score of the pretest was 6.9 and mean score for the post test was 19. The total possible score was 21.

Course Evaluations
Each participant was asked to complete a course evaluation (See the appendix for results.) Selected outcomes from the forms follow: Some participants neglected the back page of the evaluation.

Comments on Instruction: What I really like about the workshop is that we covered good, strong content - not just methods or technology tools for high school subjects. Please keep the material rigorous, although pertinent to our field. Thanks for your hard work. Thank you so much for everything you do. Laura did a fantastic job organizing this workshop. Keep up the good work. This workshop was fantastic and I really liked the material. I learned a lot of things I can USE in my classroom. Very educational and enjoyable. Thanks so much for this opportunity. I look forward to the opportunities available through the summer workshops. James, Laura and Lalah were the best. I can't think of any more that we could ask of them. They did the jobs they were supposed and then went beyond ... and all with a great attitude. Thanks so much for the great experience. Thanks for the opportunity. I had a very educational week. The only thing that I didn't like was the long drive every day. The information and material will be very useful in the classroom. The workshop was VERY well organized and presented! GREAT JOB! Great!

Summary of Selected Evaluations Questions (average score out of 5):

The mathematics in this course was at the appropriate mathematical level.
15- 5's and 6 - 4's 4.5
The mathematics in this course will enhance my teaching and student learning.
17- 5's and 4 - 4's 4.8
The course materials were useful in helping me learn how to teach more effectively with hand-held technoloy.
16- 5's and 5 - 4's 4.8
The discussions about how and why to teach with technology were valuable to my everyday teaching.
14- 5's and 5 - 4's and 2 - 3's 4.6
The materials provided were useful.
18- 5's and 3 - 4's 4.9
As a result of this course, I will use handheld technology more in my teaching.
15- 5's and 5 - 4's and 1 - 3 4.7
The instructor enhanced his/her instruction with appropriate use of the calculator.
21- 5's 5.0
The organizer/host for this course was helpful.
20- 5's and 1 - 4's 4.95
The instructor helped me learn how to teach more effectively with hand-held technology.
19- 5's and 2- 4 4.9

The instructor demonstrated thorough knowledge of the course material.
21- 5's 5.0
The instructor exhibited a positive attitude and enthusiasm
20- 5's and 1 - 4 4.95
The presentation skills demonstrate by the instructor were helpful in communication the course material.
19- 5's and 2 - 4's 4.9

Rating of Overall Experience
19- 5's and 2 - 4's 4.9

Key Curriculum Press Evaluations
Each participant was asked to complete Key Curriculum Professional Development evaluation forms (See the appendix for results.)
Summary of Selected Evaluation Questions:

How would you rate the material? 9/10
How would you rate the presenter? 9.3/10
How would you rate the overall organization? 9.2/10

Eisenhower Professional Development Participant Survey
Each participant was asked to complete an Eisenhower Professional Development Participant Survey (See the appendix for results.)
Summary of Selected Evaluation Questions:

Did the workshop increase your knowledge relative to the topic(s) presented?
1 - Somewhat, 3- Moderately, 18 Very Well
Did the workshop increase your skills relative to the topic(s) presented?
5- Moderately, 17 Very Well

Participant Lessons
Participants developed lessons to use in their classrooms and were required to hold a professional development session in their home schools. Please see www.blueribbon.ws for participant lesson plans which will be available by February, 2003.

All of the evaluation instruments indicated that the teachers were very pleased with the institute, the consultants, and the content.

Appendixes
Group Photo
Room Announcement
Flyer and Application form
Workshop Correspondence, Selected Course Materials
Pre/Post Test
Course Evaluations
Key Curriculum Press Evaluations
Eisenhower Professional Development Participant Survey
Eisenhower Professional Development Project Directors Survey
Journals