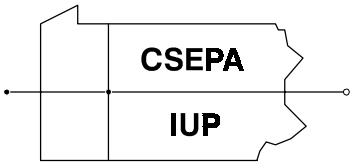
Quantitative Literature

March 2000
Number 17



Center for Statistics Education in PA at IUP

In This Issue

From the Director: Jack Shepler

Retirement this July is very much a part of my thinking at this time. During Summer I, I will be teaching my last statistics classes, one of which is an introductory graduate level course that is very much influenced by the QL approach. If any of you would like to take it or know someone who could benefit from such an experience (one who is going to teach a high school course in stats or the AP stats or a person who would like to take such a course). I will have graduate students from various disciplines -- but enough of that.

I am very excited about the team of people led by Larry Feldman who will be leading the QL effort in PA into the 21st century. Larry has been our most original thinker from the very beginning. The idea of having a K-12 workshop was his. The creation of the K-6 elementary workshop, ways to do the multidisciplinary work, assessment ideas, updates to the activity "Hog", and major writing of the hardest section of our grant proposals are some of his work. If Larry had not spearheaded the Data Driven proposal, and provided major leadership of this effort you would not be receiving this newsletter. He is joined by a very

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From the Assistant Director: Larry Feldman

We continue to be amazed at the outstanding activities that previous SEQuaL participants have done with their students since 1992. Everyone involved with SEQuaL should be proud of the fact that Pennsylvania is perhaps the national leader in K-12 statewide quantitative literacy initiatives. We are also one of the first three states in the nation to begin "data-driven" workshops statewide. So far, over 600 teachers and many thousands of students have been affected by SEQuaL's hands-on activity-based activities that teach rigorous content (that's a mouthful!).

We need the help of all of you that are reading this newsletter. The next round of SEQuaL workshops is beginning this May for one day and continuing for one week in the summer, one day in the fall, with the wrap-up next spring. Any help you can give us in recruiting is appreciated. If you have been through a SEQuaL workshop, you know how much it can mean to Pennsylvania students. Talk to your friends and colleagues and encourage them to call for an application. If you haven't taken the Data-Driven workshop yet, please consider it.

The Data-Driven Workshop (for grades 6 - 12 math teachers) will be offered for the second time at IUP. It will be taught be one of the authors of the Dale Seymour Data-Driven Mathematics series, Henry Kranendonk, and by some of SEQuaL's very best secondary teachers who went through last year's workshop. If you teach math in grades 6 -12, please apply. Previous experience with SEQuaL is not a prerequisite. At the pre-session we will have activities for SEQuaL veterans and first-timers.

This workshop will give you many ideas for teaching algebra, pre-algebra, and geometry using real data. Too often we find ourselves teaching a mathematical topic just because it's the next section in the book, with no connection to anything outside of class. Data-driven lessons must include real data.

We are also continuing K-12 workshops for the ninth year, this time at three sites throughout Pennsylvania - Manheim Township (near Lancaster), Edinboro University, and in Northeastern PA. They will be modified this year to begin the connection to the Data-Driven approach. These workshops give participants many ideas on how to integrate probability and statistics concepts in your everyday teaching.

Perhaps the best part of these workshops is the ability to work with other teachers on fun and meaningful activities for your students. We hope that SEQuaL has proved that "statistics is not sadistics".

You're invited:

SEQuaL Meeting at PCTM

Harrisburg Room, Holiday Inn

Thursday, March 23, 3:30 - 5:00 PM

Refreshments □Latest info on workshops □SEQuaL friends

Continued from page 1
enthusiastic mathematician and our financial guru, Francisco Alarcón, who has been a part of various NSF grant activities in our department and presently serves as the President of our University Senate. Fred Morgan, who was my right arm man for many years, is directing our QL workshop in the Wilkes-Barre area and plans to become more active in SEQuaL. Keeping the team focused is our Program Coordinator, Isabella Wiggins, who is doing a great job.

My hope and prayer for you and the team at IUP is that you continue to share the QL approach to mathematics and spread the word that the math and science curriculum is much more exciting when one uses the data driven approach.

Upcoming Dates . . .

March 24	SEQuaL Meeting PCTM Harrisburg 3:30 - 5:00 Holiday Inn
April 1	IUP Data-Driven Final Session and Manheim SEQuaL Final Session
April 5	MAAQL Meeting Rustic Lodge, Indiana
April 8	Mansfield SEQuaL Final Session
April 29	Clarion SEQuaL Final Session
May	Pre-sessions for 2000-2001 Workshops

SEQuaL Cited for Best Practice in Staff Development

SEQuaL has been identified as a "Best Practice in Staff Development" by the Pennsylvania Department of Education. Our project, along with 11 other programs recognized as making a difference in Pennsylvania education, is cited on the PDE website at www.pde.psu.edu/staffdevelopment/staffdev.html.

TIMSS at MAAQL

Marcia Seeley will speak at the spring dinner meeting of the Mathematics Academic Alliance for Quantitative Literacy (MAAQL) on Wednesday, April 5. Her presentation will focus on the Third International Mathematics and Science Study (TIMSS) and its implications for the math curriculum. Marcia is an educational consultant in the Pittsburgh area and often works with the Regional Math Science Collaborative in Pittsburgh.

The dinner meeting will be held at the Rustic Lodge in Indiana, PA. The presentation will begin at 5 p.m. and dinner will follow.

If your district is part of ARIN IU 28, please make a reservation through the district superintendent's office by March 31. If your district is outside of ARIN IU 28 or you wish to attend independently, please call Debbie Gurcsik at ARIN IU 28 at 724-463-5300 by March 31. The cost of the dinner is $20.00 per person.

Note from the editor: Please check the address on the mailing label for accuracy. Notify us if we need to change our records. Thank you.

Summer 2000 Workshops

K-12 Quanitative Literacy Workshop

Quantitative Literacy (QL) has proven to be an exciting, standards-based approach to teaching statistical techniques in the K-12 classroom. Through stimulating and practical activities, participants in this workshop will explore real data focusing on classifying, graphing, sampling, probability, and simulation. This direct involvement and in-depth training will enable teachers to experience first-hand the value of QL and gain confidence in their ability to incorporate it into their classrooms.

Features:

- *Specific ways to implement the probability and statistics strands of the PA Standards and the NCTM Standards*
- *Discussions on how to integrate QL concepts with technology and the curriculum*
- *Collecting, organizing, and interpreting real data of interest to the participants*
- *Participating in and designing age-appropriate activities for classroom use*

Data-Driven Approach to Teaching Middle and Secondary Math

This workshop focuses on integrating data collection and data analysis into pre-algebra, algebra, and geometry. The essence of the data-driven approach is using data gathering activities and analysis to provide meaningful and motivating settings for teaching mathematical concepts. Modules from the Data Driven Mathematics series (Dale Seymour Publications) are used.

Features:

- *Use of real data and statistics to motivate traditional mathematics topics*
- *Specific ways to implement the PA Standards and the NCTM Standards in mathematics*
- *Collecting, organizing, and interpreting real data of interest to the participants*
- *Participating in and designing age-appropriate activities for classroom use*
- *Usage of technology such as CBRs, graphing calculators, and software*

- Three graduate credits from IUP will be available to workshop participants (free tuition, nominal fees)
- Free instructional materials and graphing calculator
- Free room and board during the summer session for non-local participants
- $200 stipend (IUP site only)

For additional information on any workshop, call the director listed below or Isabella Wiggins, Program Coordinator, at 724-357-6239 or iwiggins@grove.iup.edu. Visit www.ma.iup.edu/projects/SEQual/ for information. **Applications appear on page 7.**

Site	Course	Dates (*All sites include a pre-session day, summer session, a Fall 2000 post-session day, and a Spring 2001 final session.*)		Director(s)
		Pre-session	Summer Session	
Edinboro Univ. of PA	K-12 QL Workshop	May 20	July 23 - 28	Patti Flach 814-732-2267
Manheim Township	K-12 QL Workshop	May 6	July 9 - 14	Jim Bohan 717-569-8231
Northeastern PA	K-12 QL Workshop	May 19	June 25 - 30	Fred Morgan 724-357-4765
Indiana Univ. of PA	Data-Driven Approach	May 11	June 18 - 23	Larry Feldman 724-357-4767 Francisco Alarcón 724-357-2206

Bungie Barbie

By John C. Uccellini

Take several Barbie dolls, several packages of rubber bands, tape measures and tape and students in Algebra through Calculus classes, put them together and what do you get? The answer is an exciting SEQuaL Data-Driven activity that captures the interest of students of all ability levels. The activity is entitled Bungie Barbie and it was first introduced to me at the 1999 PCTM convention at a workshop presented by Jim Rubillo, who teaches at Bucks Community College.

The basic premise of Bungie Barbie is to have students collect data on the distance a Barbie doll will fall when a bungie cord made up of inter-linked rubber bands is used for a bungie cord. Use 1 rubber band wrapped around Barbie's ankles and then between her legs as an anchor to which the bungie cord is fastened. Students start with one rubber band as the bungie cord, attach this to the anchor cord and then measure the maximum length of Barbie's fall and record this value. They repeat this procedure adding another rubber band until Barbie's head hits the floor. I had seven stations set up with two tape measures taped one to another on the wall so that the overall length was 72 inches. Students worked in small groups collecting their data. After the data was collected, the students were directed to graph the data and to come up with a mathematical model that best fit the data.

I initially used this data-driven activity with my first year algebra students as the end of the chapter activity on the chapter dealing with linear equations. As you can surmise, the data is linear in nature. After having them draw a line of best fit, I directed them to use the techniques that they had learned in class to write the linear equation of their best-fit line. Following this, I asked them to determine the number of rubber bands necessary for Barbie to make a jump from a height 200 inches without hitting her head on the ground. To make this activity more appropriate for my upper level students I included a suggestion from Paul Simpson, a SEQuaL/ Data-Driven workshop participant and mathematics teacher from the Blairsville/Saltsburg School District. Paul has his upper level students find several different regression equations using their graphing calculators and then compute the residual values (Residual Value = Actual Value - Regression Equation Value). By analyzing the graph of the residual values for each regression model used, a determination can be made as to which regression equation provides the best fit for the given data.

To heighten my student's interest in the Bungie Barbie activity I offered bonus points to each class for successfully giving Barbie the greatest thrill possible while taking Barbie bungie jumping from an undisclosed location of unknown height. Students were given two tries to get Barbie closest to the ground without hitting her head. If Barbie hit her head on any jump, the group was disqualified from the competition. The group that gave Barbie the biggest thrill (the longest jump) without killing her (hitting her head on the ground) won the bonus points. This activity provided the students the opportunity to test their models and their ability to estimate heights.

I have included a copy of my student directions for Bungie Barbie and Paul Simpson's data collection sheet for your use. Jim Rubillo can be contacted by email at RubilloJ@Bucks.edu for a copy of his directions for this activity. A good source for Barbie dolls is any Goodwill Store or Salvation Army Thrift Store and I would recommend that Barbie be appropriately dressed for bungie jumping, that is, no dresses or loose tops.

I hope you will try this activity. I think that your students will discover as mine did that playing with Barbies in math class can be a lot of fun and a good learning experience as well.

Dr. John C. Uccellini, a math teacher at Indiana Area High School, has been associated with SEQuaL since 1992 in various capacities. He will be one of the instructors of the Data-Driven Workshop for 2000-2001.

Bungie Barbie

The object of this activity is take Barbie bungie jumping and provide her with the greatest thrill possible without endangering her life. To prepare to take Barbie bungie jumping you will first work in a group collecting practice jump data on the distance Barbie (or Ken) will fall when she bungie jumps using a bungie chord made out of rubber bands. Your goal is to determine the number of rubber bands necessary to make a bungie chord long enough to allow Barbie to bungie jump from a platform of an unknown height and get her as close to the ground as possible without her hitting her head. Your group will not have prior knowledge of the jump site. You must make your best determination of the number of rubber bands that will be required based on your analysis of the practice jump data that your group collected and analyzed and an estimation of the height of the platform. You will be graded on the thoroughness of your group's completion of the requirements below. Also, you and your group will have the opportunity to compete for 5 bonus points by having Barbie make the longest jump without hitting her head on the ground.

Directions:

1. Each group will be provided with a Barbie doll, a bag of rubber bands, tape measures and a data collection sheet.
2. Collect as much data as you can in the time provided on the length of Barbie's bungie jumps as you vary the number of rubber bands in the bungie chord.
3. Record your data on the data collection sheet provided.
4. Construct a graph of the data collected.
5. Develop a mathematical model that best represents the jump data and that can be used to determine how many rubber bands it would take to give Barbie a safe but thrilling jump from a platform of a given height.
6. Write a paragraph summarizing the process that you used to develop your mathematical model. Be sure to address the factors that influenced the model that you developed.

Grading:

Students will be graded as a group. Your group grade will be based on your group's successful completion of steps 1-6 in the directions. To receive full credit your group must turn in a completed data collection sheet, graph of the data and a typed copy of #6 above. The maximum grade is 20 points. The group grade will be lowered by 5 points per day for every day the write-up is turned in late.

Bonus:

Students in Periods 1 and 6, 2 and 7, and Period 8 will compete for 5 bonus points. Each class will be taken to a location with a high drop point. Each group must determine the correct number of rubber bands to allow Barbie to get closer to the ground than any other group. Any group may have a second chance to allow Barbie to re-jump. However, if Barbie's head touches the ground on the first or second jump, she is dead and that group is disqualified from the competition.

BUNGIE BARBIE WORKSHEET

Trial Jump Number	Number of Rubber Bands	Length of Jump
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____
5	_____	_____
6	_____	_____
7	_____	_____
8	_____	_____
9	_____	_____
10	_____	_____

Graph of Data

Mathematical Regression Model Chosen: _____

Number of Rubber Bands for 200 inch Jump: _____

Application for: **SEQuaL K-12 Workshop** (Refer to page 3)

Site: ❑ Edinboro ❑ Manheim Township ❑ Northeastern PA, in the Wilkes-Barre area

Level: ❑ Elementary (K-6) ❑ Secondary Math/Science (7-12)

Name _____

Building_____

District_____

Home address_____

Phone (School)_____(Home)_____

Email _____

In order that the presenters can better meet your needs, please answer the following:

I teach: ❑Elementary ❑Middle ❑ Junior High ❑ Senior High

Please list the subjects that you teach:

_____

Have you had any experiences teaching statistics?

❑Yes ❑No If yes, please list_____

I will be able to teach lessons on probability and/or statistics in the next school year. ❑Yes ❑No

If accepted, your district superintendent or principal must endorse your participation in this workshop prior to the summer session.

Send to: Isabella Wiggins
Stright Hall 211
210 S. Tenth Street
Indiana, PA 15705

Application for: **Data-Driven Workshop** (Refer to page 3)

Name _____

Building_____

District_____

Home address_____

Phone
(School)_____(Home)_____

Email _____

In order that the presenters can better meet your needs, please answer the following:

I teach grades _____

and courses _____

Have you had any experiences teaching statistics?

❑Yes ❑No If yes, please list_____

What is your level of expertise with the TI-83 graphing calculator?

❑Very little, but willing to learn ❑Moderate ❑Advanced

I will be able to teach a data-driven unit in my mathematics class in the next school year. ❑Yes ❑No

If accepted, your district superintendent or principal must endorse your participation in this workshop prior to the summer session.

Send to: Isabella Wiggins
Stright Hall 211
210 S. Tenth Street
Indiana, PA 15705

Indiana University of Pennsylvania

Center for Statistics Education in PA
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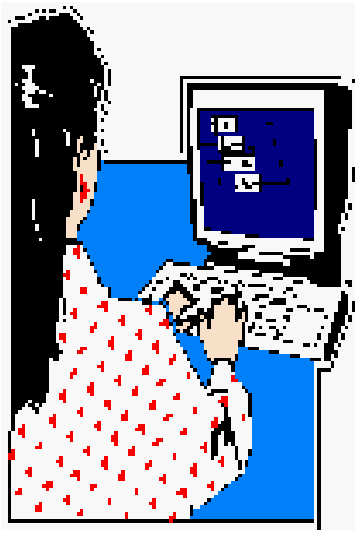

SEQuaL at PCTM

Thursday, March 23

3:30 - 5:00 p.m.

Harrisburg Room, Holiday Inn

BRING A FRIEND…REFRESHMENTS…SEE YOU THERE

Please send articles for this newsletter or comments to the Editor: Isabella Wiggins, Stright Hall Room 211, 210 South Tenth Street, Indiana, PA 15705-1087. Ph: 724-357-6239 or FAX 724-357-2616. Internet: iwiggins@grove.iup.edu. This newsletter is published through the Center for Statistics Education in PA at IUP. **Director:** Jack Shepler; **Assistant Director:** Larry Feldman; **Budget Coordinator:** Francisco Alarcón; **Program Coordinator:** Isabella Wiggins; **Site Directors:** James Bohan, Elaine Carbone, Patricia Flach, Fred Morgan, Jean Werner; **Program Development Specialists:** Larry Feldman, Barbara Lamberski, John Uccellini; **University Teaching Faculty:** Ann Massey, Fred Morgan, Caryn Pugliese, Glenn Rock, Allan Rossman, Bernie Schroeder, Tom Short; **K-12 Teaching Faculty:** Brenda Ashanti, John Aufman, James Bogaczyk, Linda Brecht, Chris Bruening-sen, Lorrie Bucklen, Glen Butters, John Costango, Marlene Davis, Renetta Deremer, Charles Fleming, Arlene Gaudioso, Phyllis Howard, Wes Hunkler, Barbara Kaufman, Peggy Lunardini, Jill Mackey, Michael McBride, Rita McMinn, Gary Merrick, Mary Lou Metz, Joseph Monteleone, James Preston, Anita Smith, Carol Tanweer, Jennifer Traynor, Mark Zilinskas.