The Editor's Corner

Welcome to Issue 80 of the *Statistics Teacher Network*. I hope you enjoy this special anniversary issue. It contains seven articles that span the entire 30-year publication life of *STN*.

The first issue of *STN* appeared in September 1982 under the editorship of Ann Watkins. For the 30th anniversary issue, the committee directed me to ask each past editor to reflect on the issues published under his or her tenure. Every attempt was made to contact each editor, but as one might expect, not everyone was available to contribute. The current associate editors have each written an article when the original editor wasn't available. The first article is an overview of the history of *STN* written by me.

As you take a read down memory lane, please let me know if you find these articles interesting. As always, I'm interested in hearing from you with ideas for improving *STN*, suggestions for articles, new teaching techniques, and/or upcoming events relevant to our cause. Please email me directly at *rpierce@bsu.edu*.

Best regards,

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Articles

STN: Thirty Years and Counting

By Rebecca Pierce, Ball State University

This 30th anniversary issue of the *Statistics Teacher Network* (*STN*) marks an important milestone for those interested in furthering statistics education. Dedicated educators and statisticians have been instrumental in seeing that *STN* provides an avenue for K–12 teachers to learn about current events, new publications, and classroom-tested activities written by practitioners.

STN was one of the initial responsibilities of the ASA/NCTM Joint Committee on Curriculum in Statistics and Probability for grades K–12. The committee was created in 1967 by the American Statistical Association and National Council of Teachers of Mathematics. Today, the committee consists of seven members: three appointed by the ASA, three by NCTM, and one ASA staff person. The members of the committee are still dedicated to furthering statistics education and have expanded their focus to include peer-reviewed lesson plans.

The ASA/NCTM Joint Committee was initially given the following four responsibilities:

1. To support a newsletter, *Statistics Teacher Network*, for communication with pre-college teachers

2. To assist in securing funding to support curriculum efforts for pre-college programs

3. To develop strategies to promote statistics and probability in the pre-college classroom

4. To provide leadership for the inclusion of statistics and probability in assessment and curriculum efforts

The first issue of *STN* appeared in September 1982. *STN* was established as and remains a free publication whose purpose is to keep grades K–12 teachers informed of statistical workshops; programs; and reviews of books, software, and calculators. In addition, articles are included that describe statistical activities that have been successful in the classroom. Contributors continue to come from all levels of statistical expertise. The editor is responsible for collecting all appropriate information to be printed.

There have been six past editors of *STN*. They include Ann Watkins for issues 1–9, from 1982 to 1985; Beth Bryan for issues 10–18, from 1985 to 1988; Jack Kinney for issues 19–30, from 1988 to 1992; Jerry Moreno for issues 31–62, from 1992 to 2003; Beth Lazerick and Murray Siegel for issues 63–71, from 2004 to 2007. For issues 72–78 from 2008 to 2011, Derek Webb was editor and was assisted by three associate editors: Larry Peterson, Rebecca Pierce, and Angie Walmsley. During this time, the format of *STN* changed from hard copy to electronic.

For the 30th anniversary issue, the ASA/NCTM Joint Committee directed current editor, Rebecca Pierce, to ask each past editor to reflect on the issues published under his or her tenure. Every attempt was made to contact each editor. but as one might expect. not everyone was available to contribute. However, in keeping with the request of the committee, past editors who were available and the current associate editors have each written an article that covers one of the six time periods.

As you read these articles, you'll find interesting themes that have been pervasive throughout the history of *STN*. You'll discover that some concerns are still being discussed and debated, but also that some ideas are just as applicable today as they were years ago. Since 1982, *STN* has provided a wealth of timely information. Even though the availability of information has changed dramatically with the web, the committee believes *STN* can continue to be a valuable resource to K–12 teachers.

Keep in mind that you can easily locate the original articles using the search option on the website. Searches are possible by author last name or title. Articles also can be sorted by author last name, in chronological order, or by title for four grade bands: level A (most appropriate for K–grade 5), level B (most appropriate for grades 6–8, level C (most appropriate for grades 9–12), and all grade levels.

Franklin, Gould Talk K–12 Stats Ed On Google+

ASA members Christine Franklin and Rob Gould were featured guests during a Google+ Policy by the Numbers Hangout on Air talk about K–12 statistics education. They addressed the value of statistical literacy, the increasing interest among students, preparing teachers for teaching statistics, and the importance of teaching students using real data sets. Visit *http://policybythenumbers.blogspot. com/2012/11/data-hangout-on-air-4-statistical.html* to watch this informative session.
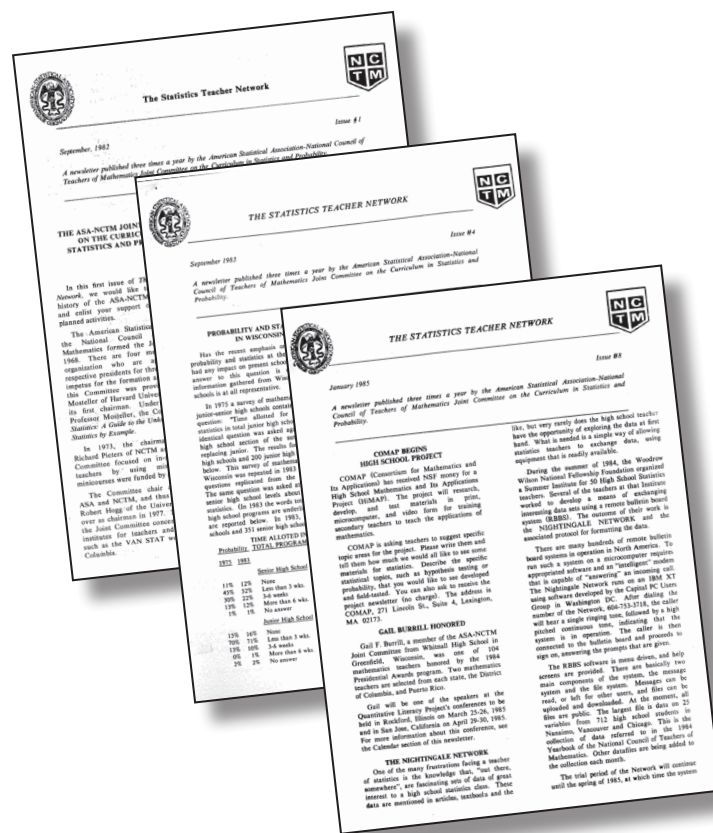
The Early Years: 1982–1985

By Jessica Cohen, Western Washington University

The inaugural issue of the *Statistics Teacher Network* was published in September 1982 with a focus on disseminating information about statistics education to statistics teachers and statistics teacher educators. The first editor was Ann Watkins, currently at California State University, Northridge. Over the succeeding three years, most of the articles published briefly addressed news of relevance to the statistics education community, including announcements and summaries of conferences, workshops, funding opportunities and awards, and competitions. While the modern incarnation of the newsletter incorporates updates on news of interest to the statistics education community, it also includes more in-depth articles focused on activities and research in statistics education.

An article of particular interest and relevance from the first three years appeared in the fifth issue of *STN* in December 1983, "Why Offer a High School Statistics Course?" In this article, Jim Swift responds to requests from high-school teachers to help craft arguments that could convince administrators of the value of incorporating a statistics course into the curriculum. Swift suggests that (1) statistics courses are an important alternative for students who might stop taking math out of lack of interest, (2) statistics is an important component of computer literacy, (3) statistics is the mathematical content most frequently used in the media, (4) statistics appears in other subjects, and (5) statistics is a career choice in itself (Swift, 1983). The timelessness of these arguments is striking, as is the ongoing need to argue on behalf of statistics education. Certainly, significant strides have been made in integrating statistics into school curriculum, but a quick search reveals that educators are still arguing on behalf of statistics education, and that, while the arguments have evolved over time, Swift's points are still a part of the modern arguments.

Many groups and individuals acted to promote the value of statistics education in the intervening years, but the National Council of Teachers of Mathematics (NCTM) *Curriculum and Evaluation Standards for School Mathematics* (NCTM, 1989) had substantial influence on the perception of the importance of statistics by including data analysis and probability as one of the five content strands. This position was further emphasized in NCTM's *Principles and Standards for School Mathematics* (NCTM, 2000), which influenced curriculum development and adoption nationwide. In both seminal documents, the NCTM included statistics, in the data analysis and probability strand, as a part of the K–12 curriculum at every grade level, extending beyond the 1983 *STN* arguments for incorporation at the high-school level.

Since the NCTM's recommendations, several other groups have furthered the call for statistics as an integral part of K–12 curriculum. This includes the *College Board Standards for College Success: Mathematics and Statistics*, which include data and variation as a part of the essential knowledge to be developed for college readiness (College Board, 2006). The National Assessment of Education Progress (NAGB, 2004)

includes data analysis and probability in a prominent role. The *Guidelines for Assessment and Instruction in Statistics Education (GAISE) Report: A Pre-K–12 Curriculum Framework* (Franklin et al, 2007) set forth detailed, research-based recommendations for what statistics should be included in the K–12 curriculum, with an emphasis on building statistical literacy. The GAISE report argues the importance of incorporating statistics in K–12 education, echoing several of Swift's arguments. It suggests that understanding statistics is critical for evaluating information presented in the media and important for advancing in careers, particularly those in science (Franklin et al, 2007), echoing Swift's third and fourth points and connecting to Swift's second point.

Moreover, the Advanced Placement course in statistics has had a substantial effect on statistics education at both secondary and post-secondary levels. For many administrators, arguments in favor of developing high-school statistics courses become unnecessary when the position is validated by the AP board and leads to college credits. As more students enrolled in AP Statistics courses, universities witnessed enrollment in undergraduate statistics courses increase by 45% from 1990 to 2000 (Lindsay et al, 2004).

Of course, the increased value placed on statistics education and the more frequent appearance of statistics courses and topics in the K–12 curriculum is not due entirely to national

professional organizations, commissioned reports, and testing organizations. It should not be overlooked that many individuals worked tirelessly to promote statistics education, fighting to incorporate it into their own schools and universities; building and sharing bodies of meaningful teaching materials; speaking at international, national, and regional conferences in favor of statistics education; and building communication networks. The earliest years of *STN* reveal some of these contributions, as individuals began to share effective activities and ask for help to address teaching challenges.

Even with decades of support for statistics education, there are still important arguments being made. With the recent adoption of the Common Core State Standards in Mathematics (CCSSM) by 45 states, the role of statistics in K–12 education is being rearticulated (National Governors' Association, 2010). Statistics does not appear in the CCSSM until grade 6, a departure from previous recommendations. The CCSSM emphasis on *focus* and *coherence* has required a step away from the "mile wide, inch deep" approach of previous state standards, and the paring down of early statistics topics is part of this emphasis. During his tenure as NCTM president, Mike Shaughnessy expressed his concern over this position, noting its departure from NCTM standards, the GAISE recommendations, and the standards implemented in many other countries. Shaughnessy cited the importance of statistical literacy in our information-heavy world, connecting to Swift's third point (Shaughnessy, 2010).

Perhaps a mark of how far statistics education has come since Swift's 1983 article is the recent argument suggesting that calculus may not need to be the ultimate goal for college-bound students. Shaughnessy (Shaughnessy, 2011) suggested that perhaps one of these alternate pathways to college readiness could emphasize statistical literacy, preparing students for decisionmaking and careers in modern life, but also addressing the disinterest and disengagement created for many students through the traditional, algebra-heavy pathway. Mathematician Arthur Benjamin echoed these points, suggesting in his TED talk that statistics should precede calculus in the curriculum, as statistics is far more applicable to the daily lives of most students and significantly more engaging for many (Benjamin, 2009). This discussion is a long way from convincing administrators that statistics is a worthy topic for a high-school course, but the arguments are still the same as those Swift suggested in 1983.

Much has changed in statistics education, and the idea of arguing for the importance of a high-school course in statistics is no longer relevant to most *STN* readers. However, we can still view the state of statistics education through the lens of Swift's points in favor of high-school statistics. As we consider statistics education in the early grades or paths of study for high school, questions about student engagement, connections to other subjects, statistical literacy, and career preparation are still relevant and meaningful foundations for arguments in favor of statistics playing an important role in the curriculum.

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Mathematics of Planet Earth Competition for an Open Source Exhibition of Virtual Modules

This competition is part of the world initiative Mathematics of Planet Earth 2013 (*http://mpe2013.org*). The modules could be reproduced and used by institutions around the world, from science museums to schools. The exhibition will have a virtual part, as well as instructions to realize material parts. The competition will be open until May 15. Prize winners will be selected by an international jury nominated by MPE2013 and announced in August. The winning modules will occupy a prominent place on the website of the exhibition. Moreover, it is planned to show the modules of the overall winners in exhibitions and museums.

Active Learning of Statistics: How Far Have We Come?

By David Thiel, Clark County School District, Las Vegas, NV

The three-year period from mid-1985 to mid-1988 was one of transition for me. I had just completed student teaching, started a master's degree, and landed my first teaching position in Las Vegas. So, it was with a bit of nostalgia and a measure of curiosity that I began my review of the *Statistics Teacher Network* (*STN*) newsletters. I had not read those issues, having only learned of *STN* in the late 90s. It would be intriguing to learn what was happening in the world of statistics education when I cut my teeth in the classroom a quarter-century ago.
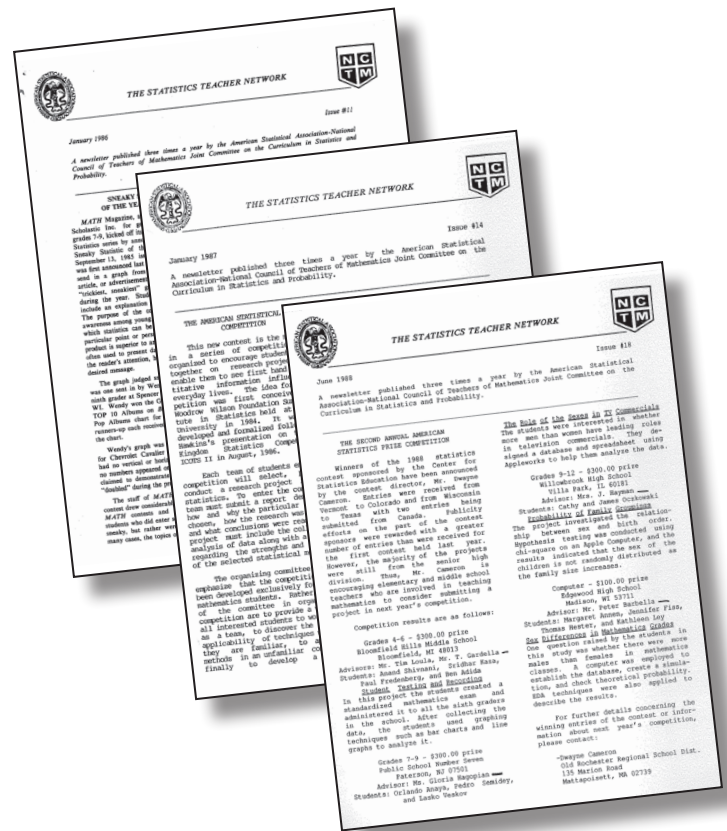
As I progressed through the *STN* newsletters from September 1985 to June 1988 under the editorship of Beth Bryan, there were many articles that resonated with me. There were descriptions of the Woodrow Wilson Institutes, innovative textbooks and resource materials, the *Quantitative Literacy Project*, a draft of the NCTM Standards, and the first ASA Statistics Prize Competition. Among the articles, a major theme seemed to permeate: building quantitative literacy through active learning. But was there one timeless article that wrapped up the three-year period in a nice little package? It came in the June 1988 issue: "Guidelines for Teaching Statistics," by Richard Scheaffer.

The article presented a draft framework for teaching statistics in the K–12 curriculum from the advisory committee for the second Quantitative Literacy Project. The 10 principles for teaching statistics in the framework were as follows:

1. Learning should be active, not passive, focused on asking questions about something in the students' environment and finding quantitative ways to answer the questions.

2. Problems should be approached in more than one way, with an emphasis on discussion and evaluation of the different methods.

3. Real data should be used whenever possible in any statistics lesson.

4. Traditional topics in statistics should not be taught until students have experienced and worked with simple counting and graphing techniques and have established a foundation for those traditional ideas.

5. The emphasis in teaching statistics should be on good examples and building intuition, not on probability paradoxes or using statistics to deceive.

6. Topics should be presented in ways designed to give students hands-on experience in working with data.

7. Student projects should be an integral part of all statistics work.

8. The emphasis in all work with statistics should be on the analysis and the communication of this analysis, not on a single answer.

9. Statistics should not be taught as a separate unit. Rather, it should be introduced whenever appropriate to illustrate and expand upon standard concepts and to form interdisciplinary links for students.

10. The progression should be from the concrete to the pictorial to the abstract.

To me, these are timeless truths. For too long, statistics was taught in a teacher-centered, skill-based, and computation-heavy way. Data were presented without context or were contrived. Students saw data analysis as just another abstract set of skills in their recipe card file. Projects were done rarely, if at all, and very little instruction was done at a concrete level.

Directly or indirectly, these guidelines helped teachers, including me, create classrooms of active learning. Publishers adapted to produce materials that engage students and use real data, focusing less on plugging numbers into formulas. Curricula changed to reflect the necessity of making connections among statistical topics, other disciplines, and the real world.

Technology was one item that seemed to be missing from the 1988 guidelines. The first graphing calculators were still two years away, and those capable of doing meaningful statistics did not appear until 1996. There were some simple computer programs available—several reviews appear in *STN* from 1985 to 1988—but students and teachers had limited access to computers in the classroom.

In the quarter-century or so since these guidelines were first printed, the expectations for teaching statistics have evolved and continue to do so. NCTM published standards in 1989 and updated them in 2000. The College Board began offering statistics as an Advanced Placement course in 1996. The ASA produced the *Guidelines for Assessment and Instruction in Statistics Education (GAISE) Report* in 2007. All of these include elements of these original guidelines. Also, interactive and powerful software specifically designed for data exploration, like Tinkerplots and Fathom, is inexpensive. The web provides real data and interactive tools.

While the guidelines outlined by the Quantitative Literacy Project helped pave the way for reform in teaching statistics, change must continue. Many important principles are not present in university statistics classes, and prospective teachers do not receive a firm foundation in statistics and quantitative reasoning. Consequently, some teachers are ill-prepared to teach their students using active learning methods. Perhaps this is the challenge for the next quarter-century.

Sources

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We invite your school to join in an international collaboration among schools, colleges, societies, and other organizations around the globe to celebrate 2013 as the International Year of Statistics (*www.statistics2013.org*).

The purpose of this International Year of Statistics (Statistics2013) is to promote the importance of statistics through the combined energies of societies and organizations worldwide to the broader scientific community, business and government data users, the media, policymakers, employers, students, and the general public. As noted below, there is a specific emphasis on promoting the importance of statistics to young people.

The goals of Statistics2013 include:

- Increasing public awareness of the power and impact of statistics on all aspects of society

- Nurturing statistics as a profession, especially among young people

- Promoting creativity and development in the sciences of probability and statistics

To register your interest in participating, go to *www.statistics2013.org/iyos/join.cfm*. When you register, you will provide the name of a contact person who will serve as a liaison for your school. The liaison will help the International Year of Statistics Steering Committee know what kinds of activities you might be considering that relate to the goals of Statistics2013, and the steering committee will keep your liaison informed of activities being planned elsewhere.

There is no charge or obligation to register or participate in the International Year of Statistics.

There are numerous ways a school might participate: bringing in local experts to speak about statistics at the high school, entering statistics poster and project competitions, participating in the international Census at School classroom project, using information from the website in lessons, etc. The flyer available at *www.amstat.org/education/pdfs/EducationResources.pdf* describes additional free K–12 statistics education resources. We hope to build a network of schools that can share information about how such activities can help meet the objectives of the Common Core State Standards for Mathematics.

Thank you.

Ron Wasserstein, Executive Director, American Statistical Association

International Year of Statistics Steering Committee: Richard Emsley, University of Manchester; Adam Jakubowski, Nicolaus Copernicus University; Denise Lievesley, Kings College London; David Madigan, Columbia University; Vijay Nair, University of Michigan; Sastry Pantula, North Carolina State University; Ada van Krimpen, International Statistical Institute

A Look Back at the *Statistics Teacher Network* from December 1988 to May 1992

By Angela L.E. Walmsley, Northeastern University Seattle Graduate Campus

It is with great pleasure that I write about issues 19–30 of the *Statistics Teacher Network,* when "Jack" Kinney was editor. As this is the 30th anniversary of *STN*, Editor Rebecca Pierce has asked associate editors to take a look at the past and comment on issues and some outstanding articles that pertain to the present. I found a couple of interesting differences between the issues in this time frame (December 1988 to May 1992) compared to recent years. Obvious changes are the print to electronic version, the preliminary typewriter or word-processing text and lack of graphics compared to the advanced text and color graphics we have today, and the comments regarding technology.

However, I also noticed that the issues in this time frame contained fewer articles and, instead, focused more on current everyday information. Most issues included book reviews and textbook reviews, conferences, workshops, institutes, statistics contests, technology information, and short examples/articles. Issues today include featured articles much longer in length than the newsletters during this time frame.

It was like taking a trip through time as I read through the past issues. I could see the development of statistical computer software and graphing calculators as they were featured and analyzed in various articles. Since I attended high school and college during these years, I could relate to the introduction, functionality, and excitement as Casio promoted their graphing calculator and computer programming became the standard. While reading the articles, I felt a bit like I was reliving my own mathematics and statistical education and teacher training.

A few of the shorter articles caught my attention. I have chosen to concentrate on two articles in particular that were instrumental at the time and yet are still timely today. They are "Statistics and Probability in K–12 School Mathematics Received a Big Push from the NCTM *Standards for Curriculum and Evaluation in School Mathematics*" Part 1 in the October 1989 issue and Part 2—"The High School Expectations" in the February 1990 issue; both were written by Henry S. Kepner Jr. of the University of Wisconsin-Milwaukee (who, most notably, was the NCTM president from 2008–2010).

Again, walking back through time, I was reminded of the influence and importance of these first sets of mathematics standards issued by the National Council of Teachers of Mathematics. The first standards were published in 1989, and many would argue that this was the first publication that widely pushed for statistical literacy among all levels of all school children. Hence, these two articles in *STN* included some of the first information written about the standards relating to statistics.

Why did I choose these two articles? Both helped me remember the correct and close time line of events. *Everybody Counts: A Report to the Nation on the Future of Mathematics Education* was released in January 1989; the NCTM Standards were released in March 1989, and the first of these two articles was published in October 1989 in *STN*. So, in a short amount of time, the issue of statistical literacy (among other important mathematics topics) was brought to the forefront of America's thinking and understanding about the future of mathematics and statistics in this country.

While the standards promoted multiple important facets of mathematical education such as the importance of children being involved in doing mathematics, the use of calculators and computers in mathematics, and the use of mathematics as it relates to the real world, an important inclusion was the focus on probability and instruction.

The article in *STN* Issue 22 describes the call "for student involvement in statistical activities at all grade levels." The author also points out that the standards were one of the first to promote the understanding of data analysis *before* probability in educating students. The push for gathering, exploring, and

interpreting data teaches students to analyze critically, which is an important part of the educational process before probability is used.

The *STN* article then discussed the three important components as they relate to statistics: 1) problemsolving, 2) communication and reasoning, and 3) connections and a core curriculum. The author concludes that the natural aspect to connect statistics to other areas and everyday situations also promotes the use of problemsolving and communication and reasoning. The author also argues that, despite a student's ability to continue along a high-level mathematics curriculum, all students need statistical understanding. The remainder of the October 1989 article and February 1990 article surrounding the standards focuses on the three original grade bands of statistical development: K–4, 5–8, and 9–12.

The K–4 statistical standards focus on students being able to 1) collect, organize, and describe data; 2) construct, read, and interpret displays of data; 3) formulate and solve problems that involve collecting and analyzing data; and 4) explore concepts of chance.

The 5–8 statistical standards focus on students being able to 1) systematically collect, organize, and describe data; 2) construct, read, and interpret tables, charts, and graphs; 3) make inferences and convincing arguments based on data analysis; 4) evaluate arguments based on data analysis; and 5) develop an appreciation for statistical methods as powerful means for decisionmaking.

The 9–12 statistical standards focus on students being able to 1) construct and draw inferences from charts, tables, and graphs that summarize data from real-world situations; 2) use curve fitting to predict from data; 3) understand and apply measures of central tendency, variability, and correlation; 4) understand sampling and recognize its role in statistical claims; 5) design a statistical experiment to study a problem, conduct the experiment, and interpret and communicate the outcomes; 6) analyze the effects of data transformations on measures of central tendency and variability; and 7) transform data to aid in data interpretation and prediction and test hypotheses using appropriate stats (#7 for college-bound students only).

In addition, the author discussed specific probability standards for grades 5–8 and 9–12 in the second part of the article, published in the February 1990 issue.

The articles are timeless because the NCTM Standards was the first strong standard movement in the United States—a movement that has continued to current times. In addition, the article points out the movement toward promoting statistics and probability across all levels of education—a movement that continues today in America's classrooms. The author describes these first standards as the "strongest, most unified call for inclusion of statistics and probability concepts and applications in the entire K–12 mathematics curriculum." I agree that while these standards were the first, current standards ask us to do the same.

The author also emphasizes in the February 1990 Part 2 article that one of the focuses on the standards was to promote student engagement in their own understanding, rather than memorizing and applying formulas. He states, "Computational deficiencies of a high-school student *must not* be a screen to stop that person from exploring statistical concepts and uses!" This is a completely true statement today.

So, how might these points be relevant for today's classroom? As you know, the NCTM Standards were analyzed, critiqued, praised, and re-evaluated. A more current version, *Principles and Standards for School Mathematics*, was released in 2000. The author of the article in February 1990 even cautions readers that some early critics state this is a movement for "dumbing down" mathematics; he argues early on that it actually calls for more challenging mathematics. He also mentions that college professors may need to create a more challenging introductory statistics curriculum, since students will be coming to college with more statistical literacy than ever before.

As many states have developed their own mathematics state standards over time based on NCTM's publications, we see a movement to the Common Core State Standards by the majority of states. Hence, the connection between the NCTM *Principles and Standards for School Mathematics* and the Common Core State Standards should be made clear. (An interesting note is that the author of these *STN* articles, Henry Kepner Jr., was a member of the mathematics feedback group for the Common Core State Standards). Information regarding support for the Common Core State Standards from NCTM (and others) can be found at *http://www.nctm.org/standards/content.aspx?id=26088*.

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PROJECT-SET

Project-SET is a new NSF-funded project to develop curricular materials that enhance the ability of high-school teachers to foster students' statistical learning regarding sampling variability and regression. All materials will be geared toward helping high-school teachers implement the *Common Core State Standards* for statistics and are closely aligned with the learning goals outlined in the *Guidelines for Assessment and Instruction in Statistics Education: A Pre-K–12 Curriculum Framework (GAISE) Report*. Materials are available at *http://project-set.com*.
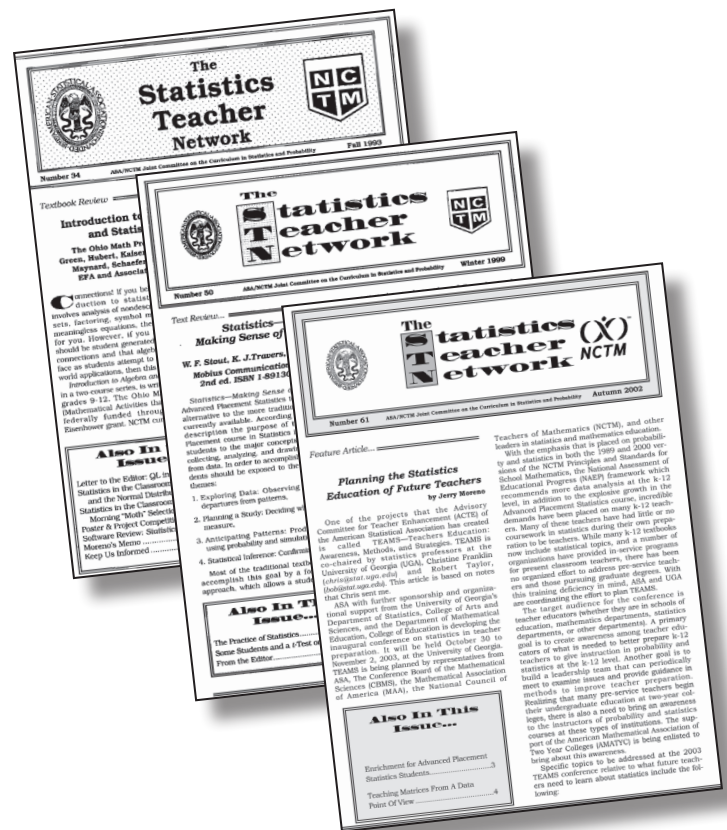
Reflections from a Veteran Editor: Creating a Statistically Literate Citizenry

By Jerry Moreno, John Carroll University

I was privileged to have been the editor of *STN* for 32 (31–62) issues from fall 1992 to winter 2003. It was an exciting time for statistics education as you recall that, in March of 1989, NCTM published its *Curriculum and Evaluation Standards for School Mathematics,* recommending statistics and probability be an integral part of a school's mathematics curriculum. Many of us were ecstatic as we had been trying for years with little success to open such doors. Teachers were in need to know how to implement statistics and probability into their classrooms, and *STN* tried to help with its Statistics in the Classroom articles. These articles continued throughout my tenure as NCTM, a decade later in 2000, reinforced the importance of statistics and probability in its *Principles and Standards for School Mathematics*.

All of the 50 or so Statistics in the Classroom articles are interesting and continue to be helpful to teachers. Some that come to mind are "Learning from Industry: Using Quality Control Techniques to Monitor and Motivate Student Progress" (31), whose author developed a 'grade control chart' that enabled students to become personally involved in their performance evaluation; "Sunday Morning 'Moth' Selection – an Exploratory Data Analysis Activity" (34), a neat biology activity that allows students to see easily the effect of camouflaging; "Estimating the Attendance at a Football Game" (40), a terrific real example of using the tag-and-recapture technique to estimate the attendance at the 1994 Clemson-Maryland football game; "Investigating Centers – 'Thinking Art'" (47), a creative set of data-driven activities in geometry; and "Teaching Probability to Young Children" (54, 55), a two-part series on exploring how to teach fourth graders that 'fairness' is not about behavior, but about probability concepts. Those are just a few of the useful best practices that helped teachers implement statistics into their classrooms. Two other informative issues entirely devoted to the ASA competitions for students were The American Statistics Project Competition (60) and the American Statistics Poster Competition (62).

Teachers also were presented with close to 50 reviews of textbooks, resource books, and software, as well as the review of a video series. As the Common Core State Standards in Statistics and Probability become reality, readers may find the *STN* reviews of resource publications interesting. Teachers can use such materials to help augment and enhance their Common Core classroom activities and data sources. This may even be true of some publications that had excellent review recommendations, e.g., *Data Analysis: An Introduction*, by Jeff Witmer (36); *The Cartoon Guide to Statistics,* by Gonick and Woollcott (36); *A Handbook of Small Data Sets,* by Hand et al (40, expensive but worthwhile); *Probability and Statistics,* by Alan Barson (43); and *Activity-Based Statistics,* by Scheaffer et al (44). There are five wonderful bedtime-reading books published by Marcel Dekker

in its Series of Popular Statistics (51). Several of these resource books might be found through Amazon.com or other new and used books sites.

The video series, Statistics: Decisions Through Data (32), consisted of 21 units, each 12–20 minutes, illustrating a real application of statistics designed for the high-school curriculum. Each episode uses documentary footage chosen to engage students' interest. The series is intended as an introductory statistics course designed to unravel the statistical arguments behind surveys, polls, experiments, and product claims. While some of the specifics may be a little outdated, each episode teaches skills to gather data, analyze patterns, and draw conclusions about real-world issues and could be used easily to supplement a current course. The series is still available as a set of DVDs from Comap at *http://www.comap.com*.
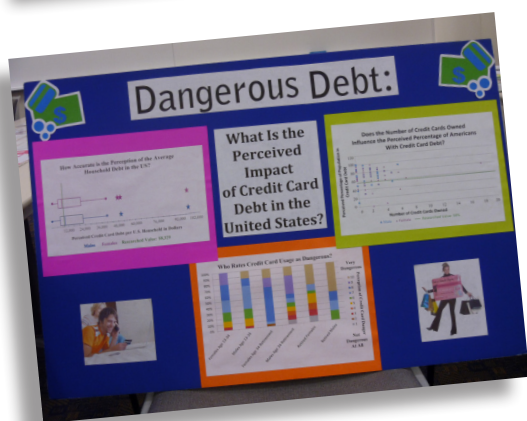
Almost all the textbooks reviewed are still available, although many have been updated and are in new editions. Textbooks included *Contemporary Precalculus Through Applications,* by NCSSM (32); *Introduction to Algebra and Statistics: The Ohio Math Project,* by Green et al (32); *Workshop Statistics: Discovery with Data,* by Allan Rossman (42); *Statistics and Data Analysis: An Introduction* (2nd ed.), by Andrew Siegel (42); *Seeing Through Statistics,* by Jessica Utts (43); *Statistics*

(3rd ed.), by Freedman et al (48); *The Practice of Statistics,* by Yates et al (50); *Interactive Statistics,* by Martha Aliaga and Brenda Gunderson (53); and *Introduction to Statistics and Data Analysis,* by Peck et al (57).

Finally, there are reviews of handbooks regarding the use of calculators, Minitab, and Fathom (46, 48, 54, 55, 56). Apologies to the writers of the many other articles and reviews not mentioned here.

I once again thank all the many contributors to *STN* who share my desire to create a statistically literate citizenry. It starts with you, the classroom teacher, to whom we are deeply indebted. In my 'farewell' *STN* issue as editor (62), I said "The present and future are very bright for statistics education." Indeed, they are even more so now with Common Core's standards in statistics and probability starting in earnest in the sixth grade. I am optimistic that the future will attain the quantitatively literate citizenry we continuously work toward creating.

Poster and Project Competitions

2013 Poster and Project Competitions

Introduce K–12 students to statistics through the annual poster and project competitions directed by the ASA/NCTM Joint Committee on Curriculum in Statistics and Probability. The competitions offer opportunities for students to formulate questions and collect, analyze, and draw conclusions from data. Winners will be recognized with plaques, cash prizes, certificates, and calculators, and their names will be published in *Amstat News*. Posters (grades K–12) are due every year on April 1. Projects (grades 7–12) are due on June 1. For more information, visit *www.amstat. org/education/posterprojects*.

ASA 2012 Poster and Project Winners Announced

The American Statistical Association is pleased to announce the winners of the 2012 poster and project competitions. The competitions offer opportunities for students to formulate questions and collect, analyze, and draw conclusions from data. Winners were recognized with plaques, cash prizes, certificates, and calculators, and their names were published in *Amstat News*. To view the winning posters and projects or for more information, visit *www. amstat.org/education/posterprojects*.

The Lazerick & Siegel Years: 2004–2007

By Murray Siegel, Arizona State University

I have been asked to reflect on my tenure as co-editor of *Statistics Teacher Network*. In looking back at what we accomplished, I believe the most significant contribution for the issues 63 to 71 was the article "The BYU Child and Family Studies Laboratory Program," by Scott Grimshaw, which appeared in fall 2004. The article details the statistical activities that occur as part of the Family Studies Laboratory Program (FSLP), which conducts pre-kindergarten classes for four-year-olds.

I became aware of the FSLP through a conference presentation by Scott and was immediately fascinated and intrigued. While my own dissertation research investigated the teaching of statistics techniques to fifth-, sixth-, and seventh-graders by having them conduct surveys and analyze the subsequent data, I had never envisioned the possibility of incorporating these types of activities into the preschool classroom. After the presentation, I spoke with Scott about writing an article on the FSLP for publication in the *Statistics Teacher Network*. My co-editor, Beth Lazerick, and I had both taught in the elementary grades and felt it was never too early in a child's education to lay the foundation for quantitative literacy. We were thus interested in including more activities for younger children in our issues of *STN* and decided to expand the number of articles specifically focused on the use of data and probability activities in the lower elementary grades. We were delighted when Scott agreed to detail some of the aspects of the FSLP.

One of the statistical activities, titled Question of the Day, involves having students answer a question, compare their answers with those of their classmates, and then investigate the frequency of the responses. The FSLP students also conducted surveys of Brigham Young University students on campus, gathered the data, tallied the results, and presented them in a bar graph. These activities, in addition to providing an introduction to data gathering and analysis, have been shown to enhance students' socialization skills (through peer teaching), improve reading comprehension, and develop their ability to form properly worded questions.

Since the publication of the article about the FSLP, many resources have been made available to elementary teachers that provide statistical activities for these grade levels. These resources are provided by various organizations, both domestic and international. Described below are several examples.

The NCTM, through its standards, has suggested the following objectives for students in pre-K through grade 2:

- Pose questions and gather data about themselves and their surroundings

- Sort and classify objects according to their attributes and organize data about the objects

- Represent data using concrete objects, pictures, and graphs

- Describe parts of the data and the set of data as a whole to determine what the data show

- Discuss events related to students' experiences as likely or unlikely

Furthermore, NCTM publishes *Navigating Through Data Analysis and Probability in Prekindergarten–Grade 2,* by Linda Jensen Sheffield, Mary Cavanagh, Linda Dacey, Carol R. Findell, Carole Greenes, and Marian Small. According to the abstract, "this book demonstrates how some fundamental ideas about data analysis and probability can be introduced to build a strong foundation in young students. Activities designed to introduce and promote familiarity with essential concepts develop and extend students' ideas about data analysis and simple probability through the use of bar graphs, tallies, frequency tables, and Venn diagrams. Helpful margin notes provide teaching tips, anticipated student responses to questions, samples of students' work, and ways to modify the activities for students experiencing difficulty or needing enrichment. The supplemental CD-ROM features interactive electronic activities, master copies of activity pages for students, and additional readings for teachers."

In Australia, the national curriculum recommends the following for students in kindergarten, answering yes/no questions to collect information. In first grade, students should identify outcomes of familiar events involving chance and describe

them using everyday language such as "will happen," "won't happen," or "might happen"; choose simple questions and gather responses; represent data with objects and drawings where one object or drawing represents one data value; and describe the displays. For second graders, the curriculum requires students to identify practical activities and everyday events that involve chance; describe outcomes as likely or unlikely and identify some events as certain or impossible; identify a question of interest based on one categorical variable and gather data relevant to the question; collect, check, and classify data; and create displays of data using lists and table and picture graphs and interpret them. In third grade, students should conduct chance experiments, identify and describe possible outcomes, and recognize variation in results; identify questions or issues for categorical variables; identify data sources and plan methods of data collection and recording; collect data, organize into categories, and create displays using lists, tables, picture graphs, and simple column graphs with and without the use of digital technologies; and interpret and compare data displays.

The National Security Agency (NSA) offers online activities for mathematics classes at various grade levels. Among these are data analysis activities for second grade. Take a look at *http://www.nsa.gov/academia/early_opportunities/math_edu_partnership/collected_learning/elementary/data_analysis.shtml*. At another website, *http://www.printable-math-worksheets.com/data-analysis-worksheets.html*, printable math worksheets are available. Among the worksheets are "Reading/making graphs" and "More or Less Likely?" for kindergarten and "Using tallies, tables and graphs" for first and second grades.

With all these resources available, the question is: Are primary grade teachers actually incorporating data analysis and probability activities into their classes? Since *STN* is highly interested in the promotion of statistical literacy, it is important that each of us do what we can to make primary teachers aware of the vast amounts of grade-level appropriate material available to develop the quantitative abilities of their students.

The Most Recent Issues

By Derek Webb, Bemidji State University

I am excited to write an article briefly discussing the content of *STN* during my tenure as editor. I became editor in the fall of 2007 and oversaw publication of issue 72, which was the first digital issue of *STN*. I stayed on through 2011, the publication of issue 78, and to welcome our current editor, Rebecca Pierce. The one word that comes to mind after looking back at the eight issues I oversaw is "change." There have been many changes in statistics education and in the publication of *STN*. Let's take a look.

Perhaps the largest change to *STN* was going to a digital format with Issue 72. This was a move carefully considered, and given the direction other publications were headed, timely. It allowed more flexibility with regard to article length, and we could publish in full color! We also posted all previous issues of *STN* on the website and created a search feature allowing readers to search all issues based on keyword or author.

The importance of statistics education has definitely grown over the last few years, as is evident by the enrollment in Advanced Placement Statistics classes growing more quickly than classes in any other AP area ("Why Do Students Take Advanced Placement Statistics?" by Monica Johnston and me in Issue 76).

The number of resources for teachers has also grown quickly, and *STN* has always strived to provide readers with previews of or access to these. Issue 74 provided readers with an excerpt from *Making Sense of Statistical Studies* by Roxy Peck, Daren Starnes, Henry Kranendonk, and June Morita. This is an excellent resource for teachers of non-AP high-school statistics courses. During my tenure, many other resources were published, including "In Depth Explorations of Data and Chance: Activities for Middle School Students," by Beth Lazerick (Issue 72); "Looking at Data," for middle school students, by Todd Frauenholtz (Issue 73); "Collecting, Depicting, and Understanding Data," for Pre-K–2 students, by Angela Walmsley (Issue 73); "Using Games and Game Shows to Teach Probability," for middle school students, by Sara Paul (Issue 74); and an article I wrote, "Statistics and Mathematics Through Data Collection and Graphical Display" for the second and third grades (Issue 77).

Over the past few years, there have been major developments in standards and pedagogy for K–12 teachers of statistics. Two examples are the publication of *Guidelines for Assessment in Statistics Education (GAISE): A Pre-K–12 Curriculum Framework* (2007) and the creation of a set of national standards called Common Core (*http://www.corestandards.org*). Anna Bargagliotti and I examined the impact of GAISE and Common Core on teaching statistics in the K–5 grades ("Elementary School Teachers: Teaching, Understanding, and Using Statistics" in Issue 78). Another article about standards and pedagogy, titled "Preparing Statistics Educators – Integrating Content, Standards, and Pedagogy," by Deborah Lurie, was published in Issue 77. This article looks at content, standards, and pedagogy from many angles, including American Statistical Association guidelines, GAISE, Common Core, American Mathematical Society, and the Mathematical Association of America.

Another area of great change in our classrooms is the number of students who are English language learners. According to the article "Supporting Learners of Varying Levels of English Proficiency," by Lawrence Lesser (Issue 77), one in 20 K–12 students was an English language learner in 1990, and now that ratio is one in nine. Reaching out to these students is critical, and Lawrence looks at how statistics can be effectively taught to students whose primary language is not English.

Finally, I want to remind our readers that *STN* routinely publishes information about opportunities in statistics education for both students and teachers such as the American Statistical Association's annual national poster competition (*http://www.amstat.org/education/posterprojects/index.cfm*) and the Meeting Within a Meeting Statistics Workshop for K–12 teachers, offered annually at the American Statistical Association Joint Statistical Meetings. In Issue 78, Jamis Perrett wrote "Student Poster Presentations: K–12," which gives good insight into poster creation and presentation.

In closing, I want to thank the readers of *STN* who have supported it through the years and the teachers who have taken the materials published in *STN* back to their classrooms. I believe statistics education will continue to grow in importance as statistical thinking and techniques are used more frequently. I hope you continue to turn to *STN* as a statistics education resource in the future.

MAKING SENSE OF STATISTICAL STUDIES

Finally, a statistics book that makes sense!

You're telling me! I understand everything.

Making Sense of Statistical Studies consists of student and teacher modules containing 15 hands-on investigations that provide students with valuable experience in designing and analyzing statistical studies. It is written for an upper middle-school or high-school audience having some background in exploratory data analysis and basic probability.

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CENS*US* at ☑SCHOOL

FREE international classroom project to engage students in statistical problemsolving

Teach statistical concepts, statistical problemsolving, measurement, graphing, and data analysis using your students' own data and data from their peers in the United States and other countries.

Complete a brief online survey (classroom census)

13 questions common to international students, plus additional U.S. questions

15–20-minute computer session

Analyze your class results

Use teacher password to gain immediate access to class data.

Formulate questions of interest that can be answered with Census at School data, collect/select appropriate data, analyze the data—including appropriate graphs and numerical summaries for the corresponding variables of interest—interpret the results, and make appropriate conclusions in context relating to the original questions.

Compare your class census with samples from the United States and other countries

Download a random sample of Census at School data from United States students.

Download a random sample of Census at School data from international students (Australia, Canada, New Zealand, South Africa, and the United Kingdom).

International lesson plans are available, along with instructional webinars and other free resources.

www.amstat.org/censusatschool

For more information about how you can get involved, email Rebecca Nichols at *rebecca@amstat.org*.

STatistics Education Web

Lesson Plans Available on Statistics Education Web for K–12 Teachers

Statistics Education Web (STEW) is an online resource for peer-reviewed lesson plans for K–12 teachers. The lesson plans identify both the statistical concepts being developed and the age range appropriate for their use. The website resource is organized around the four elements in the GAISE framework: formulate a statistical question, design and implement a plan to collect data, analyze the data by measures and graphs, and interpret the data in the context of the original question. Teachers can navigate the site by grade level and statistical topic.

Lesson Plans Wanted for Statistics Education Web

The editor of STEW, Mary Richardson of Grand Valley State University, is accepting submissions of lesson plans for an online bank of peer-reviewed lesson plans for K–12 teachers of mathematics and science. Lesson plans will showcase the use of statistical methods and ideas in science and mathematics based on the framework and levels in the *Guidelines for Assessment and Instruction in Statistics Education (GAISE)*. Consider submitting several of your favorite lesson plans according to the STEW template to *steweditor@amstat.org*.

For more information, visit *http://www.amstat.org/education/stew*.

STEW

STatistics Education Web

Bridging
the
Gap
Between
Common Core State Standards
and Teaching Statistics

Twenty data analysis and probability investigations for
K–8 classrooms based on the four-step statistical process as defined by the
Guidelines for Assessment and Instruction in Statistics Education (GAISE)

www.amstat.org/education/btg