

Feb 3, 2015

To the USCOTS 2013 Lifetime Achievement Award Review Committee,

We are very pleased to nominate Dr. Milo Schield, Professor of Business Administration at Augsburg College, for the 2015 USCOTS Lifetime Achievement award. www.causeweb.org/uscots/awards/

1) He has made a significant contribution to statistics education with broad impact in developing and maintaining a website dedicated exclusively to statistical literacy: www.StatLit.org.

In 2003, Milo created this website. Each year since then it has been Google-ranked as #1 website dedicated to statistical literacy. Since inception, it has had more than 1.7 million downloads, 1.4 million visits and 930,000 page views. In 2014, there were more than 365,000 downloads, 260,000 visits and 170,000 page views. It is still growing. In 2014, downloads were up 36%; visits up 26% and page views up 10%.

Today, it hosts almost a thousand papers and slides involving statistical literacy. Each year Milo publishes a news summary that provides links to relevant grants, books, journal articles and conference papers. This site has no advertising and charges no fees. Of the visitors from a known location in 2014, at least a third were located outside North America. Of these, more than a third were from Asia (mainly China).

The StatLit.org website is interdisciplinary: it includes links to journalism, adult literacy, quantitative literacy and numeracy. It features pages on leading authors – both popular (e.g., Joel Best, Howard Wainer, Jane Miller and Uri Braun) and academic (e.g., Judea Pearl, Kaiser Fung, Jeffrey Bennett and Herbert Weisberg). This website is referenced in the Wikipedia article on Statistical Literacy.

Many – if not most – of those using the site have no idea that Milo owns, manages and edits this website with no assistants while teaching a full load or more: three to four courses per semester.

We know of no one in statistics education who maintains anything like Milo's website. It is a tremendous resource for statistics educators all over the world. They may never get to a meeting of statistics educators, but they have unlimited access to many of the latest ideas on statistical literacy.

2) He has brought a unique approach to statistics education. He believes that statistics are of vital importance to non-statisticians: to journalists, political analysts, business managers and educated consumers. Milo has a PhD in Space Physics from Rice University and a 15 year career in business as an entrepreneur, a Senior Consultant with a CPA firm and a Senior Operations Research Analyst with a large property-casualty insurance company. He has been at Augsburg College for almost 30 years and is a tenured professor in Business Administration. He has taught Critical Thinking as a part of General Education for more than a decade and has taught undergraduate statistics for over 25 years. While on sabbatical at the RSS Centre for Statistical Education in 1995, he studied Bayesian statistics in a seminar taught by Colin Howson at the London School of Economics. These influences help explain Milo's unrelenting focus on context and causation in reading, interpreting and communicating statistics as evidence in arguments.

Milo brings a very broad perspective to statistical literacy: www.StatLit.org/pdf/2001-Schield-Statistical-Literacy-creed.pdf In 2005, he presented "Making Science a Core Liberal Art for the 21st Century", www.statlit.org/pdf/2005SchieldPKAL.pdf, to the AAC&U Project Kaleidoscope. In 2004, he delivered an invited peer-reviewed paper at an international philosophy conference in Prato Italy on the problem of induction (Resolving Three Key Problems in the Humanities): www.statlit.org/pdf/2004SchieldNDIH.pdf

3) He has been very active in supporting statistical education organizationally. He has been a member of the ASA Section on Statistical Education since 1995. In 2009, he was elected Vice President of the National Numeracy Network (NNN). In 2011, he was elected to membership in the International Statisti-

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cal Institute (ISI). <http://isi.cbs.nl/ISImembers/isimembersS-Z.pdf>. That same year he was elected President of the Twin Cities Chapter of the American Statistical Association. He is the US Director of the International Statistical Literacy Project (ISLP): iase-web.org/islp/People.php?p=Country_Coordinators

Milo has organized 17 topic-contributed sessions on statistical literacy at the ASA-JSM (this seems like some kind of record), one late-breaking session and a session at the ISI. He has invited over 50 speakers: many from outside statistics (e.g., Joel Best, Sociology; Joe Abramson, Epidemiology; and Gary Klass, Political Science), some from statistics but outside statistics education (e.g., Donald Rubin, David Cox and John Bailar) and some from within statistics education (e.g., Jessica Utts, Deborah Rumsey, Andrew Gelman and Robert Hayden). www.statlit.org/pdf/Schild-JSM-Sessions-Statistical-Literacy.pdf

4) *Milo has been active in promoting statistics and statistical literacy outside the discipline.* In 1999 his invited papers, "Statistical Literacy: Thinking Critically about Statistics" and "Common Errors in Forming Arithmetic Comparisons", appeared in the first issue of the journal *Significance* published by the Association of Public Data Users. www.StatLit.org/pdf/1999SchildAPDU.pdf

In 2001, Milo was the Principal Investigator on a four-year grant from the W. M. Keck Foundation along with Donald Rubin (Harvard) and Judea Pearl (UCLA). The purpose of the grant was "to develop statistical literacy as an interdisciplinary curriculum". This appears to be the first grant to support statistical literacy in the world. www.StatLit.org/images/2001-Augsburg-Now-Keck-Grant.jpg

In 2004, his invited paper, "Statistical Literacy and Liberal Education at Augsburg College", appeared in the AAC&U's *Peer Review*: www.StatLit.org/pdf/2004SchildAACU.pdf. Sociologist Joel Best referred to Milo as "the leader of the statistical literacy movement" in his book, *More Damned Lies and Statistics*.

In 2005, his invited paper, "Information Literacy, Statistical Literacy and Data Literacy", appeared in the IASSIST journal, *Information Quarterly* (IQ). www.StatLit.org/pdf/2005SchildIASSIST.pdf

In 2008, Milo's invited paper, "Quantitative Literacy and School Mathematics", was published by the Mathematical Association of American in a book titled *Calculation vs. Context*. He argued that QL or statistical literacy should be offered in place of Algebra II for college-bound students in non-quantitative majors. www.statlit.org/pdf/2008SchildMAA.pdf. In a review, Professor Mast said "This is an excellent suggestion." www.statlit.org/pdf/2009MastReviewOfSchild-QLvsSchoolMathematics-Numeracy.pdf

In 2009, he was featured in an article on Quantitative Literacy in the *Washington Post*. http://voices.washingtonpost.com/x-equals-why/2009/02/what_is_quantitative_literacy.html. In 2010, he was referenced by the *Los Angeles Times*: www.statlit.org/pdf/2010SmithLATimes.pdf.

In 2011, he created a new catalog course at Augsburg: "Statistical Literacy for Managers". His invited paper, "Statistical Literacy: A New Mission for Data Producers", was published in the *Statistical Journal of the International Association of Official Statistics* (SJAOS). This paper has been downloaded more than 10,000 times. www.statlit.org/pdf/2011schildsjaos.pdf.

5) *Milo has been active in advancing statistics education within the discipline.* During the past 20 years – starting with his first presentation at an ASA JSM conference in 1994 -- Milo has written 66 papers on statistical literacy. See www.StatLit.org/pdf/Schild-Papers.pdf. Of his nine invited or peer-reviewed papers, six are described above and three are described below. The rest were presented at the ASA JSM (27), ICOTS (5), IASE (4), MAA-JMM (4), Making Statistics More Effective in Schools of Business (3), ISI (2), etc. Milo has given more statistics talks outside the US (34 talks in 17 countries on six continents) than many educators give within the US: www.StatLit.org/pdf/Schild-Talks-by-Location.pdf.

In 1998, Milo was a pioneer in his use of "statistical literacy": www.statlit.org/pdf/1998SchildASA.pdf

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His 1999 JSM paper, "Simpson's Paradox and Cornfield's conditions", was cited as a "great paper" by Peter Westfall, a former Editor of *The American Statistician*. www.StatLit.org/pdf/1999SchioldASA.pdf

In 2004, his invited paper, "Statistical Literacy Curriculum Design", appeared in the IASE *Curricular Development in Statistics Education*: www.stat.auckland.ac.nz/~iase/publications/rt04/2.4_Schiold.pdf

In 2005, Milo published his textbook, *Statistical Literacy – seeing the story behind the statistics*, for students in non-quantitative majors. This appears to be the first introductory textbook that includes necessary conditions for a confounder to reverse an observed association. www.StatLit.org/Schiold.htm

In 2006, *STATS* magazine published Milo's article: "Presenting Confounding Graphically Using Standardization". It has been downloaded more than 19,000 times. Peter Holmes, co-founder of ICOTS and *Teaching Statistics*, said that reading this article was the first time he "really understood Simpson's paradox." Milo's students use this technique to answer this question: Will controlling for a confounder transform a statistically-significant association into one that is statistically-insignificant – or vice versa? www.statlit.org/pdf/2006SchioldSTATS.pdf

In 2006, he presented "Percentage Graphs in USA Today" at the ASA JSM. This paper is the most popular on his website (over 100,000 downloads). www.statlit.org/pdf/2006SchioldASA.pdf. In 2010, his invited paper, "Assessing Statistical Literacy: Take CARE", was published by Wiley in *Assessment Methods in Statistical Education*: www.statlit.org/pdf/2010SchioldExcerptsAssessingStatisticalLiteracy.pdf. That year he offered his statistical literacy course online. In 2012, he co-presented "A Second Statistics Course is Needed: What should it be?" at eCOTS. www.causeweb.org/ecots/ecots12/breakouts/7/

In 2013, he created statistics exercises using Excel that were downloaded over 50,000 times in 2014. The most popular (over 37,000 downloads) was "Create Log-Normal". In second-place was "Create Logistic Regression" (over 6,500 downloads). www.statlit.org/Tools.htm

In 2014, he presented an invited webinar at eCOTS: "Two Big Ideas for Teaching Big Data". This paper was downloaded more than 4,600 times in 2014: www.statlit.org/pdf/2014-Schiold-ECOTS.pdf. An audio presentation is at <https://www.causeweb.org/ecots/ecots14/35/> He is working on a textbook: *Statistical Literacy for Managers*. www.StatLit.org/pdf/2013-Schiold-MBAA.pdf

6) *Milo has been acknowledged by his peers.* According to Google Scholar, Milo has authored four of the 20 most-cited papers with *Statistical Literacy* in their title. www.StatLit.org/pdf/2014-Google-Scholar-Statistical-Literacy.pdf He has been invited to give papers by a wide variety of organizations. His papers, slides and Excel exercises have been downloaded over 250,000 times. This is broad impact!

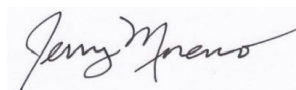
Given Milo's noteworthy and long-standing support of statistical education, his mentoring of other statistical educators, his many contributions to statistical literacy – both inside and outside our discipline -- and the breadth of impact world-wide from his papers, talks, JSM sessions and statistical literacy website (as evidenced in the breadth of the 35 attached testimonials), we strongly endorse his candidacy for the 2015 USCOTS Lifetime Achievement Award.



Larry Lesser
University of Texas at El Paso



Daniel T. Kaplan
Macalester College



Jerry Moreno, Emeritus
John Carroll University

Testimonials

Danny Kaplan, DeWitt Wallace Professor of Mathematics, Statistics & Computer Science Macalester College. "I am pleased to join Larry Lesser and Jerry Moreno in nominating you for the USCOTS Lifetime Achievement Award. The nomination document is about your accomplishments. I'm writing to share with you some of the ways your work has had an impact particularly on me. ■ I started to become familiar with your work more than ten years ago. As I recall, it was 2002 or 2003. At the time, I was working on a project at Macalester to establish a college-wide quantitative thinking requirement. You, of course, had been working for some time in statistical literacy, which was to become an important component of the Macalester quantitative thinking requirement. Some of your work at that time, supported by your 2001 WM Keck Foundation grant, involved finding ways to help students understand basic concepts such as percentage vs percentage points, including a fabulous computer-based tutoring system that parsed students' sentences to give them guidance in replying correctly to a prompted situation. A couple of years later, you had compiled this and many other topics into your "Statistical Literacy" book. ■ Possibly the most important topic for me was your work on presenting covariates to students. At the time, as you must remember, the conventional wisdom is that this topic is too complicated for introductory students. Yet you were teaching it successfully to business students at Augsburg. You accomplished this at least in part by use of novel explanatory modes. Your graphical presentation of Simpson's Paradox is particularly impressive in this regard. ■ A couple of years later, I was fortunate to receive support from Keck for my statistical modeling project. My project was more mathematical and computational in style than yours, centering on vector geometry and the emerging R language, but overlapping in the focus on the importance of being able to describe and model covariation. Most people had responded to my work with a dismissive "that won't work for introductory students." It was certainly heartening to know that you had found ways to teach about covariation. ■ Also very influential was your work with drawing inferences about causation from observational data. You may recall a paper I gave at the JSM in about 2008, "the abstention-based curriculum," which warned educators against the simple "don't do it" message usually conveyed in introductory statistics: "No causation without experimentation." As you know, students and professionals are going to do it anyways, because they need to inform decision making with the data at hand. My approach to helping students make sensible choices about causation involved modeling with multiple variables. Yours involved understanding the minimal strength of effect of a spurious covariate that's required to create a Simpson's-Paradox situation. As you wrote in a 1999 JSM paper,

"Cornfield's minimum effect size is as important to observational studies as is the use of randomized assignment to experimental studies. No longer could one refute an ostensive causal association by simply asserting that some new factor (such as a genetic factor) might be the true cause. Now one had to argue that the relative prevalence of this potentially confounding factor was greater than the relative risk for the ostensive cause. The higher the relative risk in the observed association, the stronger the argument in favor of direct causation, and the more the burden of proof was shifted onto those arguing against causation. While there might be many confounding factors, only those exceeding certain necessary conditions could be relevant."

(In writing this letter, I looked up your paper and found the above quote to be better than anything I might write.) Over the last decade, you've arranged many well-attended sessions at JSM to bring reasoning about covariation and causation to statistics educators. In the early years, this was my main means of contact with the statistics education committee. ■ You've worked tirelessly for more than a decade to make sophisticated and useful ideas about covariation and causation accessible to students. You've done this by your teaching, by your publishing, and by your leadership in the statistics education community. You've drawn attention of educators to the work on causation by folks such as Donald Rubin and Judea Pearl. I've witnessed a slow turning of the ship of statistics education to start to deal with covariation as a problem to be engaged. As this change occurs, I think your impact on statistics education will be more widely recognized. For myself, though, your work has already been formative and influential. Thanks for that!"

Larry Lesser, Professor. Mathematical Sciences Department, College of Science. The University of Texas at El Paso. "The nomination letter speaks for itself, but I'd like to go beyond the list of academic accomplishments and dissemination and note Milo's gracious welcoming spirit and ability to weave together people from diverse backgrounds to maximize the richness of the collective conversation. I love his willingness to take risks by putting out there conjectures and findings that may not mirror mainstream practices or categorizations and his quickness to put ego aside and take into account new insights and information that emerge. I will always be grateful to how he reached out to me to discuss an ethics paper I had just presented at JSM in 2001, back when I was swamped with a 13-hour teaching load and virtually unknown in the statistics education world. His vote of confidence in my creative potential inspired much of my subsequent professional progress and it is a great pleasure and honor now to be in a position to nominate this deserving colleague for this award."

Jerry Moreno, Emeritus, John Carroll University. ASA Fellow. It's my honor to nominate Milo for the USCOTS Lifetime Achievement Award. Over the years, Milo has been a presenter in JSM sessions I have organized or chaired and I have been a presenter in his. Whenever any of the terms statistical literacy, quantitative reasoning, quantitative literacy, numeracy, or statistical reasoning are mentioned, one immediately thinks of Milo and the remarkable work he has done in contributing articles and providing extensive resources in those areas catalogued on his website www.StatLib.org. In presenting workshops I have used extensively his articles particularly regarding graphing and confounding. Our nomination document indicates how valuable Milo has been and continues to be to statistics education and the international statistics community. I enthusiastically support honoring Milo with this prestigious award. He is most deserving of it.

COLLEAGUES IN STATISTICS EDUCATION (12):

Carl Lee, Professor of Statistics, Central Michigan University and a Fellow of the ASA. "It is a great honor to endorse and support Professor Milo Schield's nomination for the 2015 USCOTS Lifetime Achievement Award. Milo's long standing contribution to statistical literacy is absolutely incredible. Anyone who is looking for statistical literacy will immediately think

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about Milo's work and his StatLit.org web site. I have known Milo for over a decade; at first, through reading his work on statistical literacy, then, through the participation of the CAUSE and USCOTS activities and meetings in various statistical education conferences. During the decade, I have benefitted from his creative work on statistical literacy greatly. Thanks to Milo, his work has a great impact on the development of our quantitative literacy curriculum at Central Michigan University. Professor Milo Schield truly deserves this award."

Bob delMas, Associate Professor, Quantitative Methods in Education, Dept. of Educational Psychology, U. of Minnesota. Fellow of the ASA. "I am in complete support of your nomination for the USCOTS 2015 Lifetime Achievement award. Much of what I know about your involvement in the promotion of statistical literacy is thoroughly chronicled in the nomination letter. From my own personal experience, I note the significant contributions that you have made to college-level statistics instructors in the Twin Cities, Minnesota area through your active involvement in the Stat Chat meetings. Stat Chat is a gathering of college-level statistics instructors, including teaches of AP Statistics, in the larger metropolitan area surrounding Minneapolis and Saint Paul. You have brought wonderful examples of numeracy issues to Stat Chat, such as people's tendency toward base-rate neglect, alternative explanations and causes for the phenomena, and instructional and presentational approaches that can help ameliorate the problem. Your lively presentations always produce active and engaged discussions around the issues that have enhanced my instruction and, I am sure, the instruction of the other participants. You are very deserving of the Lifetime Achievement award and I hope the committee sees fit to honor you as this year's recipient."

Peter Holmes, Co-founder of *Teaching Statistics* and first Director of the RSS Centre for Statistical Education. See www.StatLit.org/pdf/2013-Teaching-Statistics-Holmes-Prize.pdf. "I would like to support the nomination of Dr. Milo Schield for the USCOTS 2015 Lifetime Achievement award. 20 years ago Milo impressed me with his novel approach to statistical literacy. Unlike many of us in the field, he came at it from a business/commerce/management perspective. So his emphasis was on reading tables and allowing for confounding etc. These are very important aspects of general statistical literacy that would otherwise have been neglected. ■ Over the intervening years Dr. Schield developed his new course from scratch – there was nothing similar around that he could draw on. His course and approach was truly innovative and he has continually been seeking to improve it. He has not been content with received wisdom, such as 'correlation is not causation' but seeks to give insight not only into the place of a confounding variable but also simple means of estimating its effect. Similarly he not only used Simpson's paradox to whet the appetite but moved on to simple visual and other explanations of how the paradox worked and why. He was helping students get to grips with the problems posed by large unstructured data sets well before the current major emphasis on large data. ■ When you put together these insights and developments with the energy and drive he has consistently shown over the years, developing his web site, corresponding with others, presenting at conferences etc. I consider Dr. Schield well worthy of consideration for a Lifetime achievement award."

Jeff Witmer, Professor of Mathematics, Oberlin College. Fellow of the ASA. "Milo Schield has been a strong advocate for statistics education, and for a more statistically literate society, for many years. I have been impressed with Milo's energy and accomplishments, as he has organized sessions at meetings, has served on panels, has given talks, and has written about numeracy. In particular, I credit Milo with changing how I think about causal inference and observational data. We are fortunate to have such a tireless worker advancing the cause of statistics education."

Rossi A. Hassad, PhD, MPH, CStat, PStat. Professor, School of Social & Behavioral Sciences. Mercy College, NY. I write to strongly support Dr. Milo Schield's nomination for the USCOTS 2015 Lifetime Achievement Award. I have known Milo for at least a decade, and have always found him to be a consummate statistics educator and ambassador of the quantitative reasoning and statistical literacy movement. ■ His teaching, presentations and publications, as well as journal editorship and project management activities reflect a broad interdisciplinary reach, including business, economics, education, epidemiology, health sciences, leadership, and legal studies. ■ Milo is undoubtedly one of the pioneers of the statistical literacy movement, and he has worked tirelessly and unselfishly over the years to integrate this competency at both the undergraduate and graduate levels, across disciplines. I have personally benefitted from his expertise and mentorship, in this regard.

Amy E. Wagler, Ph.D. Assistant Professor of Statistics, Department of Mathematical Sciences, the University of Texas at El Paso. "I became aware of Dr. Milo Schield 5 or 6 years ago when I first began teaching courses in statistical literacy and, at the same time, became involved in statistics education research projects grounded in language and communication. His contributions to statistics education have impacted both how I teach a course in statistical literacy and also how I instruct my students. The primary interaction I've had with Milo was indirectly, via the website www.statlit.org, for which he is editor. This website contains numerous resources for teaching that I regularly use in my own teaching as well as interactive applications also useful for teaching. In particular, I regularly use tools such as the web-based statement validator. These kinds of applications have been incredibly helpful to my students as they attempt bridging the connection between language use and conditional probability events. Understanding that "part" versus "whole" of a conditional probability statement is particularly difficult for students whose first academic language is not English and this tool effectively uses drill and visuals to help students correctly identify these components. This is just one example of a resource that Milo has made available to statistics instructors via his role as editor of StatLit.org. Thus, I highly recommend him for this honor, as I believe his accomplishments and contributions make him most worthy."

Uri Bram, author of *Everyday Statistics* and *Thinking Statistically*. "I could not be happier about Milo's nomination for the USCOTS Lifetime Achievement award; his immense and lasting direct contribution to statistics education is without question, as his nomination letter so wonderfully highlights. But I would like to add how much Milo also contributes as the central node in the statistical literacy world, connecting those of us passionate about statistical literacy in the academy, the press, the media

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and beyond to create new projects and explore new horizons. I am certainly not alone in knowing that no small part of my own contribution to statistics education was in fact made possible by Milo's facilitation – as such, Milo's contribution extends beyond the (already numerous) impactful projects under his direct purview to innumerable others that would not have happened without him."

Kathy Hall, PhD, Statistics and Quality Systems for Complex Processes, Hewlett Packard Corporation. "Milo Schield continues to push statistical literacy in a uniquely diverse range of venues. He has the ability to generate interest in linking thinkers in other areas with the germane topics from statistical literacy that really need to be applied in these diverse areas of endeavor. He does all of this in a way that helps other fields understand the necessity of statistical literacy, but in a way that makes it interesting and even fun to do so. ■ I have worked with Milo at JSM meetings and on the US ISLP steering team. Milo provides the energy and drive to keep all of us from dropping the ball. I must support his nomination."

Robert Raymond, Emeritus. Associate Professor of Statistics, Dept. of Quantitative Methods, University of St. Thomas, St. Paul, MN. Milo has made concrete something that I felt intuitively; that there is a lot that statistically literate citizens of the 21st century should know which does not involve deep mathematics, or even any mathematics. He has given specific examples of the importance of understanding tables, percents, even words related to causation. We wrote papers presented at JSM 2008 and 2009 that demonstrated just what is required to achieve the often stated goal of "enabling my students to be critical readers of quantitative statements in the newspapers." www.statlit.org/pdf/2009SchieldRaymondASA.pdf

T. Paulette Ceesay, Merck and Co. Adjunct Assistant Professor, Statistics Dept., Fox School of Business, Temple University. "I enthusiastically recommend Dr. Milo Schield, Professor of Business Administration at Augsburg College, for the 2015 USCOTS Lifetime Achievement award. I became acquainted with Milo in 2011 when I was doing a presentation on teaching statistics using the new media at the Joint Statistical Meetings in Miami. Milo was the session chair. Before and after the presentation, Milo gave me numerous helpful hints and references that I could use to improve my presentation. After the presentation he encouraged me to write up my talk in the proceedings which I did. Since that time, Milo has given me many helpful hints and references to help me enhance my teaching. The passion he has for promoting statistically literacy radiates from him not only in his papers and teaching but in the guidance he provides to other teachers so they can take up the charge of promoting statistical literacy. I am proud and fortunate that Dr. Schield is my mentor."

Dr. Rose Martinez-Dawson, Senior Lecturer, Department of Mathematical Sciences. Clemson University. "There is one word that comes to mind when I think of Milo Schield's work... inspirational. When I was pursuing my PhD, I read many articles related to statistical literacy as I was not quite sure that this was an area I had a passion to study... until I read Milo's work. His work inspired me to view statistical literacy in a new light, one that Milo described as having an understanding of statistics so as to ask questions about statistical information. This revelation changed how I teach and inspired me to pursue research in statistical literacy. I cannot think of a better legacy for a researcher than to inspire others, and I wholeheartedly support Milo Schield's candidacy for the 2015 USCOTS Lifetime Achievement Award."

Dr. Nathan Tintle, Associate Professor of Statistics at Dordt College, Sioux Center, IA. "Improving statistical literacy is one of the most pressing educational issues in our society today, and it's clear that Milo has taken an internationally recognized leadership role in this critical endeavor for many years"

COLLEAGUES IN MATHEMATICS (6):

Bernie Madison, Professor of Mathematics, University of Arkansas, a Chief Reader on AP Calculus and the founder and first President of the *National Numeracy Network*. "I am pleased to support your nomination for the USCOTS Lifetime Achievement Award, although I hope neither your lifetime nor your achievements are finished. During all my work in quantitative literacy and reasoning over the past 15 years, no one in statistics (save perhaps Dick Scheaffer) has been more influential than you in statistics education from my perspective. Your dealing with statistics as they come from the muddled world of media has always astounded me, and your calling to our attention issues I certainly missed has enlightened me and, I am sure, others. I have had the pleasure of editing some of your publications, notably the one in *Calculation vs. Context* that is referenced in the nomination letter. And that [nomination] letter revealed how much you were doing back at Augsburg on top of all I knew you were doing. Wow! You deserve two achievement awards!" www.statlit.org/pdf/2008SchieldMAA.pdf

Eric Gaze, Director of the QR Program, Bowdoin College and President of the National Numeracy Network. "I am happy to write a brief testimonial in support of Milo Schield's nomination for USCOTS's Lifetime Achievement Award. I have known Milo for the last decade connected to our work in the field of Quantitative Literacy/Reasoning (QL/R). Milo has been actively involved in the Mathematical Association of America's Special Interest Group in QL (SIGMAA-QL) and in the National Numeracy Network (NNN) with me as a fellow board member and officer. The statistical community was actually the first to introduce the concept of QL to a wide audience in the 1980's. Citing the importance of such literacy for active participation in our society, mathematicians soon thereafter took up the task of replacing math general education requirement with QR requirements. Statistical literacy has been subsumed into the broader conception of QL, and Milo has provided a crucial link between the mathematics and statistics community in the ongoing evolution of this enterprise. ■ Milo has consistently been a highly active advocate for the promotion and development of a meaningful QR curriculum for students. When SIGMAA-QL undertook a survey of all institutions of higher education regarding the presence of QR, it was Milo who volunteered to create, conduct, and analyze the survey. www.statlit.org/pdf/2010SchieldJMM.pdf His work output is truly phenomenal! It seems Milo is always giving a talk or leading a workshop somewhere. His website is a fabulous resource for both statisticians and

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mathematicians. Indeed Milo has always been the “record keeper” of the NNN, archiving records of presentations and creating a repository of such on his website. Personally, I have truly enjoyed the many conversations Milo and I have shared regarding the development of new QR curricula. He always seems to have a fresh insight into problems, and his passion for creating a meaningful and engaging educational experience for students is evident in the courses he has created and his book on statistical literacy. ■ Milo’s boundless energy and consistent dedication to the statistical education of generations of students make him an ideal candidate for this award!"

Dr. Maura B. Mast, Associate Vice Provost for Undergraduate Studies, Associate Professor of Mathematics, University of Massachusetts Boston. "I'm writing in support of the nomination of Dr. Milo Schield for the 2015 USCOTS Lifetime Achievement Award. Milo's work in statistical literacy has been an incredible resource and inspiration for me and for others in the quantitative literacy movement. Quantitative literacy as a formal, organized movement in the United States is still rather young. There are two national organizations in the U.S. that are focused on quantitative literacy - the National Numeracy Network (NNN) and the Special Interest Group of the Mathematical Association of America on Quantitative Literacy (SIGMAA-QL); both formed within the last 10 years. Both organizations have benefitted from Milo's trailblazing work in statistical literacy, as well as his enthusiasm and commitment to this work. Milo's service as Vice President of NNN is only one example of his involvement in the quantitative literacy movement. He regularly attends and participates in SIGMAA-QL meetings and events; he always has excellent suggestions (as a former chair of SIGMAA-QL, I particularly appreciated his insights and ideas); and he has expanded the statlit.org website so that it now serves as the premier resource for quantitative literacy teaching and scholarship material. ■ While Milo's formal background is in science and business, he is aware of, and involved in, issues of teaching and learning mathematics and statistics at all levels of the curriculum. As a mark of Milo's influence and reputation, he was one of a select group invited to attend a workshop entitled “Quantitative Literacy and its Implications” and to write a reflection on the link between teacher education and quantitative literacy education. I reviewed the resulting book (“*Calculation vs. Context: Quantitative Literacy and its Implications for Teacher Education*”) for the journal *Numeracy* and was delighted to read Milo's essay. His piece showed a clear grasp of the deep fissures in today's K – 6 mathematics education and articulated the disconnect between what students learn and what they are expected to do in the next stage of education and in life. I found his command of the issues and his recommendations for modifying the mathematics curriculum to be impressive. Milo's essay is another example of the expansive approach he takes, one that looks well beyond the traditional boundaries of the disciplines. ■ Milo brings great enthusiasm and energy to his speaking, his writing and his participation in quantitative literacy efforts. He is seemingly tireless in his wide-ranging advocacy for statistical literacy, and the quantitative literacy community has benefitted greatly from Milo's contributions. By its nature, quantitative literacy is interdisciplinary. However, mathematicians are often responsible for teaching and developing quantitative literacy material and tend to focus more on the mathematics aspects of the material. Milo's work has pushed the quantitative literacy community in a good direction, keeping us honest about the truly interdisciplinary nature of this work and giving us excellent direction in broadening the approach to include statistical literacy. ■ It has been a privilege to work with Milo and to see the passion he brings to statistics education. I strongly support his nomination for the Lifetime Achievement Award."

Arjun Tan, Professor Emeritus, Alabama A & M University. "It is with great pleasure that I write this recommendation letter in favor of Prof. Milo Schield, who has been nominated for the 2015 USCOTS Lifetime Achievement Award. I have known Prof. Schield for several years since he contacted me regarding my paper on Simpson's paradox in the *Coll. Math. J.* There were several authors on the same topics which appeared in different journals within a few years. It was Prof. Schield who set them in chronological order in his website on Statistics Education www.StatLit.org. ■ This is a unique website, the first and only one of its kind in the world. Prof. Schield is the founder of this website which he created in 2003 and maintained it ever since single-handedly. This is a Herculean task and how he carries it is beyond my imagination. It is a non-profit organization and can be used without any charge. Its reach is worldwide and its audience is in the millions. Thus its contribution to statistics education and outreach is incalculable. Prof. Schield is the pioneer in this area. His place in history is thus secured as is his website's. The details of Prof. Schield's contribution can be found in his CV and do not need my elaboration. I have no hesitation in strongly supporting Prof. Milo Schield for the 2015 USCOTS Lifetime Achievement Award."

David Bressoud, Professor Mathematics, Macalester College. Past-President, MAA. "Glad to see you getting this nomination: I've worked with Milo on the National Numeracy Network and in the development of the various numeracy courses that we have run at Macalester College. I've been particularly impressed by his ability to take complex statistical concepts and cast them in a form that makes them intuitive to students. I've used many of his examples and illustrations in my own classes."

Lynn Arthur Steen, Professor Emeritus of Mathematics, St. Olaf College. Former President (1985-86), MAA. "I first met Milo Schield when I served as chief organizer for the Working Group on Mathematics Education in Universities at the Ninth International Congress on Mathematics Education (ICME) that was held in Tokyo/Makuhari, Japan, in August, 2000. Dr. Schield's paper, *Statistical Literacy: A Pre-Stats Bridging Course*, was chosen from a large number of submissions for presentation at this International Congress by a selection committee of mathematicians and mathematics educators from China, Japan, New Zealand, Papua New Guinea, Switzerland, and Ukraine. In this paper Dr. Schield introduced to the mathematical world the new idea of statistical literacy as an important but distinctive aspect of more general statistics education. ■ Subsequently, I interacted with Dr. Schield on a number of occasions, notably in relation to his leadership of a W.M. Keck Foundation grant to expand statistical literacy education. His leadership of this project took place about the same time (2001-07) that I was helping lead a national effort to develop support for quantitative literacy (QL). Dr. Schield's work in statistical literacy (which included a widely used survey of quantitative literacy) was of great benefit to the emerging interdisciplinary National

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Numeracy Network that has helped spread these efforts into the social and natural sciences. ■ One outcome of this collaborative work was a commissioned paper on Quantitative Literacy and School Mathematics that Dr. Schield presented in 2007 at a special conference on the implications of QL for Teacher Education. The issues raised by his paper continue to reverberate as teachers and parents debate the content and merit of the Common Core standards for K-12 education.

COLLEAGUES IN FIELDS OTHER THAN STATISTICS OR MATHEMATICS (11):

Joel Best, Professor of Sociology, Univ. Delaware; Author of *Damned Lies and Statistics*. "I am delighted to support the nomination of Milo Schield for the USCOTS Lifetime Achievement Award. I am a sociologist, not a statistician, but Milo taught me—not just that there was a statistical literacy movement, but that I was part of it. I soon came to realize that much of that movement's energy depended on his tireless efforts to maintain the Statistical Literacy website, organize JSM sessions, develop educational materials, and write papers advancing statistical literacy. He has promoted a broad, interdisciplinary vision of statistical literacy as skills that need to be taught at every level, from high school to graduate school, and that are important for those in all disciplines and professions. I cannot imagine that many statistics educators have had a greater impact on more people. ■ Single-handedly originating and operating the major statistical literacy website is surely a valuable way of teaching statistics, and I urge CAUSE to award Milo Schield the USCOTS Lifetime Achievement Award."

Neil Lutsky, Kenan Professor of Psychology, Carleton College. "I am pleased to have the opportunity to write this e-mail supporting the nomination of Milo Schield for the USCOTS Lifetime Achievement Award. Milo has had a profound effect on statistics education in the United States and beyond, and he has been a major influence on my own work in this field. ■ I first met Milo 12 years ago when my home institution, Carleton College, was developing an initiative to address quantitative reasoning in our educational program. A colleague knew about his work and web site, and thought he would be an important source of insight, information, and experience on undergraduate education in statistics. We invited Milo to campus and he met with us. *What he had to say was pivotal in our framing of our initiative*, which became known as QuIRK. Milo emphasized the importance of quantitative reasoning in the context of argument. I can't understate how significant that insight proved to us to be. We constructed QuIRK around the evaluation of students' uses, misuses, and missed uses of quantitative reasoning in the construction of arguments represented in their written work... QuIRK was selected for initial funding by the U.S. Department of Education FIPSE program and received subsequent grants from the National Science Foundation and the Keck Foundation. QuIRK in its own right has come to influence quantitative reasoning initiatives at undergraduate institutions across the country, and I, personally, have consulted with numerous colleges and universities about their quantitative and statistics education programs and have spoken at major conferences on undergraduate education (e.g., the Association of American Colleges and Universities, AAC&U). And all of this stems, ultimately, from Milo's intellectual contributions to our thinking.

Milo's web site on Statistical Literacy has also been instrumental in keeping my colleagues and I, at Carleton and at other institutions interested in undergraduate statistics education, abreast of the latest resources, presentations, and examples in the area. I know of no other resource that has served our educational community as effectively and reliably as Milo's. It has required a prodigious amount of work to maintain that site, which is why most other efforts along those lines wilt. The Statistical Literacy site has flourished, however, and that is due to and illustrative of Milo's passion and commitment to this cause. ■ Milo is also an active contributor to disciplinary, educational, and public discussions of statistical literacy. He regularly speaks at major conferences on the topic, and he does so in singular fashion. His talks don't recycle what others have done. Instead, Milo is always highlighting new educational challenges in mathematical and statistical education, describing relatively accessible means of addressing those in teaching assignments and presentations, and discussing student responses to his innovative methods. I value attending Milo's talks for their creativity, for his teaching insights and suggestions, and for the great zeal he inspires by his own example. ■ Finally, I appreciate deeply Milo's efforts to encourage and cultivate my own work in this field. He has been a mentor. He has reached out to encourage my participation at conferences and in other professional circles. He has, as I hope to have underscored above, inspired my own efforts and shaped my thinking. There are two individuals who have had a profound influence on my work on quantitative reasoning. Lynn Steen is one of them. Milo is the other. ■ I respect most highly Milo's lifelong contributions to our common educational aspirations and encourage his most serious consideration for this well-deserved recognition."

Joseph Ganem, Ph.D. Professor and Chair of the Physics Department, Loyola University MD. "I strongly recommend Dr. Milo Schield for the 2015 USCOTS Lifetime Achievement award in statistics education. For more than 20 years he has worked to advanced statistical literacy far beyond the classroom, and far beyond the discipline of statistics, in order to bring the essential knowledge and uses of statistics to multiple disciplines and the general public. Milo has written 66 papers on statistical literacy and organized 17 topic-contributed sessions on statistical literacy at the ASA-JSM. ■ I was one of the speakers from outside the discipline of statistics who he invited to speak at one of his statistical literacy sessions at the ASA-JSM. I am a physicist who wrote a book (*The Two Headed Quarter: How to See through Deceptive Numbers and Save Money on Everything You Buy*) for a popular audience that teaches how to apply quantitative (including statistical) literacy to improve personal finance decisions. I was honored to contribute to one of his sessions and I was deeply impressed at how he was able to bring people from multiple disciplines together in one session to advance the cause of statistics education. ■ Through his multi-disciplinary sessions at ASA-JSM and his Website and online papers that have hundreds of thousands of visitors and downloads, Milo's impact on statistics education reaches far beyond the field of statistics. This is an achievement that I believe embodies the ideals of the award. I am happy to recommend that he receive the honor."

Donna L. Sundre, Professor of Graduate Psychology, Executive Director, Center for Assessment and Research Studies, U. of Virginia. "I am very pleased to support the nomination of Professor Milo Schield for the 2015 USCOTS Lifetime Achieve-

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ment Award. As a member of the National Numeracy Network (NNN), an elected board member of that group, and an Associate Editor of the journal *Numeracy*, I have had many occasions over the years to observe and appreciate the many contributions Milo has made to the advancement of numeracy and statistical education. Milo has devoted a lifetime of commitment to this work and has made many lasting contributions to this most important field. ■ Those who have even fleeting knowledge of Milo's work will be familiar with his StatLit website. As a statistics and measurement professor, it has served as a valuable resource for my own teaching and the learning of my students. This website has served several communities interested in the advancement of statistical literacy and education. I have been very impressed with Milo's leadership in NNN, but it is humbling to know that his services are extensive and valued by so many other professional organizations here in the United States and internationally. Reviewers attempting to make a decision on who to recognize with this esteemed award will recognize the NNN, ISI, and the ASA. His publications speak volumes (literally), and his leadership is critical to the field's advancement. ■ For these and many other personal reasons, I wholeheartedly endorse Professor Milo Schield's nomination for this award."

Nathan Grawe, Professor and Chair of Economics, Carleton College. "I write in wholehearted support of Milo Schield's nomination for the USCOTS Lifetime Achievement award. Milo has been a critical force in statistical literacy education and its intersection with the quantitative reasoning (QR) movement. Through his textbook and website, Milo has provided high-quality resources to those working directly with thousands of students. He has played a particularly powerful role in developing intuitive ways for students to think about statistical concepts through graphing and rules of thumb. ■ Most of my interactions with Milo over the last decade have been through the National Numeracy Network (NNN). Milo's early work in the NNN was instrumental in establishing it as the primary professional organization to support scholarship and programming in an area of great national importance. Even as he helped the NNN to set its own agenda, through leadership on the NNN's board and regular conference presentations Milo made sure the organization kept an eye on the importance of statistical education in its broader mission. In addition to his own work, Milo has been invaluable to those of us who have created and implemented QR initiatives on campuses across the country. By speaking on our campuses, providing resources like his text and web site, and encouraging us with experience-based advice, Milo has shaped statistics and QR education across the nation. Through this work, Milo's influence in advancing statistical literacy has been felt by literally thousands of students outside the statistics discipline."

Geoff Cumming, DPhil, Emeritus Professor, School of Psychological Science, La Trobe University, Melbourne Campus, Victoria, Australia. "I'm delighted to be able to give my strongest heartfelt support to the nomination of Milo Schield for this Lifetime Achievement Award. Frankly, compared with him, I can't think of anyone else who comes close, as a potential awardee. The nomination letter makes a stunningly strong case. I'm especially impressed by the great breadth of his achievement--breadth, but all directly related to hands-on stats ed, with a driving insight that statistical thinking and statistical literacy is what really matters. It is taking a while for the field to swing from obsession with the minutiae of formulas and techniques to focus on cognition, understanding, and judgment. Milo has for decades been a primary driving force in this crucial transition. I speak with personal knowledge, having discussed these issues with Milo in person at conferences over the years. He would adorn and enhance this Award. I give my enthusiastic support to this nomination, without any reservation whatever."

Jim Ridgway, Emeritus Professor in the School of Education, Durham University, Durham, England. "I first met Milo at an IASE Roundtable in Lund, Sweden, in 2004. We have common interests in data visualization and statistical literacy, and have met and shared sessions at ISI, ICOTS and IASE. There have been times when I thought I knew the scope and scale of Milo's work – then rapidly adjusted my judgements in the light of new information. Commonly, this new information is not a paper I hadn't found, but a mini-corpus on a topic I had not associated with him. His seminal papers have shifted my thinking on the role of critical thinking in statistics. His work on visual representations (e.g. on confounding effects, and his review of graphs in USA Today) has influenced the work of my group in Durham. ■ It is difficult to overstate Milo's contributions to statistics education over a very long period. His StatLit website is the first port of call for my students, and the breadth and depth of this resource has been extremely influential in promoting links between disparate communities, all of whom are concerned with statistical literacy. ■ Milo Schield has made significant and lasting contributions to statistics education over a long period of time. The USCOTS Lifetime Achievement Award would be an entirely appropriate recognition of his many and varied contributions to statistics education."

Bill Goodman, Professor of Business and Information Technology. University of Ontario Institute of Technology, Toronto, Canada. "Thank you for the opportunity to add support your nomination for the Lifetime Achievement Award. The evidence put forward in your Nomination letter makes it very clear how your long term, and very impactful contributions, are deserving of this honor. I know for myself I have valued, and am thankful for, your encouragement and support, in pursuing statistical literacy in my own career."

Len Vacher, editor of the National Numeracy Network's journal *Numeracy* and Professor of Geology at the University of South Florida. "I am a geologist and have been teaching geology for forty years. I gravitated into quantitative literacy by teaching various courses in mathematical concepts for geologists at both the undergraduate and graduate level. Since about 2001 with the formation of the National Numeracy Network, the biggest influences in my transition into QL were Lynn Steen, Bernie Madison, Dorothy Wallace – all mathematicians – and Milo Schield, the great ambassador of statistical literacy. With Milo's help via his Web site, his papers, and in person, I have gone from a statistics hater to one who deeply values statistical literacy as a vital educational goal. I believe that QL education for all will evolve as an independent, transdisciplinary endeavor that engages students to become effective communicators of quantitative material, become skilled at discrete math and problem solving, and become statistically literate. That last will be because of Milo's tireless outreach. Thank you, Milo!"

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Esther Isabelle Wilder, Director of the Lehman Quantitative Reasoning Program and Professor of Sociology at Lehman College and the Graduate Center, City University of New York (CUNY) PI on NSF grant to teach CUNY faculty best QL pedagogy. "Milo Schield's contributions to the field of statistics education have been far-reaching and highly influential. His numerous accomplishments ranging from his statistical literacy website to his many articles and textbook (and much in between) have influenced the teaching practices of countless educators both in the US and abroad. He has also touched the lives of faculty and students at a broad array of colleges and universities (ranging from elite private schools to public universities and minority-serving institutions, as well as community colleges). He is passionate, creative, driven and above all else, committed to ensuring that educators, students, and the general population have the tools needed to address whatever statistical literacy challenges they confront. Indeed, because of his impressive array of resources (both his own and others he has assembled) and his tireless efforts to disseminate them, we have good reason for optimism!"

Steven Woloshin and Lisa Schwartz Professors of Medicine and Community & Family Medicine. Dartmouth Institute for Health Policy and Clinical Practice, Geisel School of Medicine at Dartmouth. "Lisa Schwartz and I are professors of medicine at Dartmouth. One of our major research interests is in improving how doctors, patients, policy makers, journalists and others communicate about the benefits, harms and uncertainties of medical tests and treatments. Milo learned about our work and encouraged us to do a presentation at the ASA meeting in 2009 where we had the opportunity to meet – and ultimately do some collaborative work with – researchers with similar interests but in a different field. Milo has been a great source of encouragement for us – and we've learned a lot from him (especially about bias and confounding) through our email correspondence and several in-person meetings over the years. While Lisa and I are not statisticians, we hope you will still be able to consider our experience with Milo in deciding about the USCOTS 2015 Lifetime Achievement award."

COLLEAGUES AT AUGSBURG (3):

John Schmit, Professor of English, Augsburg College. "I strongly support the nomination of Professor Milo Schield for the USCOTS 2015 Lifetime Achievement Award. I have had the opportunity to observe Milo's classes, to review his extensive course and assessment materials, and to use his course website as a model for teaching statistical literacy. I have heard public presentations of his research and attended scholarly meetings that he has organized to further the teaching of statistical literacy. Without question, Milo has been this nation's leader of the statistical literacy movement, and he has worked tirelessly to support those of us who believe quantitative reasoning to be an essential outcome of higher education. ■ As a faculty member in the humanities and thus a teacher of students whose disciplines are non-quantitative, I can attest to the importance of the quantitative reasoning initiatives that Milo has developed over the past decade and more. If we allow students in the arts and humanities to graduate without a rigorous understanding of statistics and quantitative methods, we exclude them from most serious conversations concerning public policy, public health, environmental protection, educational effectiveness, and every manner of discourse concerning causal connections, measurement of effects, confidence measures, statistical significance—in short, the whole range of measures by which our most important social decisions are influenced. These concepts and concerns name the outcomes of Milo's work in statistical literacy. ■ While some educators—teachers of statistics, for example—might argue that such applications of quantitative methods lie outside statistical education, I have to argue that these applications constitute an absolutely essential set of concepts for all students today. Milo Schield has dedicated decades to furthering the goals of statistics education and thus is highly deserving of this recognition."

Marc Isaacson, Assistant Professor. Augsburg College Dept. of Business Administration. 2013-14 President - Twin Cities Chapter of the American Statistical Association. "It is with great pleasure that I send an endorsement of my colleague Professor Milo Schield for the USCOTS Lifetime Achievement award. For the last 20+ years, Milo has been a leader in the promotion of Statistical Literacy at Augsburg College, in the United States and around the world. At Augsburg, he has pioneered a number of firsts including the first Statistical Literacy course taught as a General Studies course and offered for students in non-quantitative majors. In addition, Milo also spearheaded the adoption and teaching of a course called Statistical Literacy for Managers which is aimed at teaching students in business to become better consumers of quantitative and statistical data. ■ As a thought leader in Statistical Literacy, Milo has been instrumental in gathering and promoting the many varied ideas and practices in statistical education (and elsewhere) through his creation and promotion of the StatLit.Org website. This website is an amazing collection of articles, publications and notices of world-wide activities involving Statistical Literacy and related topics. ■ As a personal mentor, Milo has been an active participant in my personal and professional development over the last twelve years. He possesses a keen insight of the statistical education landscape and the history of the discipline. His thoughts and views on Statistical Literacy have significantly changed my perspectives on the teaching of statistics and the need for improving the statistical literacy of all students including those many who take only one statistics class in their college career. Professor Milo Schield is certainly deserving of this recognition award."

Amy Gort, Dean of Arts and Sciences, Augsburg College. "I am writing to voice my support of Professor Milo Schield's nomination for the USCOTS Lifetime Achievement Award in Statistics Education. Professor Schield has developed admirable expertise in Quantitative Literacy and Statistics Education which he has used to enhance the education of students at Augsburg College. ■ One example of his impact is the development of a Quantitative Reasoning and Statistical Literacy course that serves students from a diverse mix of majors. To develop the course, he worked with faculty from the Humanities to ensure that the course would meet the broad quantitative literacy goals for student in those fields. Professor Schield has also developed an online version of the course which allows students to engage the material from our branch campus. This course is an important component of our curriculum and Professor Schield has worked to ensure that students achieve the quantitative reasoning goals that we have for them. ■ While his impact on quantitative literacy at Augsburg has been significant, I know that his scholarship has led to important improvements in quantitative literacy and statistics education across the country."