SO, YOU HAVE RETIRED: HOW CAN YOU CONTINUE TO HELP THE STATISTICS AND DATA SCIENCE EDUCATION PROFESSIONS?

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This paper describes ways retirees have contributed as volunteers to the growth of statistics and data science education at local, national, and international levels, with focus on help given to the American Statistical Association (ASA), its local chapters, and its specialized subject matter sections. Topics include mentoring, developing new materials for primary through post-secondary education, reviewing materials in development, reviewing journal submissions, and volunteering to help with competitions. ASA has benefitted from using volunteers because by having volunteers do certain tasks, ASA employees have more time to work on other ways of improving statistics and data science education. Further, they have regular contact with experts with extensive experience. A major benefit for the volunteers is that volunteering helps them keep current on newest trends.

BACKGROUND

When the first author retired, she contacted the second author and volunteered to help her with whatever she needed. The second author said that she needed someone to carefully review the education webpages on the ASA website at https://www.amstat.org/education and suggest items that needed updating. Two areas that needed additional coverage were resources for K–12 (primary and secondary) educators and listings of education-related student competitions, grants, fellowships, and more. The first author then developed, in 2015, a first version of the "Resources for Teaching K–12 Statistics (including Common Core Measurement and Statistics)" document and continues to update it regularly (Blumberg, 2022).

In 2018, she developed a first version of "Statistics and Data Science Related Competitions, Grants, Scholarships, Fellowships, Internships, Travel Awards, and Other Awards/Honors for Students, Educators, and Early-Career Professionals" and continues to update it regularly (Blumberg, 2022). The development of that document was done in cooperation with the third author. The first author has been updating both documents regularly. Although both documents have mostly American-based listings, there are some international listings in each of them.

The first author was contacted by 2021–2023 IASE President Ayse Bilgin to prepare a paper for the 11th *International Conference on Teaching Statistics* that would discuss work that the first author had done related to statistics education. The first author and the IASE President decided to expand the topic to what several American retirees have done *as volunteers* related to statistics and data science education for both the ASA and other organizations since retiring.

METHODOLOGY

The first author, in consultation with the second and third authors, contacted five American retirees who were known to be active in statistics education in retirement and who had done volunteer activities for the ASA and others since retiring. Each was asked to list or discuss their involvement with statistics education activities since retirement. The discussion in the main part of this paper will summarize their answers while maintaining the anonymity of individual responses. The following people, in alphabetical order by last name, provided responses: Carol Joyce Blumberg, Gary Kader, Henry Kranendonk, Katherine Monti, Jerry Moreno, and Roxy Peck.

OVERVIEW OF RESPONSES

One of the respondents nicely summarized the sentiments of all respondents about continuing to help the statistics and data science profession by saying, "Staying involved with ASA and other professionally related volunteer activities after retirement has allowed me to stay connected professionally and to maintain both professional and personal contacts. I think that this has definitely contributed to both my health and well-being." Another respondent pointed out that "overall, I was able

In S. A. Peters, L. Zapata-Cardona, F. Bonafini, & A. Fan (Eds.), *Bridging the Gap: Empowering & Educating Today's Learners in Statistics. Proceedings of the 11th International Conference on Teaching Statistics (ICOTS11 2022), Rosario, Argentina.* International Association for Statistical Education. iase-web.org

to devote more time to the 'job' than I would have pre-retirement." "Job" was defined by the person as any work completed for ASA.

DISCUSSION OF SOME SPECIFIC AREAS OF VOLUNTEER ACTIVITIES

Mentoring

In 2014, ASA President-Elect David Morganstein announced that his principal presidential initiative would be starting mentoring programs "within ASA committees, sections, and interest groups" (Hanlon & Morganstein, 2019, paragraph 2). Since then, local chapters (geographical groups that meet regularly for talks and other events) and groups affiliated with the ASA (e.g., Caucus for Women in Statistics) also developed mentoring programs. Three respondents who mentioned engaging with mentoring activity in retirement mentioned the following as their types of mentees: high school mathematics teachers, two-year college faculty, university faculty, undergraduate students, graduate students, and government employees. Because two-year colleges are somewhat unique to North America, an explanation of what they are is given here. Although an undergraduate bachelor's degree is equivalent to four years of post-secondary education, many communities have developed institutions at which their residents can complete the first two years of post-secondary education at a much lower cost than in universities with four-year degrees. These institutions are sometimes called two-year colleges, community colleges, or junior colleges.

Developing New Documents and Other Materials for ASA

All six of the retirees have been involved with developing new documents and other materials for the ASA, including the documents developed by the first author discussed earlier. The other volunteers developed or co-developed important materials that were published or co-published by the ASA, including the following.

- The *Statistical Education of Teachers* (SET) report (Franklin et al., 2015). SET was developed to expand on the recommendations for mathematics teacher education that were part of the *Mathematical Education of Teachers II* report developed by the Conference Board of the Mathematical Sciences (2012). In particular, the report

  > Emphasiz[ed] features of teachers' statistical preparation that are distinct from their mathematical preparation. SET calls for collaboration among mathematicians, statisticians, mathematics educators, and statistics educators to prepare teachers to teach the intellectually demanding statistics in the PreK–12 curriculum, and it serves as a resource to aid those efforts. (p. *iii*)

- The original *Guidelines for Assessment and Instruction in Statistics Education (GAISE) Report: A Pre-K–12 Curriculum Framework* (Franklin et al., 2007)
- *Focus on Statistics: Investigations for the Integration of Statistics into Grades 9–12 Mathematics Classrooms* (Brown et al., 2020)
- *People Count! (And Their Data Stories)* (Kranendonk, 2020): The *People Count!* teaching module "is a collection of 16 lessons about counting people … designed for students enrolled in a high-school algebra 2 or equivalent course, or an entry-level statistics or finite mathematics course in college" (Kranendonk, 2020, p. *iii*).
- Lesson plans for ASA's online journal of peer-reviewed lesson plans, Statistics Education Web (STEW) (https://www.amstat.org/education/stew/statistics-education-web-(stew)
- Organizational process documents for several ASA committees
- Updates to governance documents, including the ASA Constitution and Bylaws and charters for several subgroups within the ASA
- Assisting the ASA in the development of grant applications

Reviewing ASA Publications Before Release to the Public

Since retiring, most respondents have been involved with reviewing or proofreading statistics-related publications before their release to the public. Some examples include the following.

- Reviewing *Statistics and Data Science for Teachers* (Bargagliotti &Franklin, 2021)

- Reviewing *Guidelines for Assessment and Instruction in Statistics Education II (GAISE II): A Pre-K–12 Curriculum Framework* (Bargagliotti et al., 2020)
- Proofreading the Spanish translation of the original GAISE report (Franklin et al., 2018)

Other Activities Related to Publications

Most respondents have been involved in other activities related to publications. Examples include the following.

- Writing formal reviews of new books (both textbooks and introductory expositions of statistical topics) for the *International Statistical Review* journal published by the International Statistical Institute (https://onlinelibrary.wiley.com/journal/17515823)
- Serving as referees for the following ASA journals: STEW, *Statistics Teacher* (https://www.statisticsteacher.org/), and the *Journal of Statistics and Data Science Education* (https://www.tandfonline.com/journals/ujse21)
- Serving on the editorial boards of ASA journals

Organizing or Helping with Various Competitions (Sponsored by the ASA or its Chapters or Sections and otherwise)

- Organizing regional competitions for the ASA Data Visualization Poster Competition for Grades K–12 (see, e.g., https://sites.google.com/view/cleveland-asa/k-12-activities/ohio-data-visualization-competition)
- Judging one or more of the following: The national ASA Data Visualization Poster Competition for Grades K–12 (https://www.amstat.org/education/asa-data-visualization-poster-competition-for-grades-k-12-); the national ASA Project Competition for Grades 7–12 (https://www.amstat.org/asa/education/ASA-Statistics-Project-Competition-for-Grades-7-12.aspx); and various ASA regional poster, paper, and/or project competitions, many of which send their winning posters/projects to the national competitions.

Organizing and Speaking at Workshops for Teachers during the annual Joint Statistical Meetings

Each year several of the retirees organize or volunteer their help with two types of workshops for secondary school teachers that are held in the same location as the Joint Statistical Meetings (JSM) of ASA and 11 other statistics organizations. JSM is one of the worlds' largest gathering of statisticians and is held in North America.

- The first workshop is called a Meeting Within a Meeting (MWM). MWM is aimed at middle and high school mathematics and science teachers to give them "an opportunity to discuss and apply … data analysis, data science, and statistical concepts … Teachers will learn to use strategies and technology tools that support students' learning and empower them to investigate questions using real-world data" (ASA, 2022, paragraphs 1–2).
- The second workshop is the Beyond AP Statistics (BAPS) workshop for secondary school teachers and two-year college educators. BAPS focuses on enrichment material just beyond the basic introductory statistics course taught at the post-secondary level. Some secondary schools offer their students the opportunity to study the equivalent of an introductory college level course at their secondary school, and secondary students can take a special examination for Advanced Placement (AP) Statistics (https://apstudents.collegeboard.org/courses/ap-statistics) near the end of the school year to get post-secondary credit for the course. See https://www.amstat.org/education/baps/home for more details about the workshop.

Other Examples of Workshops and Lectures Given by Retirees

- Talks at the Two-Year College Data Science Summit (e.g., https://www.amstat.org/education/two-year-college-data-science-summit)
- Lectures aimed at Two-Year College Faculty. See (Peck, 2022) for an example.
- Talks to secondary school students on how to prepare for the AP statistics examination

Examples of Other Service to the Statistics Profession

Several respondents have served on, or chaired, committees and similar groups related to statistics education, including the ASA Education Council, ASA Membership Council, a local ASA chapter's Statistics Education Committee, and Best *Journal of Statistics and Data Science Education* (JDSDSE) Paper Award Committee. Several respondents also have organized sessions for a variety of international meetings, including JSM, International Statistical Institute World Congresses, and International Conferences on Teaching Statistics.

Providing Statistics Education Expertise to non-Statistics Organizations

Two respondents assisted states in developing and implementing state standards for the statistics content to be taught in primary and secondary schools (e.g., Ohio state standards at https://education.ohio.gov/Topics/Learning-in-Ohio/Mathematics/Ohio-s-Learning-Standards-in-Mathematics), including the development of curriculum materials (e.g., EngageNY curriculum materials for New York available at http://www.nysed.gov/curriculum-instruction/engageny-mathematics-curriculum-files-archive).

BENEFITS TO ASA AND SIMILAR ORGANIZATIONS

One obvious benefit to the ASA and similar organizations is that by having retiree volunteers engage in the work of important projects for the organizations, the employees of the organizations have more time to focus on other important projects. Another obvious benefit is that the volunteer retirees have a wealth of knowledge and experiences that organizations can use in a variety of ways.

BENEFITS TO THE VOLUNTEER RETIREES

The volunteer retirees benefit from the partnership as well. As noted by one of the retirees at the beginning of this paper, "Staying involved with ASA and other professionally related volunteer activities after retirement has allowed me to stay connected professionally and to maintain both professional and personal contacts." Another benefit is that the retirees can continue to learn what is important to younger statisticians and data scientists and to educators from primary through graduate education.

CONCLUDING REMARKS

It is hoped that the activities described here give other statisticians and data scientists ideas for new ways that they can be involved in research, teaching, and service to the profession both currently and when they retire. Although the activities of only six retired statisticians and two ASA staff members have been described in this paper, it is realized that many other retired statisticians and retired/past ASA staff have made and continue to make important contributions.

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