A CONTENT ANALYSIS OF THE STATISTICS EDUCATION DISCUSSION LIST, EDSTAT-L

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EDSTAT-L is a discussion list for statistics education, begun in October, 1991. This listserv allows statisticians to discuss the topics, techniques, and technology used in their classes. Our 18-year longitudinal study will include an analysis of the number of messages generated each month. We will identify the most discussed subjects for each year. Another analysis will also focus on the most popular threads/subjects in the discussion, which should benefit present and future statistics educators. Finally, there will be a comparison of EDSTAT-L and other discussion lists dealing with statistics education, such as the APSTAT-L and the Isolated Statistician's listserv.

INTRODUCTION

This article analyzes the 41,040 messages that have been posted to EDSTAT-L, a discussion list for statistics education begun in October, 1991. The list was created by Tim Arnold at North Carolina State University. Arnold gave his rationale for creating the list in an introductory e-mail: "The purpose of this list is to provide a forum for comments, techniques, and philosophies of teaching statistics. The primary focus is that of college level statistics education, both undergraduate and graduate studies." The list has now (10/2009) been in existence for over 18 years. For the purposes of this report, we considered messages posted through August, 2009.

Not surprisingly, there is little in the statistics literature on lists such as EDSTAT-L. Hayden (1994) provided an early and short review of EDSTAT-L. Such lists were a relative novelty in the early 1990s and, after describing how the list operates, Hayden compares the messages in EDSTAT-L to well-informed and long-lasting conversations that one might enjoy over a meal at a conference. Green and Fuller (1999) analyzed almost three years of the Teaching Statistics Mailbase List. They describe the geographical distribution of the subscribers and also summarize the topics covered on the list. The most popular of the strictly statistical topics were statistical tests. The authors also reported the results of a self-selected survey of members of the list that focused on the use of technology in pedagogy. Finally, Pange (2002) does not describe a particular list, but "examines the potential of the news-group …to promote learning about the nature of statistics, and statistics learning, and teaching".

Our EDSTAT-L data set consisted of information on 15,927 threads/subject topics. For each thread we were able to extract (a) the name of the thread/subject (for example, "SPSS is now PASW"), (b)/(c) the month and year in which the thread began, and (d) the number of messages contained in each thread for each month.

STATISTICAL FEATURES OF THE LIST

Between October, 1991, and August, 2009, a total of 41,040 messages on 15,927 threads were posted to EDSTAT-L. Fully 55% of the threads consisted of just a single message. The median number of messages per thread was thus 1; the mean number was 2.6 messages. The largest thread consisted of 82 messages. The standard deviation of the number of messages was 3.6.

For simplicity, we view the total number of messages per month as our measure of how much traffic the list is carrying. Figure 1 is a plot of the number of messages per month over the 214 months for which we have data.

After flourishing for 15 months, there was a period with virtually no activity on the list. From October, 1991 through December, 1992, the average number of messages per month was 111.5. However for each of the 24 months from January, 1993 through December, 1994, the number of messages per month was only in the single digits. In January, 1995, the number of messages shot up to 205. At this point, the authors have not been able to discover the reason for this prolonged period of near dormancy!

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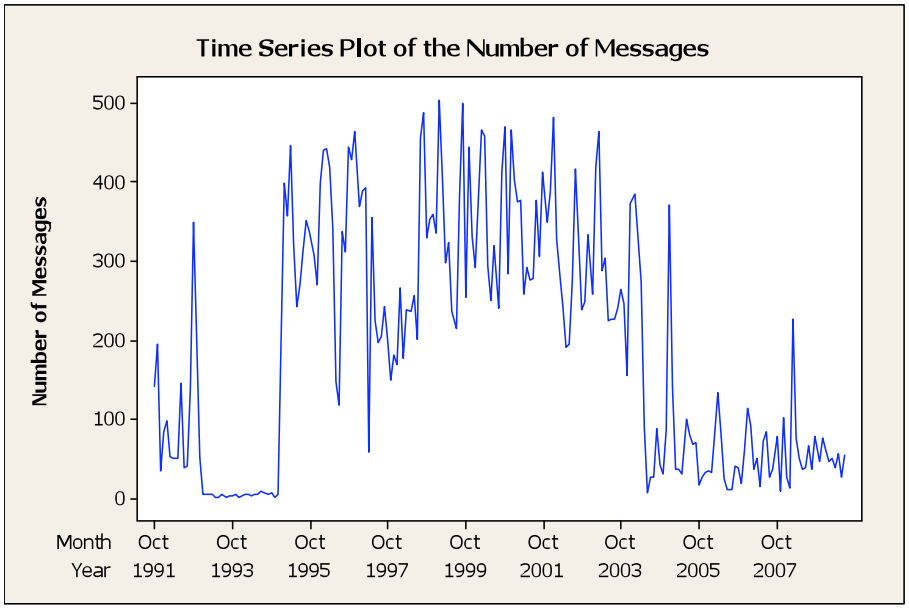

Figure 1. Time series of the number of messages per month

The other notable feature of the plot is the substantial and near permanent decline in the number of messages beginning in May, 2004. In the previous 112 months through April, 2004, there had been an average of 317.0 messages; for the months after April, 2004, the average was only 60.0 messages. The primary reason for this precipitous decline was a decision by the list's administrators to no longer allow the publication of messages from nonsubscribers. This decision meant that the large number of messages from the sci.stat.edu newsgroup no longer appeared on EDSTAT-L. At this point also, the EDSTAT-L list moved from the direction of Jacqueline Dietz at North Carolina State University to that of Dennis Roberts at Pennsylvania State University.

MOST POPULAR THREADS/SUBJECTS

Green and Fuller broke down their approximately 600 messages (a.k.a., threads) into eight categories. These are (1) Teaching techniques and technical help, (2) News of courses, reports, reviews, etc., (3) Computer software and its use, (4) Text books, (5) Mailbase matters and 'Noise', (6) Curriculum–(Assessment, Objectives), (7) Examination questions / Question banks, and (8) Miscellaneous. And, while they assigned each of their messages to a single category, they acknowledged that some of their messages fit into more than one category. In our analysis of 15,927 threads we examined the most popular threads/subjects for the entire 18-year period and for each of the 18 years and decided to break up the threads into four categories. These are (a) Course-related subjects, (b) Education-related subjects, (c) Data and context subjects, and (d) Other, including missing subjects. One of the reasons for our shorter list was our difficulty in classifying certain threads into one category. Hence, our first category included their categories (1), (3), (4), (7), and possibly their category (6). Our top 11 threads generated between 50 and 82 e-mails. Six of them dealt with course-related subjects (all of which concerned hypothesis testing, one of the most important and most difficult concept in an introductory statistics course (McKenzie (2004)), two dealt with education-related subjects (grade inflation and evaluating students), and three dealt with data and context subjects (*The New York Times* on a statistician's view of an election, statistics on Palm Beach votes, and marijuana). Except for a lively discussion in the defense of p-values in 2008, all of these threads were generated between 2000 and 2003 when the traffic on EDSTAT-L was quite high. Hence we decided to examine the ratio between the maximum thread length and the number of messages generated for each year. Figure 2 shows that most of these ratios are between .01 and .02, including 10 of our top 11 threads. Hence these threads may not be representative of the 18 years of EDSTAT-L under consideration. When we examined the thread that generated the most discussion for each year we found 11 dealt with course-related subjects,

three with education-related subjects, and five with other subjects. In our presentation we plan to discuss all of these more popular categories in more detail.

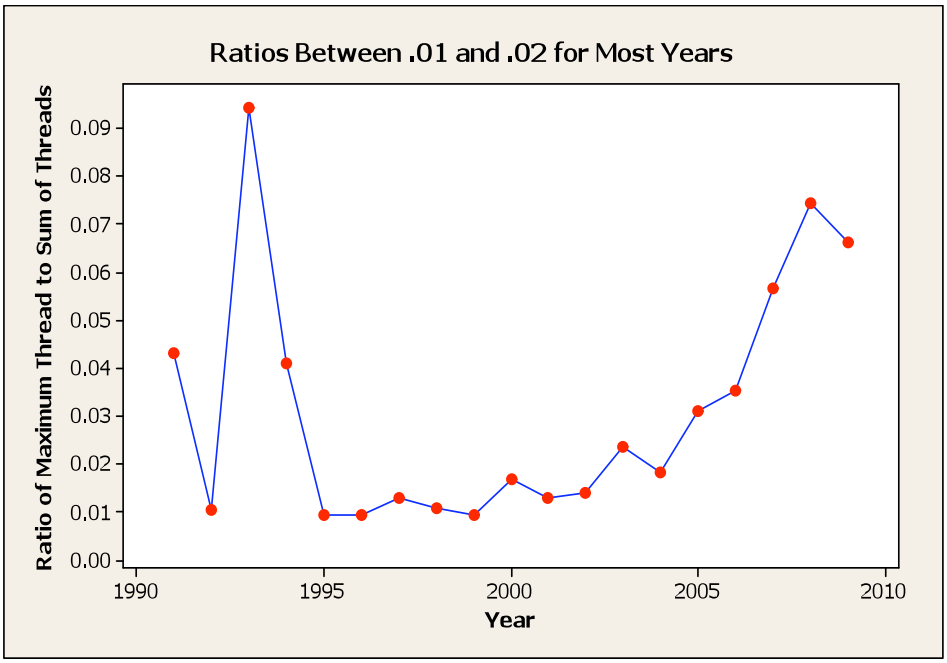

Figure 2. Time series of the ratio of maximum thread to sum of threads per year

TRENDS WITHIN EDSTAT-L

Perhaps no single development during the 18 years of EDSTAT-L has had a more profound effect on education in general and statistics education in particular as the emergence and the flourishing of the Internet. The growing impact of the Internet is captured nicely in the titles of the EDSTAT-L threads. First, consider the numbers. The authors searched the thread titles for the different forms of the keyword 'online'. Table 1 shows the number of threads containing this keyword per 1000 threads for each of five periods. The growth in the use of this keyword is evident from the table.

Table 1. Distribution of the number of references to 'online'

Years	'Online'/1000
1991-1994	0
1995-1998	4.8
1999-2002	6.3
2003-2006	26.4
2007-2009	43.8

Prior to 2000 the titles of threads including 'online' referred to such items as an online encyclopedia, online polling, online test items, and online review items. There are notices of online statistics journals including the Journal of Statistics Education. One begins to see references to online statistics courses, online statistical tables and applets to perform power calculations and Fisher's Exact Test.

After 2000, titles including 'online' refer very largely to the advertising of or questions about online courses. Of course, this is consistent with the growth of distance learning in all fields, statistics included. It is interesting to observe how the subject matter of the courses reflects the 'hot' topics in statistics. Mentioned are courses in resampling methods, data mining, modeling longitudinal and panel data, graphs in R, and DNA microarray data analysis. There are also references to courses on poker probabilities and financial risk management—modeling derivatives.

The discussion above hints at the enormous variety of topics discussed in EDSTAT-L. In our presentation we will talk about the occurrence of topics such as the importance of real data, understanding statistical concepts, and technology (Excel, in particular) that are discussed in the *GAISE College Report* (Garfield (2005)) and McKenzie (2004).

OTHER DISCUSSION LISTS

EDSTAT-L was one of the first, if not the first, discussion list concerning statistical education to appear. Others that were started about the same time were STAT-L and SCI.STAT.CONSULT, both of which discussed statistical consulting issues, many of which are relevant to the classroom. A similar list based in the United Kingdom is the ALLSTAT discussion list. The TEACHING-STATISTICS discussion list, also from the UK is for those concerned with the initial teaching of statistics in all phases of education.

In addition, there are two other American lists that are similar to EDSTAT-L. AP-STAT is the The College Board's Advanced Placement Statistics list. It discusses issues related to the Board's advanced placement exam in applied statistics in secondary schools. The ISOSTAT list (the Isolated Statistician's listserv) discusses issues related to teaching undergraduate college statistics courses. Many subscribers to these lists were past subscribers to EDSTAT-L. This may be another reason for the decline in messages in recent years, along with migration to other specialized lists such as SAS-L.

Another reason may be the increasing amount of e-mail one receives each day. One does not wish to examine or delete discussions of topics that are either too basic or too advanced for the subscriber. Finally, there is far less of a need to ask certain questions to discussion list. For example, Hayden (1994) noted that he had used EDSTAT-L to obtain the source of a quote from George Box. Today he probably would use search software, such as Google or Bing, to obtain this information more efficiently.

CONCLUSIONS

It is difficult in such a space to do justice to the richness and range of issues raised and explored in EDSTAT-L over its lifetime. The contents of the list largely reflect the trends in statistics education over the past two decades. These include the tremendous impact of technology and the evolving consensus around the need to emphasize real data and statistical concepts. Perhaps most important of all, EDSTAT-L has provided a forum in which misunderstandings can be cleared up, out-dated ideas challenged, and suggestions aired for the consideration of all.

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