

Mathematics in the Newspaper: Seeking Quantitative Literacy

Fred Worth, Professor
Department of Mathematics and Computer Science
Henderson State University

Abstract: This paper, whose presentation at the Arkansas Conference on Teaching (Little Rock Arkansas, November 8, 2002) was funded by a Henderson State University Faculty Development Grant, deals with using various media sources as classroom examples of daily use of mathematics.

This paper admittedly will not translate well into a paper since it is very visual but I will hopefully be able to give a fair idea of the content of the paper.

"Why do I need to know this stuff?"

This is a question that every mathematics (and likely other disciplines as well) instructor has heard innumerable times. While some students are content with knowledge for the sake of knowledge, most students want to know why something should be of importance to them. One thing they will generally accept is that if we can find the mathematics we are covering in the newspaper then they know they need to understand the mathematics in order to understand what they are reading. If we can help them see the need to understand mathematics in order to be a well informed consumer or citizen then we increase our chances of improving their attitudes and performance.

For the purposes of this paper, "newspaper" will be defined to include newspapers, magazines, the web, television, radio, advertising, conversations, historical material and pretty much anything else.

The main course in which I use the newspaper a lot is in mathematics for the liberal arts. Those students, typically, are non-mathematics people. They are not mathematics or science majors. They are less likely to see how mathematics will be important to their major or career.

In order for the material to work in the class, it must be reasonably closely related to the subject matter in a way students can see, not too sophisticated, not too tedious and either interesting or amusing.

Mathematics for the liberal arts has six main subject areas. These are

1. Logic & argumentation
2. Probability & Statistics
3. Finance
4. Algebra
5. Percentages

6. Other

"Other" would include general mathematical literacy.

Following are a few examples of how I use the newspaper in the class.

1. Logic & argumentation

Among other things, we take letters to the editor of various newspapers and try to analyze the logic, or lack thereof, in those letters. We look for informal logical fallacies like "diversion," "straw man," "personal attack," "hasty generalization," "appeal to popularity," "appeal to ignorance," "appeal to emotion," "false cause," "limited choice" and "circular reasoning."

2. Probability & Statistics

Clearly, statistics are used in newspapers on a very consistent basis. We seek to make sure students can read tables and graphs, and understand concepts such as mean, median, mode, and margin of error. We also look at probability and its applications to daily life. One particularly popular example was a "Reader's Digest" article which sought to determine an individual's probability of having a heart attack within the next year, five years or ten years.

3. Finance

"Should I take a debt consolidation loan that lowers my payments but increases the length of repayment?" "Should I take a 15 year mortgage or a 30 year mortgage?" "How much money will I have in my retirement fund?" These are all questions that students understand to be relevant to their lives. We look at real life examples and scenarios dealing with such questions and help students learn how to make informed decisions on such topics. This is also a place where we try very hard to help students realize the importance of thinking about answers. I have had a number of students who, when asked for a monthly payment on a 30 year mortgage of \$100,000 at 7% end up with answers like \$14000 per month or \$3.86 per month. Such questions are not generally in their realm of experience but we hope that, by the end of the course, they have a better grasp of the "reasonableness" of answers.

4. Algebra

Most of the algebra that we cover in the class deals with mathematical modeling. In particular, we look at the differences between exponential growth models and linear growth models. Examples considered are population growth, radioactive decay, and growth of debt.

5. Percentages

A year after Arkadelphia's tornado of 1997, an article appeared in the *Democrat-Gazette* quoting a scientist who studies tornados, their prediction, and warning systems. The Associated Press reporter related something said by the scientist. He was reported as saying that tornado deaths in the 1990s were down 300% from tornado deaths in the 1940s. We try to help students see the

foolishness of such comments. It should be noted that the statement was reported without quote marks so it seems the reporter was relating what was said. My guess is that the scientist said deaths had been 300% higher, which, based on the given data, was true.

Another example I use is to ask if it is possible for both people to be correct if one said something increased 1% and another reports that it increased 20%. The general reaction, of course, is no, they are not both correct. I then relate the issue of the increase in summer stipends for Henderson faculty from a few years ago. The salary went from 5% - 6% of annual salary per course. While a change of 1% in the rate, it was an increase of 20% in the actual paycheck amount.

With these and similar examples, we seek to help students understand percentages and read reports intelligently.

6. Other

There will regularly be articles dealing with quantitative issues (e.g. - elections - plurality vs. majority) that we will present to students to help them see that, regardless of major, some level of mathematical literacy is vital in order to be able to function intelligently as a citizen and consumer.

To conclude, I will repeat what was said earlier. The average student will benefit when he or she sees the applicability of any concept to daily life. We can tell them over and over about the use of what we are covering, but when they can see it in their own environment they are more likely to believe and see a subsequent increase in motivation and interest.

Biography

Fred Worth received his B.S. in Mathematics from Evangel College in Springfield, Missouri in 1982. He received his M.S. in Applied Mathematics in 1987 and his Ph.D. in Mathematics in 1991 from the University of Missouri at Rolla. He has presented papers at meetings of the American Mathematical Society and the Mathematical Association of America. He has also given a number of workshops at home school conventions. He has been teaching at Henderson State University since August, 1991.

Disclaimer: Henderson State University and the Office of Computer and Communication Services assume no responsibility for any information or representations contained in the student/faculty/alumni web pages. These web pages and any opinions, information or representations contained therein are the creation of the particular individual or organization and do not necessarily reflect the opinion of Henderson State University or its Office of Computer and Communication Services. All individuals publishing materials on the Henderson State University Web Server understand that the submission, installation, copying, distribution, and use of such materials in connection with the Web Server will not violate any other party's proprietary rights.