Suckers for numbers

by Robert Brand

Most media practitioners would agree that numeracy – a basic competence with numbers – is an essential skill in modern journalism. Without it, we can't fully understand the world we live in, or explain and interpret it for our audiences. Virtually every aspect of life these days is quantified or measured by statistical or numerological data. Yet new research indicates that South African journalists are error-prone when it comes to numbers.

In that they are not alone. Mathematical incompetence among journalists world-wide remains, as Maier (2002a) puts it, "legendary". Journalism seems to attract students who have an aversion to numbers. Maier's 2003 survey of journalists at a major US newspaper provides empirical evidence supporting the claim that "journalism is a refuge for students uncomfortable with math". The study found that journalists who had majored in journalism were worse at maths in high school, tended not to take maths at university, scored less well in a maths test, and had less confidence in their own ability in maths than those who had studied other subjects at university.

There is no comparable empirical evidence in South Africa, but the South African National Editors Forum's 2002 skills audit concluded that reporters "lack(ed) skills with regard to relatively uncomplicated calculations". More than half of the reporters questioned by Sanef's researchers couldn't give the correct answer to the question: "If 4 000 000 Zimbabwean citizens indicated they were going to vote, and 2 000 000 indicated they were not going to vote, what percentage of Zimbabwean citizens will vote?" (De Beer & Steyn 2002).

What does "numeracy" – or "mathematical literacy", the term preferred by our education authorities – mean? It does not mean mastery of mathematical fields such as algebra, calculus and geometry. It refers, rather, to the ability to use numbers to meet the demands of everyday life and work. For journalists, that includes the ability to do basic arithmetic, interpret and analyse statistical data, and understand basic economic indicators. Without those essential skills, journalists can't do their jobs properly.

As Deborah Potter (1998) of the Poynter Institute says: "Journalists need math skills to make sense of numbers the way they need language skills to make sense of words… Too often reporters and editors are suckers for numbers. A number looks solid, factual, more trustworthy than a fallible human source. And being numerically incompetent, journalists can't find the flaws in statistics and calculations. They can't tell the difference between a meaningless number and a significant one. The result is stories that are misleading and confusing at best, and at worst flat out wrong… Journalists who fail to master math …lack a basic skill needed to decipher much of the information in the world around them."

Although there have been a number of studies in the US and Canada documenting the frequency of mathematical errors in news media, there has been relatively little research into the kind of errors committed by journalists, or the extent to which journalists rely on numbers to cover the news. Maier (2002) conducted the first mathematics audit of a US newspaper to address those questions. In South Africa, the research record is thin: the Sanef skills audit, which only touched on the issue, and a master's thesis by Amelia Genis at Stellenbosch University (2001).

Neither of those studies attempted to quantify numerical errors or the extent to which journalists rely on numbers. Genis' study is an overview of error types that commonly occur in journalism, and contains some useful anecdotal data. The Sanef skills audit does not specifically address the issue of numeracy. It identifies the newsgathering process, writing and accuracy as areas that need to be addressed in training. Accuracy includes, though it is not explicitly stated, accurate presentation of numbers (ie mathematical facts). It also raises the important issue of the role of mathematics in journalism training. De Beer and Steyn state the following in a footnote to their report on the audit: "Editors expressed concern that the essential skills needed for modern-day reporters are not adequately addressed. These include knowledge of and training in subjects like economics… It was argued that tertiary institutions should train students in these subjects… This also included calculation and mathematical skills."

In my research, I attempted to answer three questions: How often do news reports in a daily newspaper involve mathematical calculation? How often do mathematical errors occur in those reports? And what types of mathematical errors occur in those reports?

Twelve consecutive weekday editions of the *Cape Times*, a daily newspaper based in Cape Town, South Africa, were examined to measure the frequency of quantitative elements in news reports, the frequency of mathematical errors in those reports containing quantitative elements, and the types of errors that occur. The sample consisted of 230 locally bylined news reports. It excluded the business pages, where a higher level of numerical competence could be assumed, as well as wire service and correspondents' reports over which the newspaper has limited control in terms of accuracy. The news reports were systematically examined to determine whether they involved a mathematical element. Those that involved a mathematical element were then examined for possible errors, and the errors that were discovered were categorised.

My choice of the *Cape Times* was a convenience sample, dictated by availability (I am a subscriber to the newspaper and therefore had easy access to any number of copies). It is therefore not representative of the South African media or newspapers, and the results cannot be statistically generalised. The aim of the study, rather, was to identify hypotheses for further research.

Even so, the choice of the *Cape Times* as a sample can be defended on grounds other than convenience. If there is such as thing as a typical South African daily newspaper, the *Cape Times* would be it. It is a mid-sized, English-language, metropolitan newspaper. Its average daily circulation at the time my research was conducted (49 500) and readership (319 000) are the median circulation and readership of the 18 daily newspapers surveyed by the Audit Bureau for Circulations and the South African Advertising Research Foundation. It is owned by the second-largest newspaper publisher in South Africa, Independent News and Media; therefore, one can reasonably assume that it is as well-resourced as could be expected.

Following Maier's example, a news story was considered to involve a quantitative element if it included either an explicit or implicit mathematical calculation. The definition excludes simple numbers such as an age, a price or a date. The definition of "mathematical error" is more complicated. Maier adopted an open-ended definition, which included factual errors as well as errors of interpretation and presentation. Of necessity, this involved subjective assessments, and that is the reason why Maier didn't attempt to quantify how many errors were made. Since the one aim of my study is to quantify the number of errors, I adopted a narrower definition including only factual errors (bearing in mind that some errors in interpretation may also be factual, for example errors in the interpretation of statistical data).

To gauge how often maths is required in daily news coverage, 230 stories from the *Cape Times* were examined over a three-week period. Of those, 92, or 40%, were found to contain a quantitative element. Of the 92 stories containing a quantitative element, 26, or 28%, were found to contain errors.

The errors could be categorised into five broad types:

- Numbers don't tally – 24%
- Unquestioning use of number – 24%
- Internal inconsistency – 22%
- Misinterpretation of numbers – 19%
- Misuse of mathematical term – 11%

In the first category, numbers don't tally, most errors were simple arithmetical mistakes: for example, a news report stated that there were 5.2 million Afrikaans mother-tongue speakers in South Africa, of which 2.9 million were coloured, 2.5 million white and 213 000 black (5 May, p5). Another story stated that 44 000 traffic fines had been issued illegally. The report then states that 6 500 people had already paid fines that were served incorrectly, and that the city had instructed the operator not to prosecute "the remaining 39 000 'non-compliant' notices".

Incorrect calculation of a percentage resulted in a number of errors: a report on a dispute between teachers and the government stated that a labour union represented 17 600 teachers, "amounting to 61% of the province's teachers". The same report later quotes a government official as saying that the

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province has 28 000 teachers. That means that the union, with its 17 600 members, represent 62.9% of the teachers.

Unquestioning use of numbers that are self-evidently wrong resulted in a number of errors which should, on reflection, have been obvious to the reporter. For example, a report on the plight of children attending farm schools quotes a spokesman for an NGO as saying "some children have to walk 35km to school every day". That is clearly impossible and an obvious exaggeration (at a walking rate of 5km per hour, walking 35km would take 7 hours).

Internal inconsistencies were common, often within a report itself, or between the report and headline, or the report and illustration. For example, a report on four Cape Town sailors who sailed a dhow from Kenya to Tanzania states that the boat is based on a "1 500-year-old design". The caption under the picture accompanying the story says it is based on a "2 000-year-old design".

Misinterpretation of numbers has to do mostly with the interpretation of statistical data, where the reporter draws incorrect or insupportable conclusions from the data available. For example, on 10 May the newspaper reported on page 1 that "Half of SA drivers are on the road with fake licences". The report is based on an audit of 10% of South Africa's 7 million drivers' licences at a small number of licensing stations, which were targeted because of allegations of fraud. The sample is therefore biased and non-representative, and the findings cannot be generalised as the reporter does. In the same report, a "verification company" is quoted as saying 18% of driver's licenses submitted to it for verification turn out to be "forged or fraudulent".

Misuse of mathematical terminology implies a lack of understanding of the meaning of terms. A common error confuses the term "percent" with "percentage point", for example when a decline in the inflation rate from 5.5% to 4% is described as a 1.5% drop". In fact, the rate declined by 1.5 percentage points. The difference between the two numbers is 30%, not 1.5%.

The proportion of stories in the *Cape Times* containing a quantitative element compares with Maier's findings at the Raleigh *News & Observer*, which found that 48% of stories contained a mathematical element. However, the error rate of 28% is much higher than that found in comparable studies, where error rates varied from 3% at the *Vancouver Sun* in Canada (Bailey 2001) to 12% at the Raleigh *News & Observer* (Maier 2002b). This clearly suggests that South African journalists are not as comfortable with numbers as they should be.

Low levels of numeracy among journalists, however, cannot be seen in isolation from broader social and education problems facing the country and the media.

The national education department has recognised the problem, and has instituted mathematical literacy as a school subject. This approach may improve the situation in the long term. However, it is now four years since Sanef's skills audit drew attention to shortcomings in journalism training, and the effect on issues such as accuracy in news reporting.

It is clear from my research that numeracy is also major problem. Perhaps it is time for tertiary institutions to include numeracy training in the journalism curricula, and for media houses to focus attention on this problem. ■

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