Chapter 2.40
Two Experiments in Reducing Overconfidence in Spreadsheet Development

Raymond R. Panko
University of Hawai`i, USA

ABSTRACT

This paper describes two experiments that examined overconfidence in spreadsheet development. Overconfidence has been seen widely in spreadsheet development and could account for the rarity of testing by end-user spreadsheet developers. The first experiment studied a new way of measuring overconfidence. It demonstrated that overconfidence really is strong among spreadsheet developers. The second experiment attempted to reduce overconfidence by telling subjects in the treatment group the percentage of students who made errors on the task in the past. This warning did reduce overconfidence, and it reduced errors somewhat, although not enough to make spreadsheet development safe.

INTRODUCTION

Spreadsheet development was one of the earliest end-user applications, along with word processing. Spreadsheet development continues to be among the most widely used computer applications in organizations (United States Bureau of the Census, 2003). Although many spreadsheets are small and simple throwaway calculations, surveys have shown that many spreadsheets are quite large (Cale, 1994; Cragg & King, 1993; Floyd, Walls, & Marr, 1995; Hall, 1996), complex (Hall, 1996), and very important to the firm (Chan & Storey, 1996; Gable, Yap, & Eng, 1991).

Unfortunately, there is growing evidence that inaccurate spreadsheets are commonplace. For instance, Table 1 shows that recent audits of 88 real-world spreadsheets have found errors in 94%; yet several studies only reported spreadsheets with

serious errors. The implications of this ubiquity of errors are sobering.

As Table 1 shows, the field audits that measured the frequency of errors on a per-formula basis found an average formula error rate of 5.2%. This formula error rate explains why so many of the examined spreadsheets contained errors. Most large spreadsheets contain hundreds or thousands of formulas. Given the cell error rates found in field audits, the question is not whether large spreadsheets contain errors, but rather how many errors they contain and how serious these errors are.

These field audits and the experiments described later found three types of errors.

• Mechanical errors are mental/motor skill slips, such as typing the wrong number or pointing to the wrong cell when entering a formula.
• Logic errors are incorrect formulas caused by having the wrong algorithm or expressing the algorithm incorrectly.

Table 1. Studies of spreadsheet errors

Study	Year	Number of Spreadsheets	Percent of Spreadsheets Containing at Least One Error	Formula Error Rate (FER): Percent of Cells Containing Errors
Field Audits				
Hicks	1995	1	100%	1.2%
Coopers & Lybrand (c)	1997	23	91%	
KPMG (b)	1998	22	91%	
Lukasic	1998	2	100%	2.2%, 2.5%
Butler	2000	7	86%	0.4%
Clermont, Hanin, & Mittermeier (a)	2002	3	100%	1.3%, 6.7%, 0.1%
Lawrence & Lee	2004	30	100%	Average of 6.9%
Total/Per Spreadsheet		88	94%	5.2%
Development Experiments				
Brown & Gould	1987	27	63%	
Olson & Nilsen (f,g)	1987-1988	14		21%
Lerch (f,g)	1988	21		9.3%
Hassinen (g)	1988	92	55%	4.3%
Panko & Halverson	1997	42	79%	5.6%
Panko & Halverson	1997	35	86%	4.6%
Teo & Tan	1997	168	42%	2.1%
Panko & Sprague (i)	1998	26	35%	2.1%
Panko & Sprague (j)	1998	17	24%	1.1%
Janvrin & Morrison (h)	2000	61		6.6%-9.6%
Janvrin & Morrison (h)	2000			8.4%-16.8%
Kreie (posttest)	2000	73	42%	2.5%

(a) Computed on basis of all non-empty cells instead of on the basis of formula cells. (b) Only spreadsheets with major errors were counted. (c) A dependent variable value was off by at least 5%. (d) Only errors large enough to demand additional tax payments were counted. (e) Only serious errors were counted. (f) Counted errors even if they were corrected by the developer. (g) CER is based only on formula cells. (h) CER was based only on high-risk formula cells. (i) MBA students with little or no development experience. (j) MBA students with at least 250 hours of spreadsheet development experience.
Source: Panko (http://panko.cba.hawaii.edu/ssr/). References to studies are given at the Web site.

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