

# A Study of Help Requested Online by Spreadsheet Users

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## ABSTRACT

*The software used by organizations can have a substantial effect on employees' productivity. One of the dominant kinds of software in the workplace today is the spreadsheet, which has proven useful for performing numeric computations as well as for organizing, manipulating, and visualizing data. The authors present an analysis of the problems reported online by users of different spreadsheet editors, in order to guide the selection and enhancement of those editors. They've found that most requests for help were related to operations that the authors refer to as "foundational," such as with configuring the editor and setting up real-world problems in the form of spreadsheets, rather than with using particular formulas or features. They have identified a number of key similarities and differences in questions about different spreadsheet editors and versions of Excel, ultimately leading to several challenging opportunities for future research.*

*Keywords:* End-User Development, End-User Programming, Information Systems, Information Technology, Spreadsheets

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## INTRODUCTION

Spreadsheets play an increasingly important role in the operations of companies and other organizations. Projections indicate that by 2012, over 50 million people in American workplaces will create spreadsheets or databases as part of their everyday work (Scaffidi, Shaw, & Myers, 2005). Worldwide, over 500 million people use spreadsheets (Microsoft, 2010). This popularity stems from spreadsheets' usefulness for a broad

range of tasks that include organizing, analyzing, exploring, and visualizing data (Nardi, 1993). In prior studies, we have also found that spreadsheets are becoming a crucial resource for storing and manipulating data that information workers retrieve from web sites (Scaffidi, Cypher, Elbaum, Koesnandar, & Myers, 2007).

With the rising importance of spreadsheets in the organizational context, it is vital to examine the problems reported when people use editors such as Microsoft Excel to create and modify spreadsheets. One reason is that the acceptance and adoption of technology is strongly

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controlled by its perceived usefulness, as well as its perceived ease of use (Davis, 1989; Ma & Liu, 2004). Therefore, understanding the relative strengths and weaknesses of different spreadsheet editors is likely to be useful for guiding organizations as they select a tool for their use. In addition, identifying common questions can provide researchers with insights about where spreadsheet editors as a whole need improvements, in order to facilitate smoother and more productive adoption.

Moreover, it is important to characterize the problems that people ask for help with because these problems directly affect the support that organizations will need to provide to users. In particular, an assessment of training needs—including an identification of problems commonly reported by users—is a necessary precursor to implementation and testing of training materials (Bostrom, Olfman, & Sein, 1998; Oinas-Kukkonen, Hohtari, & Pekkola, 2010). Organizations typically respond to requests for help through an information technology department or through informal peer support by users who are often called “local developers” or “gardeners” (Nardi, 1993; Morch & Asand, 2006). These IT departments and gardeners invest time in learning how to overcome problems that people commonly ask for help with solving, in order that they can provide support to problems as needed without having to discover solutions during a crisis. Making an informed decision about this investment of time requires knowing what kinds of problems users commonly ask for help with solving.

To date, empirical studies have focused on only a narrow range of problems reported by spreadsheet users. In particular, despite the fact that spreadsheet editors have progressed far beyond simple calculation engines, formula errors are the only spreadsheet user problem that has received extensive investigation. Studies have shown that formula errors are common (Panko, 1998; Powell, Baker, & Lawson, 2009) and can lead to monetary loss (Caulkins, Morrison, & Weidemann, 2007). In response, researchers have proposed a variety of approaches for improving the process

by which spreadsheets are created and tested (e.g., Panko, 1999; Rothermel, Cook, Burnett, Schonfeld, Green, & Rothermel, 2002; Panko, 2007). Yet formula errors are only one of many conceivable problems that users might be facing, and it is not at all clear that they remain the most important category of problem from the standpoint of designing training materials and support systems.

In response to this gap in our understanding of common requests for help, we conducted a preliminary study in prior work, where we investigated questions that users posted to an online forum about Microsoft Excel (Chambers & Scaffidi, 2010). We identified seven common categories of problems and noted that only 18% of posted user questions were about formulas.

The current paper presents a follow-up study where we extend our qualitative analysis of the forum for Microsoft Excel and also analyze data from forums for two additional spreadsheet editors, Apple Numbers and OpenOffice Calc. Broadening our analysis enables us to compare posted problems among these three tools, and it also allows us to compare posted problems related to different versions of Excel. We use this new data set to answer three new questions:

- Q1. What spreadsheet editor problems do people commonly ask online for help with solving?
- Q2. How do posted problems vary among different spreadsheet editors?
- Q3. Have users' posted problems with Excel evolved over time?

Overall, our study has shown that while there were differences among the problems posted to the three forums, there several topical areas were common among the editors. In particular, questions about what we refer to as “foundational” operations were widespread. These problems included installing and configuring the editor, setting up a problem as a spreadsheet (i.e., conceptualizing a real-world problem in terms of a spreadsheet-programming problem), and finding appropriate features in

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