

Chapter 5

Data System–Embedded Guidance Significantly Improves Data Analyses: When Data Is Made ‘Over– the–Counter’ for Users

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ABSTRACT

In the field of Education, computerized data systems are used to manage, retrieve, and analyze information. Educators view this information in the form of data reports, which educators use to inform decisions that impact students. These decisions are frequently undermined by misunderstandings concerning the data and its implications. Yet data systems and their reports typically display data without any guidance concerning the data’s proper analysis. In a quantitative study, medicine labeling conventions were applied to data systems to embed guidance in the proper use of contents. Among 211 educators of varied backgrounds and roles, data analyses were found to be 307% more accurate when a report label/footer was present, 205% more accurate when a 1-page reference sheet was present, and 273% more accurate when a reference guide was present. Findings hold implications for those who provide or use tools for high-stakes information retrieval, analysis, and/or management, particularly in Education.

INTRODUCTION

Pharmaceutical companies are required by such agencies as the Food and Drug Administration (FDA) to embed usage guidance in the packaging of over-the-counter medication to reduce errors when the medicine is used (DeWalt, 2010). Thus

consumers can read the medicine’s purpose, ingredients, dosage instructions, and dangers in order to better understand these important details (Kuehn, 2009). Considering how a mistake in medicine use can impact a person’s wellbeing, one might expect similar usage guidance on other products that – if used incorrectly – could harm people.

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In the field of Education, computerized data systems are used to manage, retrieve, and analyze student, educator, and school information. These systems display this data in the form of data reports, which educators view and analyze to make data-informed decisions that impact stakeholders. Essentially, educators use the data to impact students' wellbeing, whether that wellbeing is academic, emotional, behavioral, social, or otherwise. Yet, unlike common over-the-counter products, data systems do not typically embed usage guidance to ensure each data report's content is understood and used appropriately. In fact, many data systems display data for educators without sufficient support to use the systems' contents – data – wisely (Coburn, Honig, & Stein, 2009; Data Quality Campaign [DQC], 2009, 2011; Goodman & Hambleton, 2004; National Forum on Education Statistics [NFES], 2011).

This chapter profiles a quantitative study by Rankin (2013a) in which the concept of making data “over-the-counter” was explored, meaning usage guidance was embedded within the environment in which the data content was viewed and used. The researcher tested the impact on 211 educators and identified formats through which data systems can embed report-specific data usage guidance in order to significantly improve educators' data analysis accuracy. The chapter will provide background on current problems when data systems are used for data analyses, summarize the focus and scope of previous studies conducted, and share the purpose of the Rankin (2013a) study conducted in response. The study's details and findings will then be provided, as well as implications for future research. The chapter's main objective is to provide readers with an understanding of why data systems should offer over-the-counter data, and how this can best be achieved in order to best help students or other stakeholders affected by data-informed decisions facilitated by the data systems.

BACKGROUND

Given the many complexities of education data, particularly assessment data, educators' data-informed decisions are frequently undermined by misunderstandings concerning the data and its implications. Yet data systems and their reports typically display data without any guidance concerning the data's proper analysis. Pharmaceutical label conventions can result in improved understanding on non-medication products, as well (Hampton, 2007; Qin et al., 2011). Thus, in the way over-the-counter medicine's proper use is communicated with a thorough label and sometimes with added documentation, the researcher hypothesized a data system used to analyze student performance could include components to help users better comprehend the data it contains.

A data system, also referred to in education as a student data system, is software that provides student data to educators in a digestible, report-based format (Wayman, 2005), and educators use data systems to make decisions that impact students (VanWinkle, Vezzu, & Zapata-Rivera, 2011). No or poor medication labels have resulted in many tragic errors (Brown-Brumfield & DeLeon, 2010), and the researcher hypothesized that data systems' lack of proper labeling for educators was similarly contributing to poor data understanding and use. Feedback is one of the most powerful influences on student learning and achievement, but this impact can be negative if the performance feedback is not provided in the best way (Hattie & Timperley, 2007).

Although data systems are commonly used to generate data reports, research on aspects of report format and system support that could enhance analysis accuracy is scarce (Goodman & Hambleton, 2004). Previous research that was devoted to ways in which data systems and reports communicate data to educators limited this exploration to participants' preferences and participants' perceived value of supports. How-

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