Chapter 8
Statistical Literacy: Conceptual and Instructional issues

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FRAMING THE PROBLEM

One key declared goal of education programs at all levels is preparing learners to become more informed citizens and workers who can effectively function in an information-laden society. Towards that end, instruction in literacy and mathematics is usually provided, in part because adults will need to interact daily with quantitative situations, including many where quantitative information is embedded in test. This paper focuses on one critical but often neglected aspect of mathematics (numeracy) education, that of developing statistical literacy.

The term “statistical literacy” does not have an agreed-upon meaning. In public discourse, when “literacy” is combined with any term referring to a specific knowledge domain (e.g. “computer literacy”) it conjures up an image of the minimal subset of “basic skills” expected of all learners or citizens, as opposed to a more advanced set of skills find knowledge that only some people may achieve. In this sense, statistical literacy may be understood by some to denote a minimal knowledge of basic statistical concepts, tools, and procedures, possibly including some interpretive skills.

In this chapter “statistical literacy” describes people’s ability to interpret and critically evaluate statistical information and data-based arguments appearing in diverse media channels (e.g. newspaper articles, TV and radio news and programs, publications of political groups, advertisements) and their ability to discuss their opinions regarding such statistical information. This conception is related to a “minimal skills” conception, yet emphasizes sense-making and communicative capacities, more than formal statistical

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knowledge, assuming that most adults are consumers rather than producers of statistical information. Statistical literacy is needed if adults are to be fully aware of trends and phenomena of social and personal importance, such as crime, population growth, spread of diseases, industrial production, educational achievement, employment, and so forth, or to enable informed participation in public debate or action regarding national or community issues Wallman, 19933. Similar needs arise in many workplaces, given increasing demands for quality and employee self-management (Carnevale. Gainer & Meltzer, 1990; Packer. 1997). Despite the importance of statistical literacy and its role in adults' general numeracy (Gal, 1997), almost no in-depth discussions regarding statistical literacy and the educational processes needed to develop it have been published. This chapter aims to contribute to a needed dialogue among practitioners, educational planners, and researchers in order to promote statistical literacy. The chapter is organized in three parts. First, key contexts where statistical literacy is needed and can be developed are described. Next, key components of statistical literacy are outlined. Finally, some instructional dilemmas and implications for teaching and research are discussed.

**TYPES OF INTERPRETIVE CONTEXTS**

A discussion of statistical literacy should first consider the contexts in which such "literacy" may both develop and be called for. We start by discussing the classroom or teaching context, since students should learn and know something about statistical and probabilistic concepts and procedures as a prerequisite for making sense of statistical messages.

*Introducing statistical ideas*

Various sources exist that discuss goals and approaches to instruction in introductory statistics at different levels of instruction (e.g. Friel, Russell & Mokros, 1990; Moore, 1992; Gal & Garfield, 1997; Lajoie, 1998). Such sources usually make quite similar recommendations, though the range of topics to be covered and the sequencing of topics and activities may vary depending on student, teacher, and context factors. An approach often suggested for almost any level of instruction is that teachers spend some time on basic concepts and procedures, and also take students on at least one complete cycle of a statistical investigation, where students engage all these phases: