

## Critical Values: Connecting Ethics, Service Learning, and Social Justice to Lift Our World

Lawrence M. Lesser

Dept. of Mathematical Sciences, University of Texas at El Paso

### ABSTRACT

To a statistics educator, the American Statistical Association's call to enhance human welfare can take many forms (e.g., having one's course include ethics, service learning, or teaching for social justice) and this paper aims to give some sense of how these various forms differ as well as how they connect to each other and to the mission of the ASA. Comprehensive analysis of each form is beyond the scope of this paper, but key recent references on each form will be provided.

**Keywords:** Ethics, Service Learning, Teaching for Social Justice

### Introduction

There has recently been much interest in how statistics can better society. The theme of the 2005 JSM (and one of six parts of the ASA's Mission Statement; see the "Vision, Mission, and History" page at [www.amstat.org/about/index.cfm?fuseaction=vision](http://www.amstat.org/about/index.cfm?fuseaction=vision)) is "Using Our Discipline to Enhance Human Welfare", and at that conference a Special Interest Group was formed for "Statistical Volunteerism." The December 26, 2004 tsunami generated immediate efforts by statisticians to respond (Scheuren 2005). Pollack and Wunderlich (2005) detail efforts by the Committee on National Statistics' Panel on Methods for Assessing Discrimination to measure the outcome disparities many racial and ethnic groups in the United States continue to face in employment, income and wealth, housing, education, criminal justice, health care, and other areas. These efforts may give renewed attention to the declaration of 19th-century French statistician Eugene Burét: "It no longer suffices to know how things are constituted: we need to seek how things *should* [emphasis added] be constituted so that this world of ours may present less suffering and destitution."

Karl Pearson called statistics the "grammar of science", but as Lesser and Blake (in press) assert, perhaps statistics should also be known as the "grammar of social justice". After all, how can people

recognize, analyze or fight against social inequalities without the tools to identify statistical group differences or patterns? How can people talk about what is unfair without knowing how to calculate the expected value of a fair share and how much statistical deviation from that might be tolerated as innocuous? How can people produce or interpret depictions of quantitative information without awareness of pitfalls? Three worthwhile areas that can also eventually move towards "teaching statistics for social justice" are: ethics, community service, and statistical literacy/reform.

### Ethics

Aiming to "enhance human welfare" certainly conjures an ethical dimension and different ethical philosophies (e.g., utilitarianism) would have different ways of seeking to define and implement this enhancing. ASA (1999) gives Ethical Guidelines for Statistical Practice, and these are arguably included in the Mission's call for the "proper application of statistics". Gardenier (2002, p. 22), in turn, tells us that "You can make your case persuasively if you know not only what the statistical ethics guidelines are, but also how they relate to professional ethics generally and their basis in ethical philosophy."

The curriculum module of Lesser and Nordenhaug (2004) explored ways in which statistics is not only grounded in ethical philosophy, but also can help illuminate ethical philosophy, and thus offer more understanding or direction in what we do. One example was how mathematics and statistics can be used to explore the pitfalls of the rule-utilitarian concept of "greatest good for the greatest number".

Temkin (1993) provides analysis of various technical statistical measures of inequality, such as coefficient of variation, the standard deviation of the logarithms, and the Gini coefficient. Ethics (especially normative ethics) can give grounding and momentum towards a social justice focus, and an Internet search reveals that there are college and universities that have "ethics and social justice" courses (e.g., Kenyon College), mission statements (e.g., Curtin University of Technology), and centers (e.g., Loyola University Chicago).

## Service Learning

Anderson and Sungur (2002) describe six pedagogical levels at which an introductory statistics course can be enhanced by a “community awareness component”, ranging from “students are given a community related dataset and asked to use pre-determined statistical methods and techniques” up to “students are asked to identify a community related problem, collect or generate all the required information/data and analyze using appropriate statistical methods and techniques”.

Building on the highest levels of community awareness is a course having a component of service learning, defined by Anderson and Sungur (1999, p. 132) as “community service that relates to student involvement and appreciation within a given course.”

Kahne and Westheimer (1996, p. 593) elaborate: “Service learning makes students active participants in service projects that aim to respond to the needs of the community while furthering the academic goals of students.” This clearly goes beyond volunteerism, because there are also outcomes for the students -- academic skills and some structured reflection—so the learning process goes both ways. (The reflection is not only on the activity itself, but also includes any changes in the participant’s thinking or goals.) Faculty have implemented service learning through a variety of courses, including: a data analysis course (e.g., Anderson and Sungur 1999), an introductory course (e.g., Duke 1999), a design of experiments course (e.g., Anderson and Sungur 1999), and a statistical consulting course (e.g., Jersky 2005). In addition to courses, service learning has been provided by a student-run consulting program, as reported by Gunaratna, Stevens, and Johnson (2005). The recent book by Hadlock (2005) contains a section of service-learning projects in statistics.

## Teaching for Social Justice

Teaching for social justice, in turn, goes beyond service learning in the sense that service learning does not automatically include explicit discussion of sociopolitical and historical context, and may sometimes even come across as superior helpers giving charity to those who are without. As Gutstein (2005) explains, “the danger is that when people sometimes lack a full understanding of WHY people are without, it can become a deficit orientation so things like ‘economic disadvantage’ become ‘disadvantaged’, and there isn’t an analysis of how these things came to be” or what efforts besides direct service might alleviate the observed problems. Another difference is that service learning may be more focused on short-term benefits for an individual recipient while a social

justice approach is looking toward understanding root causes and effecting a change that is more long-term, widespread, and systemic or structural. While there do not appear yet to be any published comprehensive materials exclusively about teaching statistics for social justice, key related resources for teaching mathematics for social justice include Gutstein and Peterson (2005) and Gutstein (in press). There are also several individual articles on specific topics or data sets, such as Rouncefield (1995).

## Statistical Literacy/Reform

Yet another path towards teaching for social justice would be the kind of progressive curriculum already embedded in Milo Schield’s Statistical Literacy project ([www.statlit.org](http://www.statlit.org)) and in documents such as Guidelines for Assessment and Instruction in Statistics Education (<http://it.stlawu.edu/~rlock/gaise/>), but simply with an explicit critical component so that students are not merely learning to become savvy consumers and workers, but are also becoming empowered to be active participants in a democracy.

## REFERENCES

- American Statistical Association (1999), “Ethical Guidelines for Statistical Practice.” [www.amstat.org/profession/index.cfm?fuseaction=ethicalstatistics](http://www.amstat.org/profession/index.cfm?fuseaction=ethicalstatistics)
- Anderson, J. E. and Sungur, E. A. (1999), “Community Service Statistics Projects.” *The American Statistician*, 53(2), 132-136.
- Anderson, J. E. and Sungur, E. A. (2002), “Enriching Introductory Statistics Courses through Community Awareness.” Paper presented at 6<sup>th</sup> International Conference on Teaching Statistics, Cape Town, South Africa.
- Duke, J. I. (1999), “Service Learning: Taking Mathematics into the Real World.” *Mathematics Teacher*, 92 (9), 794-799.
- Gardenier, J. S. (2002), “Making Statistical Ethics Work for You, of Course,” *Amstat News*, No. 296, 21-22.
- Gunaratna, N. S.; Stevens, J. R.; Johnson, C. A. (2005), “Service Learning Through a Student-Run Consulting Program,” Paper presented to the Section on Statistical Education at the 2005 Joint Statistical Meetings, Minneapolis, MN.
- Gutstein, E. and Peterson, B. (Eds.) (2005), *Rethinking Mathematics: Teaching Social Justice by the Numbers*. Milwaukee, WI: Rethinking Schools.
- Gutstein, E. (2005), Personal communication with author [via email on May 28].
- Gutstein, E. (in press), *Reading and Writing the World with Mathematics*. New York: Routledge.

- Hadlock, C. (2005), *Mathematics in Service to the Community: Concepts and Models for Service-Learning in the Mathematical Sciences*. Washington, DC: Mathematical Association of America.
- Jersky, B. (2005), "Service Learning with Undergraduates." Paper presented to the Section on Statistical Education at the 2005 Joint Statistical Meetings, Minneapolis, MN.
- Kahne, J. and Westheimer, J. (1996), "In Service of What? The Politics of Service Learning." *Phi Delta Kappan*, 77, 592-599.
- Lesser, L. M and Nordenhaug, E. (2004), "Ethical Statistics and Statistical Ethics: Making an Interdisciplinary Module", *Journal of Statistics Education*, 12(3), <http://www.amstat.org/publications/jse/v12n3/less.html>.
- Lesser, L. M. and Blake, S. (in press), "Mathematical Power: Exploring Critical Pedagogy in Mathematics and Statistics." In C. Rossatto, R.L. Allen, M. Pruyne (Eds.), *Re-inventing Critical Pedagogy: Widening the Circle of Anti-Oppression Education*. Lanham, MD: Rowman & Littlefield.
- Pollack, E. and Wunderlich, G. (2005), "Measuring Abuse, Disparity, and Discrimination," *Amstat News*, 336, 44-46.
- Rouncefield, M. (1995), "The Statistics of Poverty and Inequality." *Journal of Statistics Education*, 3(2): <http://www.amstat.org/publications/jse/v3n2/datasets.rouncefield.html>
- Scheuren, F. (2005), "Tsunami and Statistics". *Amstat News*, 333, p.2.
- Temkin, L. (1993). *Inequality*. New York: Oxford University Press.

#### ACKNOWLEDGMENT

This work was supported in part by the El Paso Mathematics and Science Partnership, funded by the National Science Foundation, EHR 0227124.