[Assessing Statistical Literacy in Graduate Level Statistics Education]

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1. [Assessing Statistical Literacy in Graduate Statistics Courses]

The development of statistical literacy skills is now recognized as one of the instructional goals of statistics education at all levels. While there is growing literature on statistical literacy as a basic goal for introductory statistics courses (Rumsey, 2002; Gal and Garfield, 1997), issues in assessment related to this goal still presents further challenge for research and development. Del Mas (2002) further contends that there is a need to design instructional activities that interconnect objectives, instruction and assessment and provides feedback to each other. In this paper, I drew on aspects of statistical literacy from the literature (Schield, 2000; Watson, 1997; Gal and Garfield, 1997; Rumsey, 2002) that I consider relevant for engaging adult graduate students in discussions aimed at developing their statistical literacy as a life-long skill.

In this study, I investigated the level of statistical literacy of 56 graduate students enrolled in three sections of basic graduate statistics for education students. All participants were enrolled in the graduate education programs of a private sectarian university in Cebu City , Philippines. Participants ranged in age from 21 to 54 years (mean = 27.8, SD = 7.8). The majority of the sample were women (90.4%). A pre-assessment of their statistical literacy was done on the first class meeting of the semester. A teacher-made 15-item scale was designed to provide a rough measure of the participants' statistical literacy in two levels; namely: (1) understanding of basic statistical concepts and terminology such as the concept of populations and samples, sample representativeness, percent and rates, averages, confidence intervals and relationships between variables, and (2) ability to understand and follow claims and arguments based on data and graphs presented in newspapers and research reports. The items in level 2 were taken from tables and graphs presenting frequency counts, percentages and rates from newspaper reports and advertisement claims in various media channels. All items were answerable by "yes", "no", or "cannot tell from the given information" - format. Further, respondents were required to provide a brief explanation or justification for

their answer, or raise a question on the items asked. After adminstration of the scale, answers to the items were discusssed as students scored their own papers. As their professor of the course, I reviewed their reasons or justifications for their answer which served as springboard for further discussion and learning.

The results showed that although the students performed relatively poorly in the 15- point scale (mean =6.93; SD=2.39; range=12-2), it was evident in the discussion and in their reflection paper on the activity that these graduate students were able to construct their own meaning of statistical literacy and realize its importance in their professional and personal lives.

2. Implications for Statistical Education

The pre-assessment items which served as a springboard for discussion on the first class meeting has provided feedback to both students and teacher. I drew from the responses of the students in the class discussion and in their reflective journal entry the following implications. For the students, their relatively poor performance was an " eye-opener" on their own deficiencies and a reflection of their need to learn more. Further, it has served as a motivation for them to own the goal of developing statistical literacy as their own, and not merely a curricular goal. As an educator, pre-assessing statistical literacy among graduate students at the beginning of the course has provided direction for curricular emphases and the design of other instructional activities and assessment tasks to meet their need. These include projects on finding local news reports that call for need of statistical literacy among media writers and writing letters to the editor, evaluating tables and graphs found in news reports and local research journals, and critiquing surveys and observational studies particularly on the methods of data collection, sampling, chance-related claims and analysis of relationships between variables.

Given the multidimensional and dynamic nature of statistical literacy, the challenge remains for graduate educators to inquire further on how to deal with complexities of incorporating statistical literacy in the graduate education curriculum, particluarly within the context of a developing country like Philippines. Their is need to direct future research along this area since in the present system of graduate education, most teachers in this country are still ill-equipped to support the incorporation of statistical literacy . To ignore the importance of doing so in this modern Age of Information is to short-change adult students of this life long skill in a highly technical and global 21st century.

REFERENCES

Del Mas, Robert C. .(2002)"Statistical Literacy, Reasoning and Learning," *Journal of Statistics*

Education. Vol 10, No. 3 .

Gal, I.and J.B Garfield.(1997) "Curricular Goals and Assessment Challenges in Statistics Education," In *The Assessment Challenge in Statistics Education*. Amsterdam: The International Statistical Institute.

Rumsey, Deborah J. (2002) "Statistical Literacy as a Goal for Introductory Statistics Courses," *Journal of Statistics Education.* Vol 10, No. 3 (2002)

Watson, J. M. (1997) "Assessing Statistical Thinking Using the Media," In *The Assessment Challenge in Statistics Education*. Amsterdam: The International Statistical Institute, 1997.

Internet

Schield, Milo. (2002) "Statistical Literacy: Thinking Critically About Statistics," Augsburg College, Minnesota, USA. 2002. <http://www.augsburg.edu/ppages/schield>