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Problems in needs assessment data: Discrepancy analysis

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Abstract

Needs assessment (NA) is generally based on the discrepancy between two conditions—the desired and present states. To date, there has not been an extensive research regarding a number of subtle problems in discrepancy analysis. One such example is missing data for one or both the two states. This leads to highly varied item *n*'s for calculating discrepancy scores. Concerns like this arose in a NA study of minority students in science, technology, engineering, and mathematics programs in universities. A number of problems observed in this context are discussed as well as possible solutions for them. The results should be valuable to needs assessors and evaluators responsible for assessing needs.

Keywords: Discrepancy analysis; Discrepancy-based needs; Needs assessment

1. Introduction

Classical needs assessments (NA) generally require identifying the discrepancy between two conditions—the desired and present states (Altschuld & Witkin, 2000; Kaufman, 1988). In surveys, respondents would rate items in terms of two Likert-type scales with each representing one of the two conditions (e.g., level of importance and degree of satisfaction). Such scales work well but they have several inherent and subtle data-related problems.

Examples are 'Not Applicable' ratings and missing data for one or both of the scales, which could lead to highly varied item *n*'s for calculating discrepancy scores. What alternatives for analysis exist in such situations? What is the value of the 'Not Applicable' responses? Should they be thought of as an important source of information in their own right?

Data-based issues may threaten the validity of NAs and undermine the credibility of results if needs assessors are not attentive to them. Although such problems are routinely observed, they have seldom been examined or treated in the literature (Altschuld & Witkin, 2000). They appeared for us in NA data obtained from an evaluation of a retention program for minority students majoring in science, technology, engineering, and mathematics (STEM). While the nature of the issues and some possible solution strategies for them are emphases here, we have another equally important purpose in mind. It is to foster an illuminative discussion amongst needs assessors about the complexity of the data that is collected.

2. A initial look at data problems in NA

The discrepancy-based view, with *need* as a noun, is widely considered the cornerstone of NA (Kaufman, 1988, 1992; Watkins, Leigh, & Guerra, 2002; Witkin & Altschuld, 1995). Kaufman (1982) defined *need* as a "gap between What Is and What Should Be in terms of results". NA then is "a formal analysis that documents gaps between current results and desired results, arranges gaps (NEEDS) in priority order, selects the NEEDS to be resolved" (p. 75). The process has five main steps: (1) determining the What Should Be status; (2) ascertaining current status; (3) quantifying discrepancies between What Should Be and What Is; (4) analyzing the causes of discrepancies; and (5) establishing priorities (Kaufman & English, 1979; Witkin & Altschuld, 1995). In this manner, a list of prioritized needs for action is developed.

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Many NAs have respondents rate the two conditions simultaneously. Some empirical research has been conducted into the use of this type of double scaling (Edwards & Briers, 1999; Hamann, 1997; Hamann, Poppe, Lapar, & Banks, 1995; Johnson & Dixon, 1984). Johnson and Dixon (1984) tested two forms, one with single-scaled items to measure subjects' desired level of competence in educational evaluation, and the other with two scales, desired competence and current competence. Actual content knowledge, which had been measured earlier aided in interpreting levels of need. In essence, individuals were assumed to have small need for areas where they had enough prior knowledge. Correlation between knowledge and discrepancy scores was much higher than that of knowledge and single-scaled responses (What Should Be). A conclusion was that the double-scaled format was better and preferable for NA. On the other hand, double-scaled forms are more complex and could lead to difficulties in data collection and analysis (Altschuld & Witkin, 2000; Hamann, 1997; Lee, 2005).

Altschuld and Witkin (2000) classified data-related issues into four categories. They were those dealing with: estimates of current status, measures of what should be status, discrepancies between the two conditions, and concerns across the entire NA process. An overview of these is shown in Table 1.

Although the bold entries in the table are the focus of this discussion, several other entries will be highlighted to illustrate what can happen in NA. The measurement of current status may be neither valid nor reliable, especially when data are gathered from self-reports (Issue 1-1 in Table 1). Anderson, Jesswein, and Fleischman (1990) found that service providers tended to overstate needs in education and transportation, whereas service receivers underreported household violence, attempted suicide, and so forth. For some questions, receivers were providing socially desirable answers. Needs assessors must be aware of the basis upon which questions are answered when they interpret data.

Issue 1-3, multiple methods becomes even messier when different methods are used with different groups. Demarest, Holey, and Leatherman (1984) explored training needs in health by means of interviews of 48 randomly selected staff and head nurses, a written survey that 60 nurses completed, and reviews of hospital quality assurance data (incident reports, accreditation reviews). Different sets of educational needs and priorities dependent on method and source were noted. This made it difficult to interpret results.

The bold entries in the table come from the minority retention endeavor noted earlier. The evaluation setting and specific issues are described next.

Table 1
A Summary of data-related issues in NA data[a,b]

Categories	Issues
1. Determining estimates of current status	1-1 Measurement of current status (self-report, interview) may be invalid or unreliable 1-2 Some variables are difficult to measure (diet, drug abuse, drunk driving, etc.) 1-3 Information from different sources or methods might be inconsistent
2. Determining the what should be condition	2-1 May be difficult to decide the standard for the what should be status 2-2 Confusing what should be's with wants 2-3 Consistently high ratings for all what should be's
3. Determining discrepancies	3-1 Discrepancies derived from wants instead of needs 3-2 Size and nature of a discrepancy 3-3 Developing discrepancies from multiple sources or methods 3-4 Qualitative data (focus group interviews, individual interviews) may not directly lead to discrepancies **3-5 What is the value of 'Not Applicable' responses?** **3-6 Missing data for one or both scales?** **3-7 Should discrepancies be determined using total group means for an item or only from the subgroup of individuals completing both scales?** **3-8 Do different needs indices produce similar results?** 3-9 If varied *n*'s per item was found, should data analysis be done item by item or across items within a category?
4. Across all aspects of NA process	4-1 Using multiple sources and/or groups 4-2 Placing undue emphasis on numerical data 4-3 Problems in asking about a population intended to be served vs one actually receiving services 4-4 Using a single dimension (importance or satisfaction) to determine needs **4-5 Criteria to select items for follow-up exploration of needs when they differ across constituencies**
5. Issues associated with NA instruments	5-1 Problems caused by within-method variations **5-2 How to handle data from multiple forms of a NA survey?**

[a]Adapted from Altschuld and Witkin (2000).
[b]Bold entries are the main emphasis of this paper.

2.1. Setting of the present study

The Ohio Science and Engineering Alliance (OSEA) is a consortium of 15 institutions, funded by the National Science Foundation, with the goal of increasing the number of underrepresented minorities earning baccalaureate degrees and pursuing graduate study in STEM disciplines (Ohio Science and Engineering Alliance, 2003). The alliance is part of a nationwide effort to rectify the low enrollment and graduation rates of underrepresented minorities (National Science Foundation, 2004). Students