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ABSTRACT

This paper discusses the research methodology of the study "Alternative Patterns for Strengthening Community Service Programs" which examined programs in a large number of institutions of higher education. The first and major part of the paper deals with the use of case studies in generating data and communicating knowledge and feelings. The second part deals with how quantitative analysis was related to qualitative knowledge. Using an analogy of a clock, the author presents a number of advantages of the case study approach over the survey approach and gives the rationale for the use of the case study approach. Polanyi's concepts of tacit knowledge and propositional knowledge are discussed, and the author indicates how both types of knowledge were communicated through written case studies. Turning to a discussion of how quantitative analysis is related to qualitative analysis, the author states that quantitative analysis may only be used to confirm a theoretical insight derived from qualitative knowledge, not to discover new insights. He gives an example of how quantitative analysis was used to confirm a theoretical insight that there are three types of project orientation: transactive, institution, and community. (LMS)

The Use of Case Studies and Quantitative Analysis in the "Alternative Patterns for Strengthening Community Service Programs" Study

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The purpose of this paper is to examine the research process in the study: "Alternative Patterns for Strengthening Community Service Programs." The first and major part of the paper will deal with the use of case studies in generating data and communicating findings. The second part deals with how quantitative analysis was related to qualitative knowledge.

First of all I would like to contrast the use of case studies with the survey method. In particular I would like to explain why we used the case study approach rather than survey methodology. As Hamilton (1976) has pointed out, case study research in education has emerged as a counterimage to survey research.

The purpose of our study was to examine the strengthening and continuation of community service programs in a large number of institutions of higher education. Firstly, in order to examine strengthening and continuation we needed to know how developmental efforts to strengthen community service programs functioned. I do not believe that survey research is very suitable for providing information about the functioning of phenomena. Secondly, we were forced to be exploratory in our research since little was known about the functioning of such developmental efforts. Initially, our questions were only of a very general kind. Usually survey research makes use of questionnaires. Survey research is not suitable for exploratory research because too little is known about phenomena to devise questions for a survey questionnaire.

Our use of the case study approach involved visiting a number of the community service programs and carrying out intensive interviewing. As we carried out our research, our questions became more focused and penetrating. Case study consumes much time and human resources. Thus we were not able to contact as many programs as would have been possible with survey research. We made use of dimensional sampling (Arnold, 1970, p. 147). This type of sampling involves selecting some of each of the main types of the phenomenon being examined.

I would like to look closer at the advantages of using case study research over survey research by using the analogy of studying clocks. Suppose that, as with efforts to develop community service programs, one knew little about the functioning of clocks. A way of studying them would be to survey their characteristics. One could find out whether they chimed or not, whether they had a pendulum and whether they had a second hand or not. One could find out whether they were powered by falling weights, a spring, or electricity and so on. Unfortunately this would not tell us essentially how clocks were similar and how they were different in their functioning. To understand the functioning of clocks one could do case studies by taking a number of clocks apart. One would find that clocks that were powered by electricity worked differently from those powered by springs, yet at the same time finding similarities. From this analogy one can see the following essential differences between survey research and the case study approach.

First, case study results in the researcher becoming close to the phenomena. From taking a clock apart he comes to know its functioning intimately. The survey researcher looks at a larger number of clocks, but he comes up with frequency distributions and cross tabulations of their characteristics rather than intimate knowledge or a theory of their functioning.

Second, the survey questionnaire usually preselects what characteristics shall be examined. It assumes in advance what the phenomena are like. The case study approach does not preselect but by close examination finds out what are significant characteristics and what are not significant characteristics in the functioning of the phenomena.

Third, survey research tends to tell one what the average clock is like and this is not very informative about the functioning of clocks. Survey research thus tends to ride roughshed over differences and assume that there is a uniformity that does not exist. It asks a uniform set of questions about clocks and is not

flexible in adapting its questions to the nature of each clock it encounters. The survey research form often does not allow for the coding of the unusual case such as when one encounters a clock powered by falling water. The idiosyncratic example of a water clock becomes lost in its large representative sample.

Fourth, survey research produces gross generalizations about all clocks. Case studies also recognize what is similar about clocks but at the same time recognize what is unique for particular clocks. Social scientists, while they recognize the complexity and variability of situations involving human beings, have been optimistic about developing statements that have reasonable generalizability across many contexts. Lee Cronbach (1975), a high priest of educational and psychological research, has recently sounded a pessimistic note. Cronbach, in reviewing aptitude-treatment studies finds that generalization is very limited. As an alternative he suggests the following:

> Instead of making generalization the ruling consideration in our research, I suggest that we reverse our priorities. An observer collecting data in one particular situation is in a position to appraise a practice or proposition in that setting, observing effects in context. In trying to describe and account for what happened, he will give attention to whatever variables were controlled, but he will give equally careful attention to uncontrolled conditions, to personal characteristics, and to events that occurred during treatment and measurement. As he goes from situation to situation, his first task is to describe and interpret the effect anew in each locale, perhaps taking into account factors unique to that locale of series of events.

What Cronbach is recognizing is that in moving from one context to the next, one will notice similarities but one will also note that any one context will have unique properties. Many of the physical and human characteristics of a

context will be quite unique. Any knowledge and experience gained in one context, when applied in a new but similar context will have to be adapted to fit the unique characteristics of the new context. Stake (1976, p. 5) calls this process naturalistic generalization. He states: "What becomes useful understanding is a full and thorough knowledge of the particular, recognizing it in new and foreign contexts. That knowledge is a form of generalization too, not scientific induction but naturalistic generalization, arrived at by recognizing the similarities of objects and issues in and out of context and by sensing the natural covariations of happenings."

I now wish to deal with case studies in relation to communication of research findings. In the final report of the study, eight case study examples were given as a way of facilitating the understanding of potential users of the research results, so that they could adapt and apply the results to their own circumstances. First I shall indicate how case study examples are related to Polanyi's notions of tacit and propositional knowledge.

Polanyi (1958) makes the statement that "we can know more than we can tell." For example, we can recognize a face we know among thousands, yet we cannot tell how we do it. Polanyi terms this knowing that we cannot tell, tacit knowledge. The knowledge that we can tell is termed propositional knowledge. Another example of tacit knowledge is tying one's shoelaces. We have trouble expressing that knowledge as propositional knowledge to a sufficient extent to be able to teach someone who cannot tie laces how to tie them.

Tacit knowledge is acquired directly by experience and acquaintance. We acquired acquaintance with efforts to develop community service programs by on-site visits that included interviewing participants and other knowledgeable persons about the developmental efforts. As a result of these on-site visits, we developed both tacit and propositional knowledge of the phenomenon being studied.

In general, the aim of most research reports is to give the reader propositional knowledge. However full communication of research results cannot be achieved by presenting propositional knowledge without a tacit base. If the researcher believes this, then the researcher is faced with the question of how to achieve the generation of tacit knowledge in the reader, given that, as Ortony (1975, p. 12) points out, linguistic communication is primarily suited to the transmission of proposition knowledge. How does the researcher overcome the fact that the literal use of language is essentially a means for communicating propositional knowledge?

Techniques for communicating tacit knowledge include vivid, figurative, metaphorical language as well as nonlinguistic means, such as models, demonstrations, and audio-visual techniques. Stake (1972) and Kemmis (1974) have written about the notion of "portrayal" for use in educational evaluation. A portrayal could be described as a vivid description with possible use of photographs, audio-visuals and other sensory means, all designed to engender tacit knowledge in the audience. Kemmis (1974) describes a portrayal as follows:

> In producing the portrayal, the evaluator acts as mediator, transforming the experience of program participants into a form which can be experienced by the audience. An educational program is a complex whole: it involves people, things, places, events, activities, administration. Portrayal cannot hope to capture that enormously complex world and fix it in some rigid, final form. But it can hope to communicate something of the complexity, and something of the dynamic, flowing pattern of experiences it creates and of which it was constituted. By their experience of the portrayal, the audience may come to understand something of the program, and can make their own decisions about it . . . . For people too distant from the program to experience it

directly, it can provide a "surrogate experience." . . . the notion of portrayal is new in the sense that it harnesses sources of communication often ignored by the evaluator--those of the ethnographer, novelist, or photographer, for example.

The drawback with portrayals is that they require talented writers and result in quite lengthy descriptions. While we did not write portrayals, we took a step in the direction of trying to provide tacit knowledge to the reader. The research report contained concisely written literal descriptions of eight projects. These descriptions have proved to be particularly meaningful to those readers who have acquired tacit knowledge from working on efforts to develop community-service programs. The descriptions are less meaningful to the reader who has not acquired such tacit knowledge.

Another advantage in using case studies in research reports is that the case studies help the reader to understand how the findings apply in the contexts in which the findings were developed.

Returning to the clock analogy, it was shown that one of the strengths of the case studies was that it enabled one to see what was similar about efforts to develop community-service projects and at the same time see what was unique. Of the approximately 150 factors that were initially identified as being potentially important in efforts to bring about strengthening and continuation of Title I projects, three "key" influences and five "key" processes were found to be most important. The importance of these influences and processes were found to vary from project to project. Because of the varying characteristics of projects, an influence or a process that was important in one project may have lesser importance in another project. Furthermore, influences and processes other than the key ones were often important to the success of a project. The eight case examples were important in conveying

this conditional nature of the findings. The case examples enabled the reader to understand how the findings applied in different contexts. What is also important is that it was hoped that the case examples would help the reader who was associated with a project to apply the findings to his own context. The reader would see how his context was similar and different from the context of the eight case examples. Without an attempt to communicate the findings in such a way that the reader is assisted to apply the findings, the research becomes simply academic. The use of case study examples is a way of communicating research findings so that the reader is assisted to see how the findings apply in the reader's own context.

I wish to turn now to a brief discussion of the quantitative analysis and its relation to the qualitative analysis. In our study, quantitative analysis was used to confirm and suggest theoretical insights derived from qualitative analysis. Based on the interview data a vast array of concepts or variables had been developed such as "solution giver in the institution," "process helper in the community," "transactive orientation" and so on. The problem was to discern patterns among these myriad concepts or variables. Some of the relationships between the variables were obvious from the interview data. Correlation coefficients were calculated between all variables. In the first year these correlations served a function of suggesting relationships between variables where such relationships had not previously been considered. In the second year, when our qualitative insights were deeper, the correlations were useful because they acted as quantitative confirmation of these insights. The correlations were also useful in the second year as a way of comparing second-year findings with those in the first year.

What relation has quantitative analysis to the <u>discovery</u> of new theoretical insights? I contend that quantitative analysis <u>in and of itself</u>

is largely unproductive in the discovery of new theoretical insights. Its role is that of confirming theoretical insights into the data. Quantitative analysis is not able to conjure up new concepts or theory. Concepts and theories can only be forged from the qualitative by the human mind. This is illustrated by the fact that "you can't crank the handle backwards on the Kuhnian machine." (A diagram of the Kuhnian machine is attached.) The Kuhnian machine was introduced by Kuhn (1961, p. 33) when he discussed how measurement functioned in physical science.

> It (the machine) displays, in the upper left, a series of theoretical and "lawlike" statements, (x) ϕ_i (x), which together constitute the theory of the science being described. The center of the diagram represents the logical and mathematical equipment employed in manipulating the theory. "Lawlike" statements from the upper left are to be imagined fed into the hopper at the top of the machine together with certain "initial conditions" specifying the situation to which the theory is being applied. The crank is then turned; logical and mathematical operations are internally performed; and numerical predictions for the application at hand emerge in the left-hand column of the table that appears in the lower right of the figure. The right-hand column contains the numerical results of actual measurements, placed there so that they may be compared with the predictions derived from theory.

Approximately 150 variables were initially identified as being potentially important in efforts to bring about strengthening and continuation of community service programs. One hundred and fifty variables is a lot of variables. What we were looking for was some way of organizing the variables so that they formed some meaningful pattern or theory. In such a situation it is very

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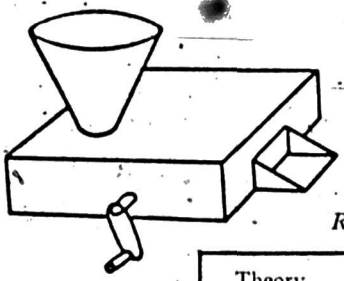
Theory

$(x)\ \beta_1(x)$
$(x)\ \beta_2(x)$
. . . . . .
$(x)\ \beta_n(x)$

Manipulation
(Logic and Math)



Results

Theory	Experiment
1.414	1.418
1.732	1.725
2.236	2.237

The Kuhnian Machine

from: Kuhn, T. S. The function of measurement in modern physical science. In H. Woolfe (Ed.) Quantification. Indianapolis: Bobbs-Merrill, 1961.

tempting to arrive at organizing conceptions by means of extensive statistical analyses. We could have applied cluster analyses, discriminant analyses and various types of multiple regression analyses. It would not work. You can't crank the handle backward on the Kuhnian machine to discover new concepts or theory.

Fortunately, a theoretical insight arose from the qualitative analysis of the data. This theoretical insight had to do with project orientation and focused on two parameters: "needs" and "resources." It was postulated that projects belonged to three possible types, each of which functioned differently. The transactive-oriented project assessed both the needs of the community and the resources of the institution and tried to match the two. The institution-oriented project assessed the resources of the institution but failed fully to investigate the needs of the community. The community-oriented project assessed the needs of the community but failed fully to investigate the resources of the institution. Projects were classified into these three types and predictions were made on the basis of the way each type functioned. For example, it was predicted that the transactive-oriented type would have higher means on the strengthening and continuation outcomes than both the institution-oriented and community-oriented types. The transactive-oriented and the community-oriented types would have higher means than the institution-oriented type on the performance of the director in the change agent role in the community. These predictions are really "cranking the handle forwards on the Kuhnian machine." They are the theoretical predictions made on the basis of logical manipulation. Means from the observed data were calculated and found to agree with the theoretical predictions. This provided confirmation of the project-orientation theory. The Kuhnian machine was not being cranked backwards.

I shall repeat the contention I made earlier. Quantitative analysis is largely unproductive in the discovery of new theoretical insights. Its role is that of confirming theoretical insights into the data.

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