CHAPTER III

Methodology

Introduction

The purpose of the study is to describe the Stages of Concern (SoC) and Levels of Use (LoU) of selected Sixth Form Geography teachers from the First and Second Divisions of Sarawak, in the implementation of the new Geography curriculum innovation. The demographic variables of the study are gender, teaching experience, and the location of the school.

This section describes the methodology used in the conduct of the study. It is divided into seven subsections which are Research Design, Population and Sample, Instrumentation, Pilot Study, Collection of Data, Data Analysis, and Limitations of study.

Research Design

A survey methodology employing a questionnaire and an interview are used to collect data for this study since it requires the descriptions of the concerns and Levels of Use of the Sixth Form Geography teachers in implementing the new Sixth Form Geography curriculum. The survey is cross-sectional since data is to be collected at a point in time although the survey covers a period of six weeks.

The CBAM model is used for the research design of this study. Hall and his associates, the developers of this model, found that knowledge of teachers' concerns about an innovation and the ability to address those concerns facilitates

effective use of the innovation. Teachers' concerns of the innovation are determined by the SoC Questionnaire (SoCQ) whereas their use of the innovation is determined by an interview using the LoU Interview Protocol (LoUIP). The interview used for this study is a focused interview that has been developed by Hall and associates.

The variables examined in this study (Table 4) are: (a) Teachers' concerns which consist of the seven stages of concerns as described in Appendix A. The intensity of each stage of concern is measured by the scores received on each of the seven stages of concern of the SoC questionnaire, and (b) Teachers' level of use which ranges from Level 0 to Level VI as described in Appendix B. Each teacher's LoU is identified through the LoU interview.

Table 4: The Variables involved in this study

Demographics Variable	Instruments Variables
Gender	Teachers' Stages of Concern
Male	Stage 0 - Awareness
Female	Stage 1 - Informational
	Stage 2 - Personal
Years of teaching experience	Stage 3 - Management
Less than 10 years	Stage 4 - Consequence
10 years and above	Stage 5 - Collaboration
	Stage 6 - Refocussing
Location of school	Teachers' Levels of Use
Urban	Level 0 – Non-use
Rural	Level I - Orientation
	Level II – Preparation
	Level III – Mechanical
	Level IVa – Routine
	Level IVb – Refinement
	Level V – Integration
	Level VI - Renewal

The demographic variables are: (a) gender, (b) teaching experience ranging from less than 10 years, and 10 years and above, and (c) the location of the school, whether in the urban or rural area.

Population and Sample

The population studied consists of all the Sixth Form Geography teachers from the First and Second Divisions of Sarawak. The list of names of all the Sixth Form Geography teachers and their respective schools, their number of years of teaching experience and their gender are obtained from the District Education Offices in Kuching and Sri Aman..

The population is divided into 2 groups according to their number of years of teaching experience, that is, (a) less than 10 years, and (b) 10 years and above. The reason for dividing the population according to the demographic variable of teaching experience was because the relationship between teacher concerns and teaching experience does not seem to be consistent in past research studies (Foute, 1982; Brown, 1984; Johnson, 1984; and Penn, 1985).

By using the technique of random sampling, the name of each individual in the population is written on a slip of paper and placed in their respective containers, indicating their respective sub-groups. After the slips in each container is thoroughly mixed, the required number of names were drawn. About 75% of the population constituted the study sample. This means that out of the total number of individuals in each container, 75% of the Sixth Form Geography teachers are drawn randomly to represent the study sample.

Instrumentation

Data on teachers' concerns and their background are collected by means of the Stages of Concern Questionnaire (SoCQ) administered to all the 30 teachers who constitute the sample of the study (Appendix E). In addition, an interview schedule entitled "Level of Use Interview Protocol" (LoUIP) is used to assess teachers' LoU (Appendix F).

Stages of Concern Questionnaire (SoCQ).

The Stages of Concern about the Innovation (SoC) Questionnaire was developed by Hall and Rutherford (1976) at the University of Texas at Austin Research and Development Center for Teacher Education. This questionnaire (35 statements) describes seven levels of individual concerns about a specific innovation. The SoCQ was developed through a procedure of reviewing the literature, developing lists of statements describing concerns, item writing, Q-sorting by a panel of judges, completion of a 195 item prototype, administering the prototype to 366 individuals, and factor analysis. Seven factors which became the seven Stages of Concern were identified. The 35 items selected for the final instrument were those which loaded highest on each factor (Hall, George and Rutherford, 1977).

Each of the 35 statements in the SoCQ expresses a certain concern about the innovation. Respondents indicate the degree to which each concern is reflected of their own position by circling the appropriate number on a Likert-type scale ranging from "0" to "7". High numbers indicate high intensity of concern and

low numbers show low intensity of concern. Circling of a "0" is indicative of a concern completely irrelevant to the teachers involved.

Each of the seven stages of concern is identified and measured by five items respectively (Table 5). The items corresponding to the seven stages are as follows:

Table 5. Item Numbers of the Various Stages of the SoC Questionnaire

Stages of Concern	Item Numbers
Awareness	3, 12, 21, 23, 30
Informational	6, 14, 15, 26, 35
Personal	7, 13, 17, 28, 33
Management	4, 8, 16, 25, 34
Consequence	1, 11, 19, 24, 32
Collaboration	5, 10, 18, 27, 29
Refocussing	2, 9, 20, 22, 31

Source: Hall, G.E., George, A.A. and Rutherford, W.J. (1977). *Measuring Stages of Concern about the Innovation: A manual for use of the SoC Questionnaire.* Austin, University of Texas: R & D Centre for Teacher Education.

Details of the statements of concerns and their item numbers are indicated in Appendix C.

The reliability of the SoCQ is high. It was used by its developers (Hall, et al., 1977) in cross-sectional and longitudinal studies of 11 different educational innovations. The alpha coefficients of internal consistency for each of the seven stages of concern computed from data gathered from a sample of 830 teachers and professors in a two-year longitudinal study by the developers of the

instrument ranged from 0.64 to 0.83. The coefficients were computed on the basis of their responses in the fall of 1974. Test-retest correlations computed on the basis of 132 completed "retest" data in the same study range from 0.65 to 0.86.

Given that another measure of concerns which is comparable to the SoCQ does not exist, the validity of the questionnaire cannot be demonstrated as easily as its reliability. The developers used a 195-item pilot instrument consisting of between 14 and 68 items for each of the seven stages of concern and correlation matrices to verify the validity of the questionnaire. Table 6 summarises how the scales intercorrelated.

Table 6. Intercorrelation of 195 Items Stages of Concern Questionnaire Scales

Stages	1	2	3	4	5	6
1	1.00	0.68	0.47	0.21	0.21	0.19
2		1.00	0.78	0.43	0.37	0.43
3			1.00	0.60	0.51	0.59
4				1.00	0.82	0.80
5					1.00	0.77
6						1.00

Source: Hall, G.E., George, A.A. and Rutherford, W.J. (1977). *Measuring Stages of Concern about the Innovation: A manual for use of the SoC Questionnaire.* Austin, University of Texas: R & D Centre for Teacher Education.

The correlation near the diagonal are higher than those away from it. This "simplex" pattern indicates the degrees of similarity and dissimilarity of one stage

with another. Each stage will be more similar to the stage immediately beside it. than those further away from it. Thus, the scales of the pilot instrument indicate an order consistent with the hypothesized order of the Stages of Concern (Hall, et al., 1977).

The LoU Interview Protocol (LoUIP).

The Levels of Use Interview Protocol was developed by Gene Hall and others at the University of Texas at Austin Research and Developmental Center at the same time the SoC Questionnaire was developed. The interview was developed after a literature review, item creation and sorting, and field tests, which showed a 0.98 correlation between interview rating data and actual teacher observation.

The interview is a focused interview with specific questions designed to elicit necessary information but has enough flexibility to be easily adapted to any specific content. Respondents are rated as to the level of use according to their answers to the interview questions. The eight levels of use, representing developmental growth and movement from one level to the next, are characterised by key decision points. Each level encompasses a range of behavior but is limited by a set of identifiable decision points. These key decision points distinguish each of the eight levels of use. By checking out these points, it is possible to assign quickly an overall LoU to a given individual. For descriptive purposes, each level is further defined in terms of seven sub-parts or categories which represent the key functions that users carry out when they are using the innovation. At each level, the category descriptions represent the typical behaviors that users at that

level are engaged in. These decision points and categories are presented in Appendix D.

The purpose of the LoU interview is to collect sufficient amount of data from the innovation users in order to assign a LoU for each of the users. Two approaches are suggested as the focus of designing the interview schedule. They are to (a) structure the schedule around the seven decision points; and (b) construct the schedule to probe each of the seven categories (Loucks, et al., 1975). Either of the two approaches or a combination of both may be used. The LoUIP used in this study was adapted from Klenke and Barrows (1980). They used a combination of both approaches (Figure 3) which focus on the key decision points and include questions to probe the seven behavior categories. Decision and behavior questions support each other and contribute to the assignment of an LoU rating (Klenke and Barrows, 1980).

The reliability of the LoU interview schedule has been verified by the developers in both cross-sectional and longitudinal studies in schools and universities (Loucks, 1976; Hall and Loucks, 1977; Rutherford, 1977). Reliability coefficients ranging from 0.87 to 0.96 have been reported by the developers. It was found that rating could be done by the interviewer immediately after the interview since the reliability was consistently high (Loucks, 1976).

The validity of the LoU interview was verified by qualitative data gathered through direct observations using an ethnographic approach. In a sample of 45 teachers who were interviewed and 17 teachers who were subjects of an ethnographic study, the developers found the correlation coefficient between

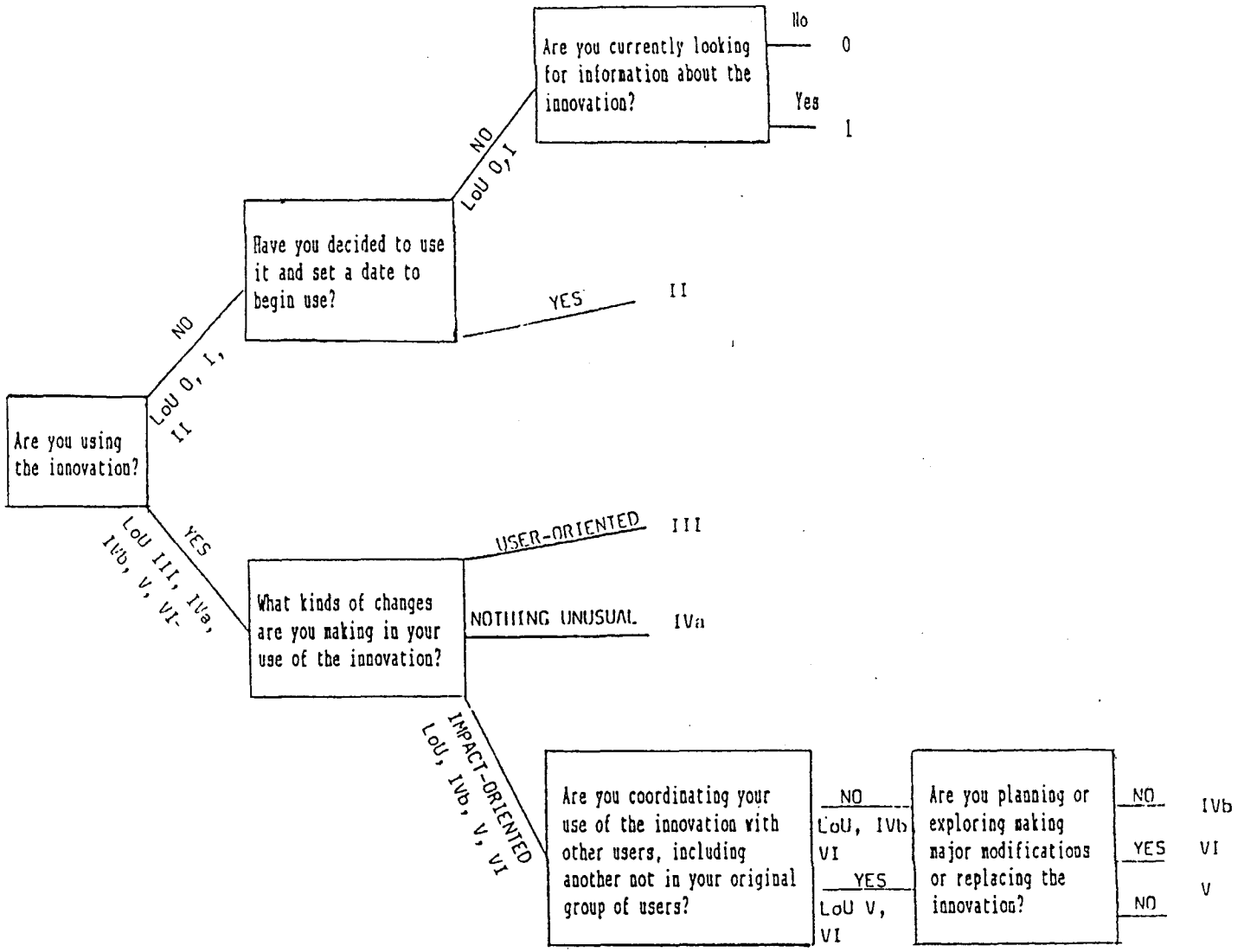

Figure 3. Overview of Branching Format of the LoU Interview

Source: Klenke, W.H. and Barrows, L.K. (1980). *The Measurement of Educational Change: The Application of the Level of Use Approach.* Madison, Wisconsin University: R & D Centre for Individualized Schooling.

the two approaches to be 0.98.

Reliability and Validity of Instrument

Toh (1991) in his study of the SoC and LoU of the Commerce and Entrepreneurship teachers in the implementation of the Living Skills programme, has translated both the SoCQ and LoUIP instruments into the Malay language with the assistance of three competent language translators. The technique of "back translation" was used by him to ensure the Bahasa Melayu version of the instruments were accurate translations of the English version. Both the English and Bahasa Melayu versions of the SoCQ and LoUIP are shown in Appendix E and F respectively.

Toh carried out a pilot study to find out whether both of these instruments are suitable for innovations study within the Malaysian context. He pilot-tested both versions of the SoCQ with a small sample of six teachers (the teachers were given the option of completing only one of the versions in the language they were most familiar with) in August 1990 and the alpha coefficients of internal consistency obtained for each of the seven stages of concern was reasonably high, ranging from 0.60 to 0.86. Test-retest correlation computed after a few relevant changes were made to the Bahasa Melayu version of the SoCQ, were found to range from 0.63 to 0.89. This high Pearson-r correlations indicate that the SoCQ is a reliable instrument in the context of the innovation studied in Malaysia.

Pilot Study

Since the Malay language is the official and national language of Malaysia, the SoCQ (Malay version) was administered to a sample of 20 Sixth Form Geography teachers in the Third Division of Sarawak. It was conducted in early May 2002. They were asked to comment on the clarity of the items in a separate section which was attached to the questionnaire. The completed questionnaires were collected from the teachers concerned two days later and there were no problem with the clarity of the items since no teachers commented anything on it. The same SoC Questionnaire was retested to the same teachers two weeks later. The data collected from both of these tests was used to compute the Pearson Product Moment Correlation Coefficient which was found to be equal to 0.88 ($r = +.88$). The high Pearson-r correlation value obtained indicates that the SoCQ is a reliable instrument in the context of the innovation studied in Malaysia.

The purpose of the pilot test on the LoUIP was to determine if it could gather sufficient data to assess an individual's LoU. The interview schedule was structured to probe all the seven decision points, from LoU Level 1 to LoU Level VI. It was pilot-tested with 10 out of the 20 teachers chosen above after they had completed their SoCQ. Each of them was interviewed for about 20 to 25 minutes.

Probing questions were asked to overcome the likelihood of individuals attempting to present themselves in the best possible light. In this way, sufficient information were gathered to describe the respondent's actual behavior in relation to the individual's use of the innovation. After a series of four to five interviews

with different respondents, it was found possible to assign the LoU for each respondent immediately after the interview.

Collection of Data

To gather data on Sixth Form Geography teachers' SoC and LoU, two visits were made to each of the respondents in the study during the months of June and July 2002. On the first visit, the SoC Questionnaire was delivered by hand to the teacher concerned and a brief explanation of what was required of the teacher was also given. At the same time, a copy of the teacher's personal time-table was collected for planning the second visit.

The second visit was made two weeks later when all the SoCQ had been completed. During the second visit, the completed SoCQ was collected first before the start of the LoU interview. Interviews using the LoUIP took approximately 20 to 25 minutes per teacher. The whole process of collecting data on the SoC and LoU was carried out as planned from the 3rd of June to the 15th of July 2002.

Data Analysis

To answer the research questions in this study, several techniques are used to analyze the data gathered on teachers' SoC and LoU. First, descriptive statistics using mean percentile scores and their standard deviations are used to describe the concerns of the (a) sample teachers as a whole, (b) the various groups categorized in terms of the demographics of gender, teaching experience and the location of the school in using the new innovation.

Based on Figure 2 of the hypothesized development of the SoC, the intensity of teachers' concerns (Table 7) is classified according to the percentile scores of the different SoC as shown below.

Table 7. Intensity Table of the different SoC

Intensity	Percentile Score of SoC
High	70 and above
Moderate	45 to 69
Low	Less than 44

Secondly, frequency counts and percentages are used to aggregate teachers according to the different levels of use. Based upon the frequency counts and percentages, description of their levels of use are made of the sample as a whole and also of groups of teachers categorized in terms of the demographics variables of gender, teaching experience and the location of the school in using the new innovation.

Limitations of Study

This study was confined to the Sixth Form Geography teachers in the First and Second Divisions of Sarawak. But there is no reason to suggest that teachers from the other divisions in the state of Sarawak are different from that of the First and Second Divisions area since all these teachers have received the same in-service training program from the Sarawak State Education Department.

Thus, the findings of this study can be generalized to all Sixth Form Geography teachers in the state of Sarawak.

Also, teachers' concerns and behavior in the implementation of the new Sixth Form Geography curriculum are studied at a given period of time. As a result, individual differences as they occur over time is not indicated. For such a purpose, a longitudinal study over a period of time would have been more appropriate.