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Sustained Interactivity as a Predictor of the Use of a Well-developed Program Innovation

by

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A thesis submitted in conformity with the requirements of the Degree of Doctor of Philosophy in the University of Ottawa

Abstract

Teachers often do not use program innovations sufficiently long for the realization of sustained changed that is critical for institutionalizing worthwhile innovations. A recent theoretical development however within the domain of social science inquiry called "research utilization" has important implications for how the use of program innovation may be enhanced by teachers so as to result in meaningful change. Within that strand, Huberman (1989) identified a concept called *sustained interactivity* as a powerful predictor of use of innovations. It is defined as multiple exchanges between researchers and potential users of that research at different phases of a study. The sustained interactivity construct implies that linkages between disseminators of knowledge and potential users of it are strengthened as they increase in frequency and intensity.

Empirical support for this theoretical development is mounting. Although sparsely tested, the potency of sustained interactivity on use of innovation is promising but data apply to research and evaluation utilization. There are no studies on the effects of sustained interactivity within the domain of program utilization but one may speculate that similar effects of its potency on the use of well-developed program innovations by teachers in school settings may be observed. This speculation prompted the motivation to examine sustained interactivity as a predictor of use of well-developed program innovation.

This study applied Huberman's (1990) model of the sustained interactivity construct within the implementation context of an existing, well-developed North American educational program called Project WILD. The model was enriched by the inclusion of other research findings (e.g., Cousins & Leithwood, 1993). A single-group, retrospective design was used to carry out an explanatory study. Data were collected by administering a common survey questionnaire to a purposive sample of classroom teachers (N=2,000) across North America who are potential users of Project WILD, which resulted in an achieved sample (n=515) of eligible respondents. A conceptual framework derived from the literature guided the study wherein use was investigated

from two perspectives, under varying conditions of sustained interactivity that ranged in levels from high to low to an absence of contact among the users and the disseminators of the innovation. The first perspective was the use of the program innovation. The second was process use, which relates to how users are affected because of their participation in, or proximity to, the innovation.

Hierarchical linear regression enabled an examination of the impact on use of (1) sustained interactivity as a global measure, and (2) of nine indicators that were employed in this study to reflect it. Five covariates were used to obtain more precise estimates of sustained interactivity effects. It was found, and concluded, that use varies as a direct function of sustained interactivity. Of its nine indicators, three were found, and concluded, to be especially potent: *Benefits of sustained interactivity* was found to be a significant predictor of process use and conceptual use of the innovation; *social processing* about it among teachers and their *involvement and engagement* in it emerged as important predictors of putting the innovation into practice more fully. *Social processing* was also found to be a predictor of process use.

A version of the teachers' questionnaire was administered to a sample of disseminators (N=23) of the innovation across North America. Independent samples t-tests analyses revealed, and it was concluded, that users and disseminators share similar views of sustained interactivity. An open-ended question within the questionnaire probed for, and found, reciprocal effects of sustained interactivity on disseminators. It was concluded that such effects include changes in perceptions of teachers and enhancements of the innovation to improve its usefulness for teachers.

The study's results were discussed in light of what is known about sustained interactivity. It was concluded that sustained interactivity is a predictor of well-developed innovation. It is believed that this study extended theoretical knowledge about the power of sustained interactivity as a predictor of the use of program innovation. Finally, implications of the study's findings were listed for disseminators of well-developed innovation and for researchers pursuing further study.

Dedication

This thesis is dedicated to my parents, my husband and my son. My parents taught their children the meaning of love for family and learning. My husband taught me that while education is important, it is the love of family that fulfills one's life. We taught our son that combining a passion for learning with his interests will help him set a course in his life to do well in what he loves doing best.

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CHAPTER 1

Introduction

1.1 Statement of the Problem

A serious problem associated with the use of program innovations by teachers is that they are often not used sufficiently long to result in lasting change. Many implementors of school programs and innovations do not acknowledge the two- to five-year period normally required for the realization of sustained change that is critical for institutionalizing worthwhile innovations (Firestone & Corbett, 1988; Fullan, 1991; House, 1979; Huberman & Miles, 1984). A key related problem is the difficulty of transferring knowledge about successful use of innovations from one context to another. Over 35 years of attempts at change has helped clarify what should or should not be done to bring about change (Fullan, 1991, 1993), but the difficulty in using knowledge from successes and failures in particular settings is that educational contexts vary widely: what may be appropriate in one context might not be suitable in another (Leithwood & Montgomery, 1982).

The problem of how program innovations are often used remains a focus for inquiry. A recent theoretical development, however, within a domain of social sciences inquiry known as "research utilization" (a strand within the general domain of "knowledge utilization") may potentially have important implications for how the use of program innovations may be enhanced by teachers in school settings so as to result in meaningful change. Within that strand, Huberman identified a concept called *sustained interactivity* as a powerful predictor of use of innovations. His literature review (Huberman,1989) surfaced several other researchers working within similar veins of inquiry, a common element among them being an approach to the dissemination of research results that was based on the potency of sustained interactivity as an influence on the amount and quality of use. Coined as a "macrovariable" (Huberman, 1989, p. 9) that has not decayed over time, the concept is defined as "multiple exchanges between researchers and

potential users of that research at different phases of a given study" (Hutchinson & Huberman, 1994, p. 41). Huberman situated it in a conceptual framework for the use of knowledge where interpersonal links between disseminators and users, spread throughout the life of a study, are at the core of the sustained interactivity construct and the key to use. Conceptually, the construct aids in understanding the dynamics of linkages between diffusers and users of knowledge and the effects of those dynamics on the use of knowledge. Although sparsely tested, the effects of sustained interactivity on use are promising (Huberman, 1990). Huberman concluded that "the best single predictor of knowledge use...is intensity of contact(s) between disseminators and receivers" (Hutchinson & Huberman, 1994, p. 41).

Given the emerging importance of sustained interactivity as a predictor of use within the research utilization domain, one may speculate that similar effects of its potency on the use and dissemination of program innovations by teachers in schools may be observed. Contemporary conceptual and empirical studies of linkage models and of information dissemination support this premise. For example, the sustained interactivity construct implies that linkages (i.e., contacts and social interactions) between disseminators and users are strengthened as they increase in frequency and intensity over time. Recent theoretical work on dissemination (e.g., Klein & Gwaltney, 1991) has identified the pivotal role of social interaction between disseminators and users for effective dissemination. Many contemporary research utilization theorists advocate strengthening linkages between researchers and practitioners for implementation of applied research (e.g., Holdaway, 1986; Huberman, 1987; Larson, 1981). Several researchers have also shown the power of linkages between researchers/evaluators and practitioners as an important but emerging predictive factor in explaining use (e.g., Cousins & Earl, 1995; Greene, 1987; Kennedy, 1984). Empirical support for this theoretical development is mounting, but data remain sparse, and what little data there are apply to research and evaluation utilization. Some researchers have empirically demonstrated benefits of applying knowledge use strategies that

build on increased understandings of linkages as an important factor to enhance use of innovations by teachers in school settings. For example, strengthened linkages promote more effective dissemination of new information to teachers that encourage use (Louis & Dentler, 1988). *Interactive processes*, which connote connectedness between disseminators and users, were also found to be potent in enhancing use of information. These findings are emergent and need further investigation, especially regarding use of well-developed innovations (Cousins & Leithwood, 1993).

1.2 Overview of Study

This study seeks to add to the theoretical understanding of sustained interactivity by applying Huberman's model of the construct within the implementation context of an existing, well-developed North American educational program called Project WILD. The purpose is to investigate the potential of sustained interactivity as a predictor of the use of a well-developed program innovation. The study examines use of this innovation by teachers under varying conditions of sustained interactivity. Project WILD is suitable for this purpose as it is characterized by inter-organizational and interpersonal linkages and frequency of contacts among disseminators and teachers that range in levels from high to low to an absence of contacts.

A single-group, retrospective design is used to carry out an explanatory study. First, the study describes sustained interactivity as it relates to program innovation use. Second, it examines use from two perspectives, under varying conditions of sustained interactivity that range in levels from high to low to an absence of contacts among users and disseminators of the program. The first perspective is the use of the program innovation. The second perspective is process use. It relates to how users are affected because of their participation in, or proximity to, the innovation. Data were generated by using a common survey across North America that was directed at 2,000 certified teachers who teach in classroom settings and who are potential users of Project WILD. Data were also generated from disseminators of the well-developed program

innovation by using a version of the teacher's survey. The purpose is to capture disseminators' views of sustained interactivity and to examine the extent to which their views converge with those of teachers.

The study seeks to extend understandings of what the implications of strengthened linkages between disseminators and teachers may be for the dissemination and the use of large, well-developed innovation within school settings. It also seeks to add to existing knowledge about what types of linkages may exert the most influence on the use of well-developed innovation and promote productive effects for meaningful local impact.

In general, use of the well-developed innovation was found to vary as a function of the degree of sustained interactivity. That is, increased levels of sustained interactivity were shown to enhance utilization of the innovation. These findings are very promising with respect to the potency of the sustained interactivity model as a predictor of use by teachers of a well-developed program innovation.

1.3 Motivation for Study

The study is motivated on the researcher's belief that, given the emerging importance of sustained interactivity as a predictor of use, as suggested by empirical research in the domain of knowledge utilization, this construct may have pivotal implications for enhanced use of well-developed innovations to result in lasting change within school settings. There is also a call to test it with well-developed innovations as sustained interactivity effects on their use is unknown. Addressing this gap in knowledge further motivates the study.

1.4 Overview of the Contents of Thesis

This thesis contains 9 chapters. This introductory chapter provides the reader with a statement of the problem that was identified by the researcher to justify the research. The overview of the study states the study's purpose and offers a general description of how the

study was carried out, its main finding and the implication of that finding as well as the motivation to carry out the research.

Based on a review of the literature from three domains of academic inquiry, a conceptual framework was developed to guide this study. Chapter 2 presents the literature review and the conceptual framework, together with the research questions that were formed on the basis of it and the hypotheses to test the relationship between sustained interactivity and utilization that arose from the questions. The study context is also described in this chapter.

Chapters 3 outlines the methods of the study, including results of a pilot that was conducted to refine instrumentation for the study proper. Chapters 4 through to 7 are devoted to analyses of data, which were collected through the questionnaire that was completed by teachers, and the presentation of their findings. This sequence of chapters starts with an examination of the characteristics of sustained interactivity in Chapter 4, then it proceeds to investigate the characteristics of use of the innovation (Chapter 5) and the covariates that were used in this study to enable more precise estimates of sustained interactivity (Chapter 6). Finally, in Chapter 7, the relationship among these variables is examined and the influence of sustained interactivity as a predictor of use is presented.

Chapter 8 shifts the focus from the user of the innovation to the disseminators of Project WILD wherein the data collected about their views of sustained interactivity enable an examination of how closely they converge with those of teachers. Chapter 9 concludes the thesis with a discussion of, and conclusions about, the findings and their implications for theory and practice, after laying out the limitations of the study.

CHAPTER 2

Literature Review and Research Questions

The first of the three parts of this chapter begins with a review of the literature from which a conceptual framework is derived to guide the study. The second part of this chapter presents the research questions and corresponding hypotheses to test the relationship between sustained interactivity and use. The third and final part of this chapter concludes with a description of the study context.

2.0 Literature Review

The purpose of the literature review is to construct a conceptual framework to guide the study, from which examples of use of innovation by teachers can be examined under varying conditions of sustained interactivity. Given this focus, literature from the domain of social sciences inquiry known as "knowledge utilization" was selected to situate the study, identify concepts of use and knowledge, critique Huberman's sustained interactivity model and related theoretical and empirical work, and identify known factors associated with how knowledge is used. Since the study's intent is to explore effects of sustained interactivity on innovation use within school settings by teachers, the literature review also drew on the domain of "collaboration" among educational practitioners to examine what is known about the use of innovation in collaborative school workplaces. Finally, as level of implementation of an innovation is also of interest, literature from the "planned educational change" domain is reviewed to help construct the framework for implementation and local innovation use.

2.1 Knowledge Utilization Literature

2.1.1 Situating the Study

A unified theory of knowledge utilization has not been well developed (Dunn & Holzner, 1988; Rich, 1991) but taxonomies to differentiate entities being used have been created by Backer (1991, 1993) and Zhang (1989). Both taxonomies are comprehensive. Backer (1991)

developed an 8-part taxonomy of sub-disciplines: technology transfer, information dissemination and utilization, research utilization, innovation diffusion, sociology of knowledge, organizational change and planned social change, policy research, and finally interpersonal and mass communication. Zhang (1989) provided a more succinct framework of five categories of major theoretical perspectives. His taxonomy helps to situate the focus of this thesis' investigation. Zhang's (1989) first category combines technology transfer and the innovation diffusion perspective, where knowledge is viewed as a concrete form and its use involves decisions to adopt it. Second, the program implementation and planned change perspective is categorized as the focus for the study of organizational innovations that are embodied in programmed actions (e.g., new programs, new procedures, research findings). His third category is evaluation for decision making, which is an extension of planned change. Knowledge is equated with findings arising from examining practical problems. The fourth category focuses on information use for policy making while the fifth is a knowledge system-utilization perspective–a macro approach concerned with the impact of knowledge on society.

Of Zhang's five categories, the program implementation and planned change perspective is the most relevant in examining how and to what extent sustained interactivity may contribute to the use of a program innovation that may result in lasting change. This perspective focuses on the study of organizational innovations that are embodied in programmed actions (e.g., research findings). Change is explained through the implementation of innovations, where scholars propose such solutions as creating linkages between knowledge producers and users to overcome implementation barriers. The next segment of the literature review draws contemporary understandings about knowledge utilization, with attention to evolving understandings of what is meant by knowledge and use to provide a richer context in which to examine Huberman's sustained interactivity model.

2.1.2 Conception of Knowledge Utilization

While the field includes a wide range of perspectives, there is general agreement (Shulha & Cousins, 1996) that the production, transfer and use of knowledge are social processes (Dunn & Holzner, 1988) that are subject to political influences (Weiss, 1983) and that the organizational contexts in which they are used operate in non-rational ways (Hutchinson & Huberman, 1994). There is recognition that utilization cannot be understood without understanding the context in which it is used (Lester, 1993) and there is a need to appreciate the complexities of user communities (Huberman, 1989). In their comprehensive literature review of recent developments in theory and research on evaluation research, Shulha and Cousins (1996) provide justification for such understandings: First, as a social process, utilization occurs in the context of social interaction and processing and must be interpreted locally. Second, since hierarchies of power exist inside organizations and are likely subject to partisan interests (Huberman, 1990), power and conflict may decide how knowledge is used (Sunesson & Nilsson, 1988). Third, characteristics of individuals responsible for utilization are also an important factor. Users of knowledge are viewed as active recipients of knowledge entering an organization (Sunesson & Nilsson, 1988) where that knowledge must pass through truth and utility tests (Weiss, 1983; Weiss & Bucuvalas, 1980): knowledge will not be persuasive, nor viewed as credible, unless it corresponds to a user's experiences (Huberman, 1990). Knowledge must also be useable (Louis & Dentler, 1988) but this determination, and its selection, may be subject to a user's ideologies and/or interests (Florio & DeMartini, 1993; Louis & Dentler, 1988; Weiss, 1983). One question that emerges is: What is the nature of knowledge and how is it understood to be used?

2.1.3 Conceptions of Knowledge

The literature clarifies conceptions of knowledge. Knowledge may be defined as an organizational innovation that is embodied in programmed actions (Zang, 1989). An innovation may be an idea, practice or material artifact, or a bundle of knowledge like an activity guide (Louis & Dentler, 1988), perceived as new by a potential user (Zaltman, 1979). In this thesis, "bundled knowledge" is used to define a well-developed program innovation.

The field distinguishes information from knowledge. There is agreement (Backer, 1991) that scientific and professional knowledge is corrigible and may be subject to non-arbitrary standards of assessment that permit judgements of merit: "information is...raw data, whereas knowledge is interpreted data" (Dunn & Holtnzer, 1988, p. 15). There are, however, different views. For example, Weiss (1983) suggests that information has "a tentative enough aura to contain the partial, biased, or invalid understandings" while knowledge might be a better label "but it often communicates a sense of accuracy, rightness and validity" (Weiss, 1983, p. 225). Weiss (1979) views knowledge as a set of cognitive understandings, subject to change and development in the process of its application. Kennedy (1983, 1984) echos a similar theme by distinguishing between factual knowledge and normative meaning, which involves interpretation and judgement. Interpretations, not factual knowledge, become integrated in working knowledge. Groups integrate working knowledge into a body of shared knowledge through informal conversations or negotiations (Kennedy, 1984). This view conceives of knowledge as socially constructed (Bandura, 1986), which is usually developed in a social context (Kennedy, 1984; Louis & Dentler, 1988).

2.1.4 Conceptions of Utilization

The literature reveals distinctions and variations in how use of knowledge is defined and that utilization can have different meanings. As Leviton and Hughes (1981) suggest, there is a sense that utilization of knowledge is not a "unitary concept" (p. 526); there are different types,

based on the purposes that they serve. Three dominant types of use of knowledge were found in the literature: instrumental use (acting on knowledge in specific, direct ways), conceptual or educative use (using knowledge for general enlightenment; influencing actions but less direct than instrumental use); and symbolic (or persuasive) use involved in the use of knowledge to support or defend a political position (Beyer & Trice, 1982; Cousins & Leithwood, 1986, 1993; DeMartini & Whitbeck, 1986; Larsen, 1980; Rich, 1991; Weiss, 1979). Weiss' (1980) concept of "knowledge creep" may be added as a form of conceptual use–a phenomenon where new ideas diffuse gradually throughout a social system and come to shape the way in which people perceive. Several researchers (e.g., King & Pechman, 1982, 1984; Larsen 1980, 1981; Rich, 1991; Weiss & Bucuvalas, 1980) argue for concepts of partial or non-use and misuse and abuse (Aiken & Coyle, 1988), an area that has not received much attention, particularly in the empirical literature (Dunn & Holzner, 1988; Shulha & Cousins, 1996). Larsen (1980) suggests that choices are made not to use information and are legitimate areas of study. Aiken and Coyle (1988) provide a classification system: non-use (inability of users to discern critical information within a study), justified misuse (user's disregard of information known to be flawed), and misuse (commissioning a study for symbolic purposes, subverting a research process, purposeful non-use of high quality findings, or purposeful use of poor quality findings).

While the literature reveals a host of varying conceptualizations of utilization of knowledge, the focus of interest in this thesis is instrumental and conceptual use. With respect to distinguishing these forms of use, Leviton and Hughes (1981) suggested that it is difficult to determine where conceptual use ends and where instrumental use begins and questioned the independence of these types of use. Cousins and Leithwood (1993) on the other hand suggest that instrumental and conceptual use are actually two extreme points along a continuum of use.

In their review of over 60 empirical studies, Cousins and Leithwood (1986), summarized a re-conceptualization of use as follows:

> At the most direct extreme is knowledge use for instrumental purposes; a specific research finding, for example, is used as the primary basis for a decision. At the least direct extreme is conceptual (or educative) use of information. One learns from the information, such learning eventually having an indirect bearing on one's thoughts and actions; there is considerable support, at present, for this as a promising way to understand how research and evaluation are most frequently used. (p. 309)

Underlying both instrumental and conceptual use is the psychological processing of information (Cousins & Leithwood, 1993; Kennedy, 1984; King & Pechman, 1984). It is the minimum requirement for knowledge used and is a prerequisite to learning from it and basing decisions on it. In this thesis, the definition of use of knowledge follows Cousins and Leithwood's (1986, 1993) idea of use as a continuum, where instrumental use is situated at one end and conceptual use at the other.

Although the dominant conceptualizations of utilization of knowledge continue to be thought of in terms of instrumental, conceptual and symbolic (political) traditions, it is also important to acknowledge an important distinction that has recently emerged in the evaluation use literature between the utilization of knowledge and the impact of the process of being involved in the evaluation can have (Cousins, 1995a; Patton, 1994, 1997). Shulha and Cousins (1996) suggest that such "thinking is among the most significant developments in the evaluation utilization field of inquiry within the past ten years" (p. 41). In his presentation of developmental evaluation, Patton (1994) defined process use as "evaluation processes and activities that support program, project, product, personnel and/or organizational development" (p. 317). More recently, Patton (1997) clarified his thinking and redefined process use as being indicated by "individual changes in thinking and behavior, and program or organizational changes...that occur among those involved in evaluation as a result of the learning that occurs during the evaluation process" (p. 90). Patton (1997) suggested that it does not matter so much what the focus of an

evaluation is "... or what its findings are, the impact comes from engaging thoughtfully and seriously in the process" (p. 20). A number of scholars have examined this impact (e.g., Cousins, 1995a, 1995b; Cousins, Donohue & Bloom, 1995; Greene, 1987, 1988a)–that is, how participation in the evaluation seemed to affect program personnel (Robinson, 1998). For example, several researchers found that participation in and exposure to evaluation processes can lead to the development of feelings of self-worth, empowerment and ownership of the program being studied (e.g., Cousins 1995a, 1995b; Greene, 1988a). In this thesis, the notion of process use is of particular interest and will be explored in a later section of this literature review.

In the next segment of the literature review, the focus turns to situating and describing Huberman's sustained interactivity model.

2.2 Huberman's Sustained Interactivity Model

2.2.1 Situating Huberman's Sustained Interactivity Model

In their recent review of developments in theory and research on evaluation utilization, Shulha and Cousins (1996) draw attention to an important development in the study of knowledge and research utilization: increased attention to the "connectedness of knowledge production and utilization functions" (p. 23). In traditional knowledge utilization frameworks, knowledge production, dissemination and utilization were typically viewed as sequential activities. Contemporary theorists and researchers, in contrast, opt for a more integrated perspective that captures reciprocal influences among these activities in non-sequential ways. A case in point, they suggested, is the evolution in thinking about the "two communities metaphor" (Dunn, 1980), which provided a way to consider the problem of utilization of knowledge. The focus was on explaining cultural differences between the communities of knowledge producers and users of that knowledge. Current conceptualizations, on the other hand, are more focused on the connections between these communities and the dynamics of interaction as a way to explain and promote more meaningful use.

Huberman's sustained interactivity model is situated within this more contemporary orientation, which advocates the strengthening linkages between researchers and practitioners for the implementation of applied research. One approach to linkage or connectedness between communities of researchers or disseminators of knowledge and users of it is through indirect links–through intermediaries, such as in person assistance (Crandall, 1988; Louis, Dentler & Kell, 1984) and linking agents (Beyer & Trice, 1982) who play the role of translating and adjusting knowledge in a form suitable for the context in which it is expected to be used. An alternative approach assumes a direct link between producers of knowledge and the intended users. Several researchers, as will be discussed later, have focused on the consequences for intended users of increasing the frequency and intensity of contacts between members of both sides. Huberman (1994) calls such contact "sustained interactivity".

In his review of the literature, Huberman (1989) identified several researchers working within the same tradition but across different disciplines. What is common among them, he suggested, is the systematic use of an approach to dissemination of research results that may be characterized as sustained interactivity and thus achieving greater effects of conceptual and instrumental use of knowledge (Huberman 1989). He coined the term "sustained interactivity" to encompass this idea and described the construct as a "configural" or "macrovariable" (1989, p. 9) that has not decayed over time but rather led him to conclude that "[o]verall, the best single predictor of knowledge use and gain is intensity of contact(s) between disseminators and receivers" (Hutchinson & Huberman, 1994, p. 41). The next segment of this literature provides a more detailed review of Huberman's model of sustained interactivity.

2.2.2 Development of Sustained Interactivity Model

Huberman's work spans over three decades of work during which he developed an integrated model of research utilization (e.g., Huberman, 1973, 1983, 1987, 1989, 1990, 1994). This body of work focuses on the consequences for the community of practice of increasing the

frequency and intensity of contacts between members of knowledge and user communities although a recent study (Huberman, 1999) also investigated reciprocal effects of sustained interactivity on researchers.

Huberman's sustained interactivity model draws largely from his empirical research, most notably a multiple-case tracer study (Huberman & Gather-Thurler, 1991) that followed research dissemination activities of a vocational education project. It was premised on the conviction that "whether or not research findings find their way into practitioners' organizations depends heavily on the number, variety, and mutuality of contacts between researchers and practitioners" (Huberman, 1990, p. 364). Huberman traced links between a research institute and users at the time of the study and 18 months after its termination to examine the dynamics and effects of linkage. *Contacts* or *interactions* were defined as activities that occur between researchers and practitioners. *Links* and *linkages* describe formal arrangements between collaborating parties prior to and after dissemination (Huberman, 1987).

The study established a continuum of linkage where five or more interactive contacts represented a *sustained* link; less than five were *episodic*. Huberman reported that contacts established before the study design or before data collection were "strong predictors of (a) practitioner interest and engagement in the study and (b) the intensity of contacts during the conduct of the study" (pp. 236-293, Huberman, Gather-Thurler, & Nufer, 1988, cited in Huberman, 1990). After 18 months, evidence was sought of new or stronger collaboration between the two communities, including those beyond the study. Linkages and contacts were found to predict instrumental and conceptual use of the data (Huberman, 1990): users who were targets of intensive dissemination of findings demonstrated a strong understanding, where conceptual mastery and its import were higher among users involved earlier in the study or associated more intensively in local dissemination. Also, contacts forged stronger linkages between organizations: a relationship was found between the type or amount of contact made

during the study and the degree of linkage between researchers and practitioners 18 months after the study, where contacts during the study promoted later dissemination effort. Of the 23 sites studied, a significant number fell into one of two categories: *mutual engagement*, where initially weak levels of contact became stronger as a result of collaborative engagements through which benefits of exchanges were shared among users and researchers, and *synergy*, which represented cases where linkage (collaboration) already in place were activated for new projects. Huberman concluded that, first, ongoing interim feedback about research findings was essential to educate practitioners about the import of data. Assimilation of findings and their implications to local settings take time (1-2 years), require interaction to integrate one's existing knowledge with new information and require the presence of researchers to rectify misrepresentations. Second, interactions over time create an appropriate, interpersonal climate for sharing between organizations. Third, contacts during the study prompt both sides to think early about the meaning of findings in the local context.

2.2.3 Sustained Interactivity Variables

Huberman (1990) isolated factors associated with sustained interactivity. His conceptual framework to guide the study of known factors to enhance use, which is depicted in Figure 2.1, aids in situating them (Huberman, 1989). *Organizational Factors* are cast as determinants of *Users'* and *Researchers' Contexts*. These factors influence *Linkage Mechanisms*, which predict that under conditions where intermediaries (people active in research and user settings) are present, and formal and informal are contacts made during the study, along with interim feedback on findings with users involved during the data collection phase, there will be a stronger push toward use (Huber man, 1994). *Dissemination Effort* and *Predictors of Local Use* are a function of *Linkage Mechanisms*. These two factors (Huberman, 1990, 1994) exerted the most influence on use. Figure 2.2 (see Appendix A) displays a list of findings that Huberman (1990) reported

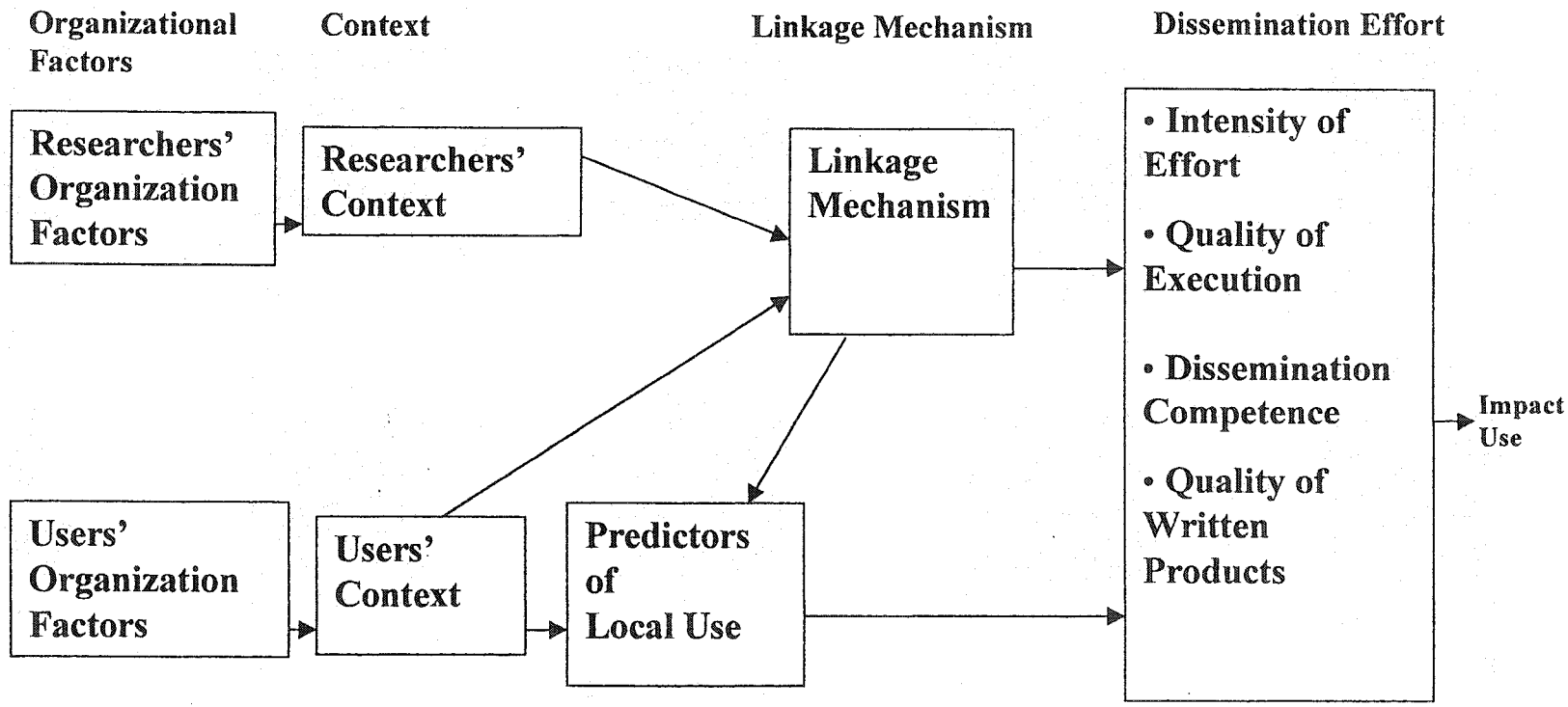

Figure 2.1: Dissemination effort model (Huberman, 1989, 1990).

with respect to the set of variables that exerted, unambiguously, a directional influence on the outcome variable (i.e., conceptual effects).

Following Huberman's (1989, 1990) interpretation of his findings, *Dissemination Effort* effects suggested that the most promising dissemination strategy for enhanced utilization implies an investment of time (intensity of effort) by researchers, including a follow-up period (which he suggested was crucial), personal contacts in addition to reports and other media and concern for users' motivation (reinforcement). By spending time in users' settings, researchers see its malleable features, determine relevancy of findings, identify key actors, and reinforce them. These activities define "sustained" components of sustained interactivity whereas "interactivity" aspects are the transactions between researchers and users (Huberman, 1990). *Predictors of Local Use* effects suggested that such a dissemination strategy improves understandings of findings among users, increases perceptions of their validity, and stimulates increases of time and numbers of users in response to similar investments by researchers. These efforts engage users if the research is compatible with their opinions, if users are aware of the stakes involved, and if the organization is open to findings that may go against the grain.

Huberman concluded that these conditions may promote strong conceptual mastery of the study and of its local significance. *Dissemination Effort* variables were also defined as the components of sustained interactivity. They imply deliberate activity by researchers but also assume a transactional frame of reference: knowledge is negotiated, reconstructed and transformed in line with frames of meaning that users bring to bear on new information. Huberman concluded that this activity likely assures higher levels of retention and use by individuals. While he qualified that his findings are suggestive, he also concluded that they may define conditions under which research-based knowledge bridges to a community of users in ways that allow for robust levels of understanding but further investigation was warranted.

2.2.4 Description of Huberman's Sustained Interactivity Model

Figure 2.3 depicts Huberman's conceptual model of sustained interactivity for use of knowledge. Sustained interactivity is defined as "multiple exchanges between researchers and potential users of that research at different phases of a given study" (Hutchinson & Huberman, 1994, p. 41). He identified the decisive exchange points during which links and contacts between these two communities ought to occur at each stage of a project's development for enhanced utilization: prior to, and during the conduct of the study, during the analysis and write-up, and during the dissemination phase, when findings are brought into the user's setting. Interpersonal links, spread throughout the life of a study, are at the core of the sustained interactivity construct as the key to use, as shown in Figure 2.3. Their effects create a mutually constructed social context, although each party is embedded within its organizational context. These networks represent inter-organizational ties and ongoing contacts between researcher and practitioner organizations and, through them, within a framework of reciprocal influences, they affect the quality of dissemination activities by researchers and the extent to which practitioners make use of knowledge, where researchers use their analytic skills and users draw on their practical experience (Huberman 1987, 1990). This experience is cast as a reciprocal exchange of a "sense-making and interpretive exercise" (Hutchinson & Huberman,1994, p. 23) and is the dynamic that makes sustained interactivity work. Sustained interactivity is built on this premise (Hutchinson & Huberman, 1994).

The model's skeleton is rooted in the Research, Development and Dissemination (RD&D) perspective, which conceives of diffusers and users interacting in a one-way progression of activity where knowledge is transferred to a passive user for adoption (Huberman, 1994). Huberman uses the skeleton but extends it by including social interactions as a part of it, having identified the absence of a link between users' needs and knowledge production and favoring a constructivist approach of dissemination efforts (Huberman, 1990). This approach (Huberman,

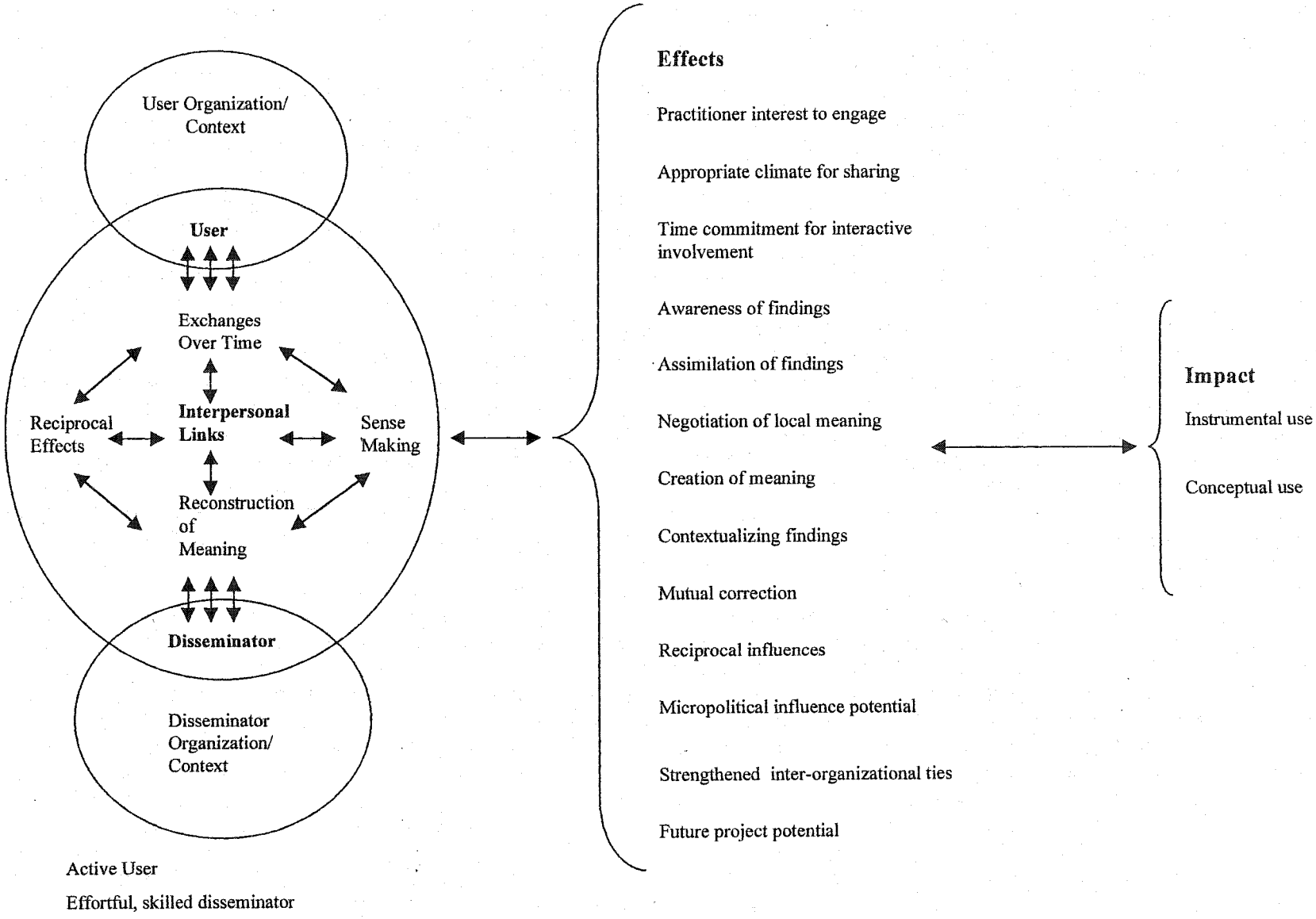

Figure 2.3: A conceptualization of Huberman's (1990) emergent sustained interactivity model.

1989) postulates that new knowledge is reconstructed in invisible ways, and whether or how it will be used depends on social transactions within the user setting–a context characterized with political influences. It emphasizes the idiosyncracy of individual frames of references and assumes that each person processes new information in ways that are "assimilated to existing 'schemata', those within the individual's mind and those within a social setting, and in doing so, transform knowledge to make it meaningful" (Huberman, 1989, p. 8).

The model rests on the assumption of (1) an active user that is a participant in the process of negotiating and reconstructing knowledge, with the potential to distort study findings without the diffuser's direct involvement, and (2) the direct involvement of an effortful, skilled diffuser, as shown in Figure 2.3. Various views exist about the merits of directness of diffusers with users, such as in-person assistance (Crandell, 1988) and linking agents or boundary spanners (intermediaries between knowledge producers and users) whose role is to make knowledge suitable for the context in which it will be used (Beyer & Trice, 1982; Louis, 1980). Having acknowledged that shorter chains of intermediaries create more effective knowledge transmission (Havelock, 1973; Louis & Dentler, 1988), Huberman opts for direct contact, citing advantages of completeness, accuracy and strong advocacy (Hutchinson & Huberman, 1994) as opposed to indirect strategies that facilitate wider dissemination but of less quality.

The effects of exchanges between users and researchers are seen from a constructivist lense. As mentioned above, the model favours a constructivist approach and includes social interactions as a part of it (Huberman, 1987); its key assumptions rest on this approach (Huberman,1989,1990, 1994):

1. User as Active: User is an active participant and recipient of knowledge.

2. Mutual Cognitive Accommodation: Accommodations evolve through engagement in multiple interactions during decisive exchange points. Users learn the study's meaning; researchers learn how they make sense of the findings and which of these are meaningful within the setting.

3. Negotiation of Meaning: The study's meaning is negotiated in a process that evolves into an ongoing conversation. First it is dominated by the researcher's framework and then shifts to that of users', with which the researcher is unfamiliar, and may be more complex than anticipated in a research design. Then, during the study, data become the substance of exchanges, along with their pertinence to local practice. Researchers defend their claims. Users test them, where the irrelevant or discrepant will be discarded or constructed in ways consistent with what users know.

4. Reciprocal Effects: Both parties are affected by their exchanges as each draws on its expertise to bear on the same topic. If done with a level of intensity or interactivity over time for conceptual reorganization to occur, new knowledge may prompt users to re-frame their vision of practice and researchers may rethink their research.

5. Reconstruction of Knowledge: Each party reconstructs the meaning they attribute to the study and generate understandings about it in a scenario of symmetry: Each may claim conceptual power as to how the findings play out in the utilization context.

6. Micropolitics of Information Use: The micropolitics of information use in social settings is recognized–that is, local attempts to transform, distort, or make illegitimate inferences from the study for strategic reasons. Researchers' continued presence in the setting after the study's completion is to attenuate the effect by advocating for their interpretation of the findings.

The effects of sets of exchanges, drawn from Huberman's research, are shown in Figure 2.3 as a continuum of outcomes that may arise from the linkages. The continuum is hierarchical, starting with stimulating users' interest and engagement before and during a study through to mutual involvement in future projects. These outcomes, and the dynamic linkage processes that underlie them, influence use–from conceptual to instrumental use, including symbolic use (not shown in Figure 2.3)–depending on the levels and nature of sustained interactivity. The continuum is a function of the connection of social interactions to enhancing use of knowledge.

Huberman (1994), however, acknowledged that his model is emergent and called for more tests of it. In this spirit, he probed the dimension of reciprocal effects, which will be briefly considered in the next segment of this review.

2.2.5 Reciprocal Influences of Sustained Interactivity

Huberman (1999) investigated what the reciprocal effects of sustained interactivity with practitioners may be on researchers in a case study of education researchers involved in exchanges of findings with schools over a 10 year period and a review of intellectual biographies of eight researchers who maintained regular contacts in the field. He found that "reciprocal taming" (where both sides come to relate confidently to one another and develop a common language) occasionally happened quickly. Sometimes researchers' perceptual shifts were dramatic but they did not bring researchers around to "teachers' way of accounting for classroom life" (p. 299). Rather, researchers and teachers created a community of exchange where each could profit in different spheres of activity. Strongest reciprocal effects arose from clearly defined projects that evolved over time and where something was on the line for both parties. Sometimes researchers' were influenced by multiple interactions with practitioners. Unexpected or discrepant findings tended to encourage both parties to contribute toward making sense of them. Agendas shifted as interests changed; interactions motivated such changes. Conceptual shifts on the part of researchers, however, occurred only when researchers were likely to assimilate what practitioners had to say and when their research interests intersected with what they were hearing, both from experienced practitioners and their academic peers. Huberman concluded that researchers may refine, deepen or recast their conceptual frameworks, their methodologies, their teaching and how they interact with nonspecialists. He also concluded that sustained interactivity between practitioners and researchers may be beneficial to both parties.

Huberman's development of his sustained interactivity model as a predictor of use of knowledge is promising but it is limited to his research. The next segment of this literature review critiques the model and draws attention to how the model may be enriched by findings in related empirical studies.

2.3 Enrichment of Huberman's Sustained Interactivity Model

2.3.1 Critique of the Sustained Interactivity Model

Huberman's sustained interactivity construct is significant for at least two reasons. First, it reflects contemporary theoretical thinking on the merit of strengthened linkages between disseminators and users. Second, it integrates a constructivist approach as an aid in understanding how the dynamic of that linkage bears on enhanced utilization of knowledge. Traditional knowledge use frameworks often cast knowledge production, dissemination, and utilization as linear or cyclical activities, such as Havelock's (1969) influential RDDE cycle. Critics of these approaches (e.g., Berman & McLaughlin, 1978) acknowledged fundamental deficiencies that failed, for example, to account for motivations and contexts of users (Hutchinson & Huberman, 1994). Current views emphasize strengthening connections between disseminators and users of knowledge and focusing on their associated dynamics of interactions as a way to explain deeper, more lasting use (e.g., Holdaway, 1986). Variables like interaction, exchange, involvement and participation, which have traditionally been viewed as important (e.g., Beyer & Trice, 1982), emerge as the focus of interest (Shulha & Cousins, 1997)–a shift from traditional perspectives to a more constructivist approach.

The model has two major limitations. First, it is emergent and requires more research. Its development has been confined to Huberman's empirical investigation of a national research program in vocational education (1990) and his more recent examination of reciprocal effects of it (Huberman, 1999). The first study supported his thesis that frequent and intense interpersonal contacts must occur before, during and after a study for research results to exert a strong

influence on practitioners; the second supported the notion that reciprocal effects of sustained interactivity may be beneficial to both researchers and users. Although the model needs refinement and testing, as Huberman (1990, 1999) acknowledged, its development fills an important gap in the literature by providing a comprehensive framework that aids in understanding (1) the linkages between disseminators and users of knowledge, and (2) the effects of those linkages on use of knowledge. Second, the model is not enriched by related scholarly work within the research and evaluation use domains. Other researchers (e.g., Cousins & Leithwood, 1986; Greene, 1987, 1988a; Louis & Dentler, 1988) also observed potent effects arising from strengthened linkages between disseminators and users over the life of a study. The next segment of this literature review will examine this body of literature.

2.3.2 Effects of Direct Linkage on Use of Knowledge

Recent empirical evidence (e.g., Cousins, 1988; Cousins & Leithwood, 1993; Dawson & D'Amico, 1985; Earl & West, 1991; Geva-May & Peretz, 1991; Johnson, 1980, 1985; Mathisen, 1990; Muthard & Felice, 1982; Winberg, 1991) demonstrates the power of direct linkages in explaining use of data, where directness ranges from contact with researchers, through to involvement in the research or evaluation process, to carrying out these functions (Cousins & Earl, 1992, 1995). Several recent empirical studies that address effects of direct linkages were examined from two strands of within the knowledge utilization field of inquiry–evaluation utilization and research utilization. Recent literature from the more general domain of knowledge utilization as it relates school improvement was also examined. The next three segments of this review highlight those studies (see Appendix B for a detailed account of the studies). Each set of literature is organized with respect to the perspective from which it originated.

2.3.3 Summary of the Evaluation Utilization Literature

The body of empirical studies from the evaluation utilization domain offers mounting evidence that sustained interactivity enhances the use of evaluation findings. Certain themes emerge as being of considerable importance for use to occur: Ongoing (Greene, 1987), interactive contact (Dawson & D'Amico, 1985) between evaluators and users, the active engagement of users in the process of evaluation (Alkin & Strecher, 1983; Greene 1987, 1988a, 1988b; Cousins & Earl, 1995; Earl & West, 1991), direct participation of users in dissemination activities (Dawson & D'Amico, 1985; Geva-May & Peretz, 1991) and the presence of meaningful dialogue among users and evaluators (Greene, 1988a, 1988b; Keiny & Dreyfus, 1993) surfaced as prominent features of instances were utilization of evaluation were observed. Suitable forums for dialogue created opportunities for shared views to be developed (Greene, 1988a, 1988b), the negotiations about the meaning of findings to occur (Alvik, 1995; Marsh & Glassick, 1988), and sharing of experiences to flourish (Strang & Pearson, 1995). These kinds of characteristics of social interaction were found to not only enhance utilization, but they contribute to users' commitment to evaluation findings (Dawson & D'Amico, 1985; Marsh & Glassick, 1988; Strang & Pearson, 1995), encourage receptivity (Strang & Pearson, 1995) and perceptions of evaluation quality (Green, 1988a, 1988b; Marsh & Glassick, 1988). Moreover, users were observed to be affected because of their proximity to the process of evaluation. Such effects included learning (Cousins, 1988; Dawson & D'Amico, 1985; Keiny & Dreyfus, 1993), gaining new skills (Cousins, 1995a; Dawson & D'Amico, 1985) and generating feelings of ownership for a program (Greene 1987, 1988a, 1988b). These effects are related to process use. Characteristics of evaluators were also found to bear on utilization (Greene 1987, 1988a, 1988b; Marsh & Glassick, 1988). Listening skills, technical competence, respectiveness to diverse views, and responsiveness of evaluators on the part of the disseminators enhanced utilization.

Questions, however, emerged for the researcher in her review of this literature: Are people who participate in evaluation processes open to change? Are we looking at studies of skilled evaluators interacting with people? More important, does sustained interactivity predict utilization, even if commitment to the evaluation or being open to change or if characteristics of the evaluator were taken into account? The next segment of the literature review focuses on a review of the literature from the research utilization perspective.

2.3.4 Summary of Research Utilization Literature

As was the case regarding the evaluation utilization literature, the set of empirical studies from the research utilization domain provides further evidence of the power of strengthened linkages in predicting the use of knowledge in addition to that of Huberman's study (1990). The set of literature that was reviewed revealed very similar characteristics of social interaction under conditions of direct linkage that were found in the evaluation utilization literature. There were reports, for example, of the central importance of ongoing, interactive contact between researchers and practitioners and the direct participation in dissemination activities and in a study, especially throughout the life of it (Yin & Moore, 1985). The presence of meaningful dialogue was also central to encouraging utilization and suitable forums within which such dialogue could occur (Kennedy 1984). Knowledge brokers helped to facilitate such conditions (Johnson 1980, 1985) as did organizations, in which ideas could be exchanged and negotiated, and in which misconceptions would be resolved (Muthard & Felice, 1982). As revealed within the evaluation utilization perspective, characteristics of researchers and the way in which they interacted with practitioners were also important determinants as to whether research was used (Yin & Moore, 1985). Similarly, effects of increased commitment and dimensions like the qualities of materials (i.e., their readability, attractiveness, their fit in the users' context) were associated with enhanced utilization, even to the extent that one investigator suggested that if quality materials were available, personal presentations might not

be needed to enhance use (Muthard & Felice, 1982). Recognizing that the quality of materials is a very important predictor of materials, as revealed in empirical research within this set of literature, the researcher raised a question: Does sustained interactivity predict utilization, even when one takes into account the presence of materials that are perceived by the user to be of high quality?

Before moving onto the next segment of the literature review, the researcher draws attention to recent findings arising from a survey of 1229 Canadian social science scholars (Landry, Amara & Lamari, 2001) to examine the extent to which social science research lends itself to utilization. While this study did not explore direct linkage (and thus not included in the above literature review), it is raised to acknowledge that the authors drew directly from Huberman's sustained interactivity variables as their independent variables. They found that "the determinants to the interaction model [Huberman's model] provide the best predictors of knowledge utilization in social sciences" (p. 345). Their study, however, was confined to researchers' perceptions of how their research lends to being used by potential users. Thus, while it supplies important information about the extent to which research may lend itself to be used, it does not provide evidence on how utilization occurred.

2.3.5 Summary of Knowledge Utilization Literature on School Improvement

Empirical literature from this strand surfaces three important influences that bear on sustained interactivity as contributing to use of an innovation–influences which are also reflected in the prior two strands. First, there is a need for a disseminator who is skilled in handling each new context (Huberman, 1990; Huberman & Cox, 1990; Louis & Dentler, 1988). Second, a forum for teachers is required to discuss innovations, develop new understandings about it and how it fits with their work and reconstruct the meaning of it before lasting change will happen. That meaning is developed within a social context, where social interpretations create shared interpretations for participants (Cousins & Leithwood, 1993; Louis & Dentler,

1988). Third, interaction among colleagues bears on assessing the usefulness of information (Hart, 1990; Louis & Dentler, 1988) but the amount and depth of that interaction may be pivotal. These needs suggest that while interaction among colleagues and between them and disseminators may enhance utilization, sustained interaction cannot be produced if the structures and culture that encourage it are absent (Marks & Louis, 1999).

The body of literature from all three strands examined in this literature review supports the premise that sustained interactivity is an important theoretical development as a powerful predictor of how use of data may be enhanced (Cousins & Earl, 1995). The literature, however, is small. Data arising from it, although sparse, are promising but are largely confined to research, evaluation and within the more general knowledge utilization domain as it relates to school improvement. Given the construct's potential to predict use in these domains, one may speculate that it may predict use of program innovation by teachers in school settings. This premise warrants testing but it ought to build on an enriched understanding of Huberman's model that draws from related research.

Huberman focused on one type of interaction: strengthening interpersonal contacts by increasing their frequency and intensity. Holdaway (1986), however, cited a need for analysis of the types of interactions that would be the most productive for local impact and sustained change. Cousins and Leithwood (1993) demonstrated the potent impact on use of information of four types of such interactions, called *interactive processes*, which are defined as processes that lie between disseminators of information and use of information by practitioner communities. The next segment of this literature review examines the effects of these processes in more detail.

2.3.6 Processes Explaining the Dynamics of Linkage

Cousins and Leithwood's (1993) study sheds light on the processes associated with the dynamics of linkage between users and diffusers. While they focused on the use of different

types of information from varieties of sources of help, they focused on local in-service as the most useful for their analysis. Their factor, *interactive processes*, was found to be discernable and potent in enhancing conceptual and instrumental use of information. These processes, derived from a conceptual framework developed by Cousins and Leithwood (1986, 1993) of all known factors that influence use, were tested in a school improvement context. Figure 2.4 situates these processes within their knowledge utilization framework. According to the framework, the extent to which knowledge is conceptually or instrumentally useful depends on factors that are categorized into two dimensions and mediated by a third: Characteristics of the *source of information* (e.g., sophistication, relevance) and aspects of the *improvement setting* (e.g., information needs, user characteristics) will each influence use directly and indirectly through reciprocal influences on the third category, *interactive processes*. These processes reflect inter-connections between disseminators and practitioners and among practitioners in terms of the *social processing* of knowledge, *engagement* of practitioners in a project, *involvement* of practitioners in delivery of interventions, and *ongoing contact*.

A significant proportion of the use of information was attributable to factors in the framework. More specifically with respect to interactive processes, high levels of *social processing* were associated with high conceptual effects, helped determine the relevancy of new information, and clarified how those not involved with implementation could assist implementors. *Involvement* in design and delivery of interventions impacted on learning and decision making. Two elements were important: the *type* of involvement (participation versus dissemination alone) was likely to inspire sustained ownership and commitment, and *numbers of people involved* (a critical mass) appeared to aid a sustained change initiative. Third, *engagement* in implementation and follow-up activities resulted in personal benefits. Most benefits of engagement were conceptual, such as renewed confidence, and affirmed commitment to an innovation through hands-on application. Fourth, *ongoing contact* allowed

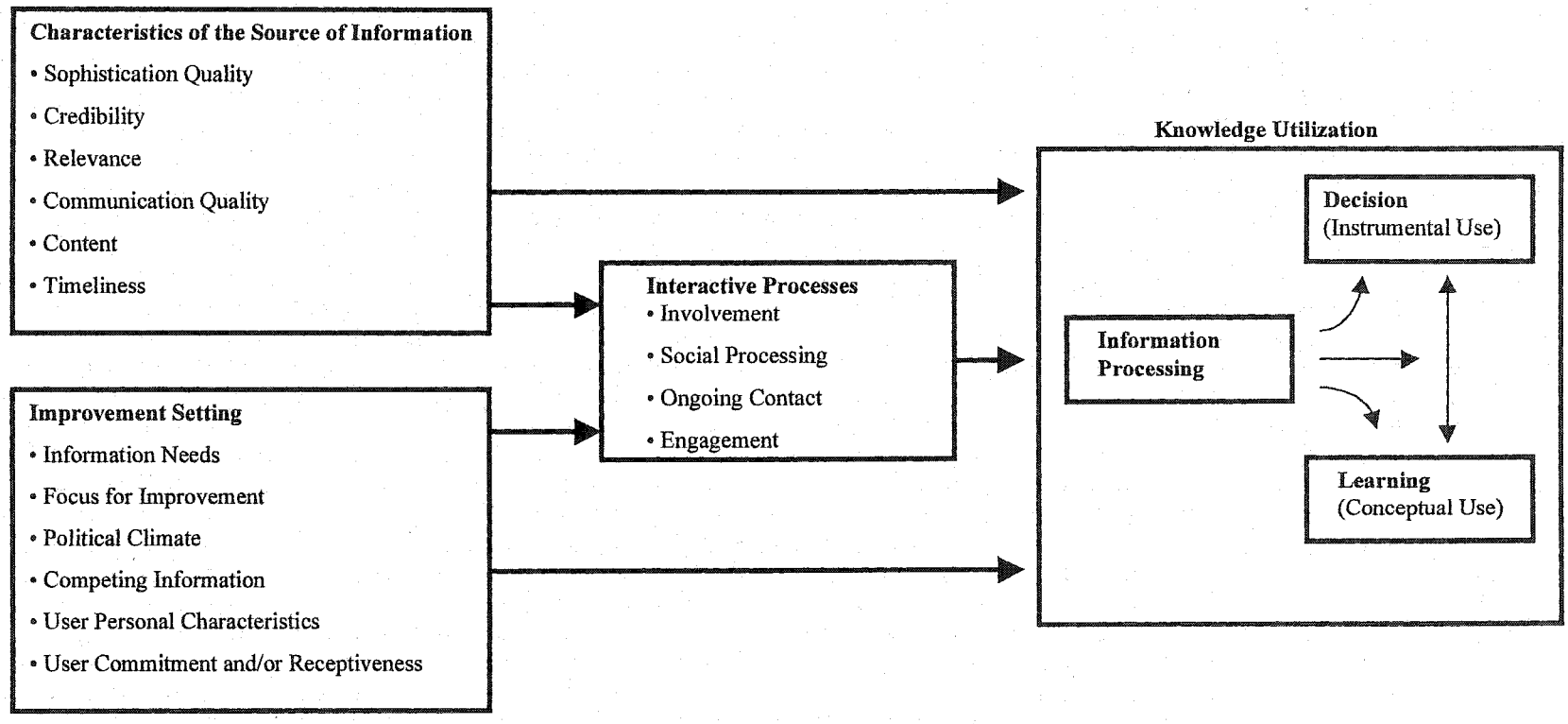

Figure 2.4: Knowledge utilization framework (Cousin & Leithwood, 1993).

users to interact with curriculum and technical assistants, which resulted in increased levels of understandings of disseminated information and its usefulness.

Because of the potency of interactive processes, Cousins and Leithwood (1993) urge that further tests are warranted to clarify the how these, and other processes, influence the use of information, with particular reference to how the completeness of information being disseminated influences use, since their study did not address this dimension: "Do the same factors which foster use of less complete types of information play a role in the adoption of well-developed innovations?" (p. 330). Given the results of their empirical findings, there is merit to include these processes in testing the sustained interactivity model in this study, including *follow up* between disseminators and users, which surfaced as important for Huberman (1990). Such a test may also reveal sustained interactivity effects on the dissemination of a well-developed innovation (Cousins & Leithwood, 1993). Huberman (1989) observed that the common element among researchers who had evidence of robust levels of use was an approach to the dissemination of findings that was based on sustained interactivity as an influence on use. Cousins and Leithwood's (1993) findings also point to the importance of process use in a consideration of sustained interactivity as each interactive process refers to how users are affected because of their participation in the innovation. The next segment turns to look at what the literature has to say regarding current perspectives on dissemination and then it will focus on process use.

2.3.7 Current Perspective about Dissemination

Louis and Jones (2001) shed light on how dissemination ought to be viewed in the context of educational change. They point out that the focus ought to be on "*new practices and materials, and new ideas* that are designed to stimulate local change" (p. 3) as educational change often occurs as a consequence of ideas rather than concrete products. The intent is not to simply distribute information but rather to do it in a way that promotes its use (Louis &

Jones, 2001). Louis and van Velzen (1988) echo this sentiment in their definition of dissemination: Dissemination consists of purposive, goal-oriented communication of information or knowledge that is specific and potentially useable, from one social system to another. Different strategies are needed to achieve use-related goals, where use is seen as the ultimate goal (Hutchinson & Huberman,1994). Current thinking about dissemination has focused on the emerging importance of social processes as a strategy for dissemination. As Louis and Jones (2001) point out, Huberman and Broderick (1994) suggest that the most hopeful new avenue of inquiry in the Dissemination & Utilization literature emerges when dissemination takes "place... through ...sustained interactions between researchers and practitioners" (Huberman & Broderick, 1994, p. 3-4)–an idea that is central to a renewed theory of dissemination (Louis & Jones, 2001).

Klein and Gwaltney's (1991) framework of four vehicles for knowledge dissemination is helpful in framing what the strategies may be. It identifies variations of directness between users and diffusers of knowledge use with respect to dissemination functions: spread (one-way distribution of information to increase awareness), choice (helping users compare alternative resources), exchange (interactive dissemination, involves interchange of information) and implementation (knowledge use, technical assistance, training, or interpersonal activities designed to change attitudes or behaviour). Klein and Gwaltney (1991) suggest that social interaction among users and disseminators plays a pivotal role in effective dissemination functions. These functions represent a continuum of the level of effort needed on the part of a disseminator where more effort is associated with exchange and implementation (Hutchinson & Huberman, 1994). Deeper levels of knowledge use are likely associated with the exchange and implementation functions (Cousins & Leithwood, 1993).

Huberman sustained interactivity model is grounded on the assumption that sustained interaction enhances utilization. What is missing is an understanding of the extent that well-

developed innovations benefit from strategies that emphasize interactive functions regarding enhanced utilization.

2.3.8 Process Use

Cousins and Leithwood's (1993) potent findings point to the importance of process use to sustained interactivity: each interactive process refers to how users are affected because of their participation in the process of information use. Extending Huberman's model to include the process use concept may help develop understanding of how to optimize conventional notions of use. Several researchers have examined process effects. Greene (1988a) categorized effects as cognitive, affective and political. The cognitive dimension includes learning. Users learn about their programs (Green, 1988a), where learning leads to skill and knowledge development (Cousins, 1995a, 1995b, 1996; Cousins, Donohue & Bloom, 1996; Patton, 1994). The affective dimension includes feelings of self-worth and program ownership (Cousins, 1995a, 1995b; Cousins & Earl, 1995; Greene, 1988a, 1988b; Patton, 1997). At the political level, participation gave voice for users (Greene, 1988a, 1988b) or a form of recognition or empowerment (Cousins 1995a, 1995b). Involvement in process may also lead to organizational development (Patton, 1997), such as organizational learning (Shulha & Cousins, 1997). Such learning occurs when actions in organizations are improved through better understanding. It draws from the principle that knowledge is socially constructed. Learning occurs at the individual level and then at the collective level. A deep level of collective learning occurs when assumptions about practice are made explicit and critiqued. Participatory activities were found to stimulate social interaction (Cousins & Earl, 1992) or facilitate deep, collaborative reflection of practice (Earl, 1995), which are conditions for organizational learning. Further exploration is warranted of process effects among teachers in school settings.

A number of scholars have noted the importance of perceptions of disseminator characteristics to the effectiveness of process use (e.g., Cousins & Leithwood, 1986; Patton,

1994, 1997), several of whom were mentioned earlier in this review (e.g., Greene 1987, 1988a, 1988b; Huberman & Cox, 1990; Marsh & Glassick, 1988; Muthard & Felice, 1982; Yin & Moore, 1985). Drawing from these studies, a set of characteristics emerges that contributes to such effectiveness. These include: strong technical skills, ability to invoke rapport, credibility, responsiveness, accessibility, listening and communication skills, and respect of diverse views.

2.3.9 Summary of Knowledge Utilization Literature

Recent literature suggests that strengthening linkages through ongoing contacts over the life of a program are fundamental to use. Empirical research has also provided information about the kind of dissemination approach that may enhance use and suggestions that users be involved in the processes of use. Interactive processes emerge as important for successful use of knowledge. These activities are collaborative. Questions regarding what kind of collaboration enhances utilization seem pertinent to raise.

2.4 Teacher Collaboration

2.4.1 Collaboration and Use of Knowledge

A number of theorists and researchers view collaboration between teachers as a powerful vehicle for reform in improving schools (e.g., Cousins, Ross & Maynes, 1994; Fullan, 1991, 1993; Little, 1990). The purpose of reform is to help schools accomplish their goals more effectively by replacing some structures, programs and practices with better ones (Fullan, 1985). The crux of it is "how individuals come to grips with the reality of change" (Fullan, 1991, p. 4) and collaboration provides a conceptual starting point to increase "teachers' capacity to deal with change and bring about continuous improvement" (p. 131). High amounts of collaborative activity enhance use (Cousins et al., 1994), especially in combination with credible disseminators (Huberman & Cox, 1990) who help interpret utility and relevance of information in a user context, engage educators in adoption of information and stimulate commitment to its use (Louis & Dentler, 1988). How much is enough for use to occur?

Cousins (1996) explored this issue in a participatory evaluation context by studying effects of three levels of researcher involvement in partnership arrangements with users: in *full partnership* in a project, *silent partnership* (an external consultant), and *general advisor* on parts of a project. He concluded that less visible researcher involvement may be enough for successful project completion. This observation raises the question: How much collaboration among disseminators and users is meaningful for use of well-developed innovations?

Benefits of collaboration are reported by a number of researchers. For example, Cousins et al. (1994) found willingness to change practice, enhanced communication and shared vision- and meaning-making, development of shared meaning in goal clarification, reflective thinking, and staff empowerment in decisions to adopt or abandon innovations. Enhanced conceptualization and learning were reported in the form of new ideas (Cousins et al., 1994; Little, 1990; Nias, Southworth & Yeomans, 1989). Collaboration is linked with norms of collegiality and continuous improvement that foster conditions for fruitful collaborative interaction (Fullan, 1991; Little, 1990; Rosenholz, 1989). Norms of privacy and isolation, however, remain the dominant paradigm of teaching (Feiman-Nemser & Floden, 1986; Hargreaves, 1990; Little, 1990; Rosenholtz, 1989). Nor are there vast numbers of collaborative schools (Huberman, 1992).

In their emergent *depth of collaboration* conception, Cousins et al. (1994) observed that as depth of collaboration increases, instrumental and conceptual benefits were more apparent. They proposed a construct of collaboration as a continuum in their empirical study. At one end were the more shallow forms that ranged from superficial (one-way dissemination of knowledge), joint planning and participation (mutual exchanges of information) toward more deeper forms at the other end that included concurrent implementation (agreement on curriculum actions to be implemented) and finally joint implementation (teachers teaching together). They examined the effects of collaboration on the implementation of school

priorities, educational innovations, and curriculum policy. They found instrumental use of knowledge to be limited to the more shallow forms of collaboration–an observation also noted by Little (1990) in her extensive review of collaboration literature. Conceptual use was also found at these lower levels but was more strongly associated with deeper levels of collaboration.

These findings suggest that as depth of collaborative activity increases, there may be more potential for enhanced use of knowledge. Such activity facilitated consensus building, willingness to change practice and staff decisions to adopt or abandon innovations. Cousins et al. (1994) proposed that the benefits of deeper levels of collaboration will be more favourable for conceptual and affective consequences than for instrumental use. They raise the question: "Are relatively well-structured innovations less likely to be implemented jointly?" (p. 461). While this call for investigation is not the focus of this thesis, the implications of their findings are of interest. Their findings suggest that varying levels of collaboration have instrumental and conceptual use consequences. The question that emerges for the researcher is: Do these consequences bear with respect to a well-developed innovation? What are the implications between depth of collaboration and their consequences for use with respect to well-structured innovations? Does sustained interactivity predict utilization even if teachers are engaged in deeper levels of collaboration?

2.4.2 Collaboration and Organizational Learning

The notion that involvement in the process of use of knowledge may lead to organizational learning was discussed earlier with respect to process use. Collaborative activity is at the heart of stimulating such learning and relates to creating an organization's capacity to learn. Organizational learning is a process, the outcome of which is "new knowledge, skills or tools for increasing learning" (Marks & Louis, 1999, p. 711). The way that organizations learn transcends the aggregated learning of individuals. Rather, it takes place among individuals as a

collective. Central to this kind of activity is double-loop learning (Argyris & Schon, 1978). It attempts to penetrate deeply into the underlying assumptions of an organization. For example, organizational learning is more likely to occur when school professionals examine their practices and those of their organization, surface their theories, engage in reflection and then attempt to make sense of them through close examination of core values, assumptions and beliefs (Cousins & Earl, 1995).

Louis and Simek (1991) draw attention to a condition for such learning to occur: the need for the presence of social processing of knowledge. Social processing is inherently a collective activity and organizational learning cannot happen in the absence of it. Leithwood and Louis (1999) found that organizations that provide collaborative opportunities and social processing have learning characteristics. These kinds of organizations are collaborative and tend toward "professional sharing and discussion of information, stimulate staff to rethink conceptions, and challenge basic assumptions" (Cousins & Walker, 2000, p. 31). The problem is that social processing of information or knowledge occurs rarely in schools (Louis & Dentler, 1988). In their recent study on capacity for organizational learning in schools, where they included collaborative activity as one of several dimensions of such capacity, they found it to be generally lacking in high schools (Marks & Louis, 1999).

While this thesis is not investigating organizational learning, it is interested in process use effects that may be related to it. Moreover, the findings in these recent empirical studies warrant further probing as to whether educators who are using a well-developed innovation are engaged in collaborative activity that suggest the presence of a capacity for organizational learning.

2.4.3 Summary of Literature on Teacher Collaboration

The literature suggests that high but deep levels of collaborative activities between teachers–within contexts that facilitate shared understandings of their work–are fundamental to

use of innovation for lasting change, especially when combined with credible disseminators skilled in handling each new context. Collaborative approaches are promising but they tend to be rare. Clearly, the context in which collaborative activities occur bear on innovation use. Questions regarding the kind of context that would support meaningful use seem pertinent to raise.

2.5 Planned Educational Change

The theoretical work of Leithwood (Leithwood & Montgomery, 1982; Leithwood & Jantzi, 1990) and Fullan (1985, 1991, 1993) help to conceptualize the local context (i.e., school context) and identifies the goal to which the use of innovation ought to be focused. The goal is to reduce the gap between outcomes students achieve and valued outcomes embodied in society's image of an educated person. Gap reduction is the process of improvement; innovations are planned change strategies to achieve the goal. Fullan (1991) includes the centrality of collaboration and shared meaning–an innovation "cannot be assimilated unless its meaning is shared" (p. 36) for such gap reduction. New meanings and behaviours depend on teachers exchanging ideas and feeling positive about their work; change occurs at individual levels through shared meaning.

Planned changed theorists typically divide the change process into three or four processes (e.g., Fullan, 1991; Glaser, Abelson & Garrison, 1983; Huberman & Crandall, 1982; Huberman & Miles, 1984; Zaltman & Duncan, 1977): *initiation* or *adoption* (process that leads up to and initiates decision to adopt an innovation); *early/later implementation* (putting an innovation into practice); *stabilization* (stabilizing innovation use), and *institutionalization* (change built into the system). These processes are a continuum of instrumental use, which represent levels of implementation with initiation at one end and institutionalization at the other. Schools, however, rarely implement copies of innovations (Weiss, 1991). Rather, m*utual adaption* is common in such settings; the innovation and the context for its use must undergo

change for implementation success (McLaughlin, 1990). This observation suggests the importance of identifying the extent that a program may deviate from the original but still be successfully implemented (Patton, 1997). Huberman and Miles (1984) examined the relationship between the amount and quality of local adaptations and successful implementation, and identified factors that contribute to sustaining change. They concluded that low impacts resulted from low user commitment and/or removing demanding parts of an innovation. Stabilization typically occurred with mastery of new practice (especially, with follow up assistance) together with strong school and district endorsement, and users who are committed to the innovation and support change. Institutionalization required some administrative pressure, lack of local resistance, teacher-administrator harmony, transformations rooted into local structures, enough assistance for stabilized use of it by other users and durability.

Planned educational change literature helps to conceptualize the school workplace context as one that supports change with highly engaged people creating conditions for the development of shared meaning and for appropriate use of innovation to accomplish a vision of an educated person. Strong user commitment to an innovation, with administrative endorsement of it, combined with assistance, are important factors for sustained change. The information disseminated and the context for its use, however, must undergo change for implementation success at local levels.

2.6 Summary of the Literature

Given that empirical studies in the domains of research and evaluation domains reveal the emerging importance of sustained interactivity as a predictor of use, it is the researcher's contention that this construct has important implications for enhanced use of well-developed program innovations by classroom teachers. The literature also calls for tests of effects of sustained interactivity on use of well-developed innovations. Testing Huberman's model with

respect utilization of a well-developed innovation will help address this gap in knowledge within the general domain of program utilization. It will also add further knowledge about enhanced utilization of well-developed programs by teachers in school settings. Huberman's model is promising for this purpose but ought to be enriched by related scholarly work in a test of it. The dimensions of linkage, utilization, and collaboration are related and may be combined conceptually with planned educational change. These dimensions were synthesized into a conceptual framework to study variations of use of an innovation under a continuum of sustained interactivity conditions. Such a framework is now presented as a basis for forming research questions and proposing hypotheses to test the relationship between sustained interactivity and use.

2.7 Conceptual Framework

The conceptual framework represented in Figure 2.5 was created to guide the study, from which use of a well-developed innovation by teachers, and its level of implementation, may be examined under varying conditions of sustained interactivity. The framework depicts knowledge as a *program innovation* derived from the *knowledge production community*. The approach to dissemination of that knowledge is based on sustained interactivity (Huberman, 1990). The *sustained interactivity* construct is identified as multiple exchanges between a disseminator and a user of knowledge at different phases of the innovation. Interpersonal links are at the core of the construct as the meaning of the innovation is re-constructed over time. The disseminator and the active user are each embedded within their respective organizations as members of their communities but connected through the *linkage network* that is characterized with *intensity* of contacts between disseminators and potential users (the disseminator is a program coordinator and the user is a teacher, as will be discussed in the Study Context section in the last segment of this chapter). That network embodies five categories of *interactive processes* constructs derived from prior research (Cousins &

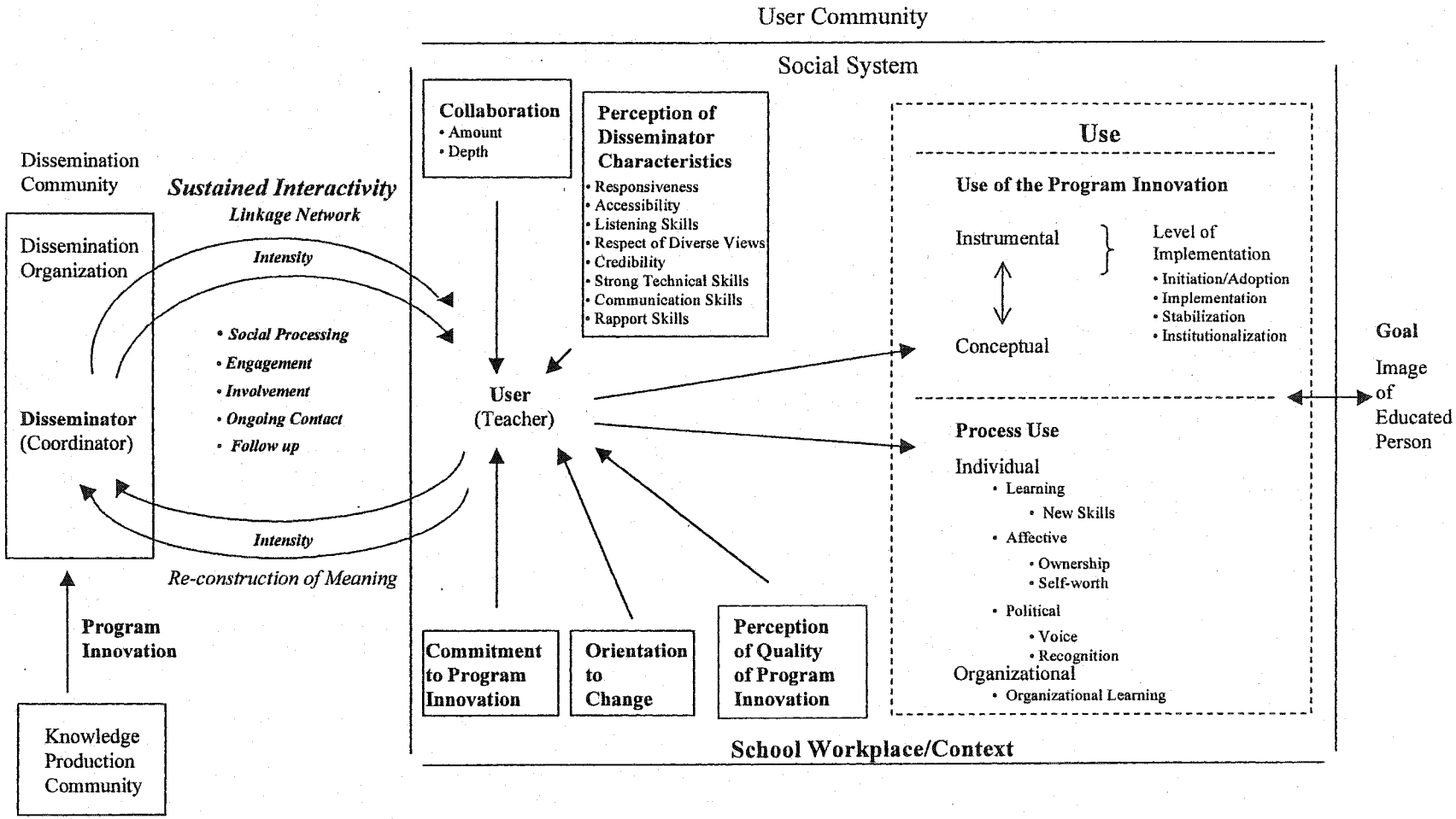

Figure 2.5: Conceptual framework for sustained interactivity as a predictor of use of a well-developed program innovation.

Leithwood, 1993; Huberman, 1990). They are considered as variables that influence the amount and the quality of sustained interactivity. The study describes and illuminates their impact on the use of innovation. The *context* in which such use occurs is conceptualized as a *social system*–the user's workplace (*school workplace*). Within that context, five categories of influences on the user are identified: the amount and depth of *collaboration* among teachers, a user's *orientation to change*, the level of a user's *commitment to the innovation,* a user's *perceptions of disseminator characteristics* and a user's perception of the *quality of the innovation*. These constructs may foster or negate the use of innovation (e.g., Cousins et. al., 1994; Cousins & Leithwood, 1986; Greene, 1988a; Huberman, 1989, 1990; Huberman & Cox, 1990; Little, 1990; Marsh & Glassick, 1988).

The construct of *use* is divided into two categories: The first category, *use of the program innovation*, depicts two conventional constructs of use: *instrumental* (decision to use) and *conceptual use* (enlightenment, learning), which are cast as a continuum, with conceptual use at one end and instrumental use at the other (Cousins & Leithwood, 1986, 1993). The four *levels of implementation* (Fullan, 1991; Glaser, Abelson & Garrison, 1983; Huberman & Crandall, 1982; Huberman & Miles, 1984; Zultman & Duncan, 1977) are depicted as a special case of instrumental use. These levels are the processes of putting the innovation into practice, starting with the adoption of an innovation through to institutionalizing it (i.e., building it into the routine of doing things within the school system). These constructs are used to describe use of the program innovation. The second category of use is the *process use* construct. It identifies potential effects that may arise among those who participate in the innovation, or are close to it (Cousins, 1995a, 1995b; Cousins & Earl, 1995; Green, 1988a; Marks & Louis, 1999; Patton, 1997). These effects are conceptualized as two broad categories: *individual* and *organizational* effects (Patton, 1997). Individual effects are subdivided into the three categories of *learning*, *affective* and *political* (Greene, 1988a) while organizational effects include

organizational learning (Patton, 1997). The arrows indicate the direction of influences and guided data collection. Finally, the *goal* to which innovation use is focused as a planned educational change strategy is identified: to achieve outcomes embodied in society's image of an educated person (Fullan, 1993; Leithwood & Montgomery, 1982; Leithwood & Jantzi, 1990).

The framework assumes that sustained interactivity enhances use for lasting, meaningful change. It was applied to address the research questions posed in this study. Table 2.1 defines the variables shown in the framework and indicates which of these will be operationalized and measured, as will be discussed in more detail in later chapters.

2.8 The Research Questions

2.8.1 Main Research Questions

Given that the intent of this study is to examine use of a well-developed innovation under varying conditions of sustained interactivity, the main research questions of this study seek to understand the relationship between the degree of sustained interactivity and use. As described within the conceptual framework, two categories of use are of interest: use of the program innovation and process use. The intent of the first main question is to gain insight into what local use of a well-developed program looks like, under different conditions of sustained interactivity.

1.0 *Does program use vary as a function of the degree of sustained interactivity?*

Process use relates to how users are affected by virtue of their participation in, or proximity to, the innovation. The intent of the second main research question is to gain insight into what the effects of process use look like, under different conditions of sustained interactivity.

1.1 *Does process use vary as a function of the degree of sustained interactivity?*

Table 2.1

Definition of Variables in the Conceptual Framework

Variable	Definition
Knowledge Production Community	The community that produces knowledge. In this thesis, the knowledge production community is the community that produced the program innovation under study.
Program Innovation	Knowledge that is produced by the knowledge production community. In this thesis, it is a bundle of knowledge in the form of a teacher's activity guide.
Disseminator	Person who disseminates the program innovation to potential users of it. In this thesis, the disseminator is a program coordinator.
Dissemination Organization	The organization that is responsible for the dissemination of the innovation. In this thesis, the dissemination organization is a state or provincial/territorial government agency that appoints a program coordinator to disseminate the innovation.
Dissemination Community	The collective community of agencies and organizations that are involved in disseminating the program innovation.
*Sustained Interactivity**	Multiple exchanges between disseminators of the innovation and potential users of it over the life of the program. In this thesis, multiple exchanges are examined within the implementation phase of the innovation.
Linkage Network	Inter-personal and inter-organizational linkages and contacts between the community of disseminators and the community of potential users.
*Interactive Processes**	Inter-connections between the world of disseminators of knowledge and the users of knowledge in terms of social processing, engagement, involvement, on-going contact and follow up.
*Social Processing**	Collective discussion and reflection among teachers about the how innovation is relevant to the work context, where the disseminator is the provider of the innovation to primary recipients of it and to secondary recipients (to whom primary recipients passed on information about the innovation).
*Engagement**	Engaging users in the innovation.
*Involvement**	Involving users in delivery of the innovation.
*Ongoing contact**	Regular contact with the innovation or with the disseminator of the innovation.
*Follow Up**	Follow up between disseminators of the innovation and users of it.

Note. * = Variable that will be measured in this study.

(Continued)

Table 2.1

Definition of Variables in the Conceptual Framework (con't)

Variable	Definition
*Intensity**	The level of intensity of exchanges between disseminators of the innovation and the potential users of it, which may range from low to very high to an absence of any intensity.
User	User of the innovation. In this thesis, the user is a teacher who is teaching in a school.
*Collaboration**	Collaboration among teachers, the depth of which may range from sharing information through to joint teaching, in which higher levels of collaboration are associated with joint teaching.
*Perceptions of Disseminator Characteristics**	The user's perceptions of selected characteristics of persons who disseminate the innovation.
*Commitment to the Program Innovation**	The extent to which a potential user is committed to the innovation.
*Orientation to Change**	The extent to which a potential user of the innovation is open to change (i.e., propensity to adopt, or not to adopt, new innovations).
*Perceptions of Quality**	The extent to which a potential user of the innovation perceives the quality of the innovation, which may range from perceptions of low to high quality.
*Use of the Program Innovation**	The use of the innovation by potential users of it. Use of the program innovation is cast as a continuum of use that ranges from instrumental use at one end of the continuum to conceptual use at the other end of the continuum. The idea of "no use" is implied as a form of use within the continuum when a potential user decides not to make use of the innovation.
Instrumental Use	The decision on the part of the user to use the innovation in practice.
*Level of Implementation**	A special case of instrumental use: the process of putting the innovation into practice, starting with adopting the innovation, implementing it, stabilizing its use and then institutionalizing it by building it into the school organization.
*Conceptual Use**	Being enlightened by the innovation; learning about the innovation; the educative use of the innovation.
*Process Use**	How users are affected by virtue of participating in the innovation, or being close to it, in terms of learning new skills, gaining feelings of self-worth, gaining feelings of ownership for the innovation, gaining voice in something and gaining recognition or empowerment. At the organizational level effects include organizational learning (i.e., improvement of an organization through better understanding).

2.8.2 Research Questions that Complement the Main Research Questions

Given that current understanding about the nature of sustained interactivity has emerged from the research and evaluation utilization domains, the nature of it with respect to programmatic use is not known. The lack of knowledge about sustained interactivity regarding program innovation use spawned a set of sub-questions that seek to describe it and the perceptions of it by disseminators of well-developed program innovation and users of it. The first sub-question, therefore, seeks to describe sustained interactivity as it relates to program innovation use.

2. *What are the characteristics of sustained interactivity with respect to a well-developed program innovation?*

As the reader may recall, empirical research revealed that multiple exchanges between disseminators of knowledge and users of it can posses characteristics associated with interactive processes. These processes lie between disseminators of knowledge and its use by users. They reflect interconnections between the world of the disseminator and that of the user and among users in terms of (1) *social processing* of information, (2) *engagement* of users in a study or project, (3) *involvement* of users in delivery of innovations, (4) *ongoing contact* between users and disseminators, and (5) *follow-up*. They are regarded as characteristics of sustained interactivity in this thesis.

The focus of the next set of sub-questions is to gain an understanding of how sustained interactivity is perceived by disseminators and users and if their perceptions converge. These research questions form a set that is divided into three parts. The first part seeks to describe perceptions of sustained interactivity by users of the program innovation.

3.0 *What are the users' perceptions of sustained interactivity?*

The second part seeks to describe disseminators' perceptions of sustained interactivity.

3.1 *What are the disseminators' perceptions of sustained interactivity?*

The third part focuses on determining an understanding of how users' perceptions of sustained interactivity converge with those of the disseminators.

3.2 *Do the perceptions of users and disseminators of sustained interactivity converge?*

2.9 The Hypotheses

The research questions gave rise to the formulation of four hypotheses. With respect to the main research questions being posed in this study, prior research suggests that utilization will be enhanced with greater levels of sustained interactivity. It is therefore hypothesized that

- *a greater degree of sustained interactivity leads to higher levels of use and implementation of the program innovation*, and
- *a greater degree of sustained interactivity leads to higher levels of process use.*

With regard to the sub-questions arising from the main research questions, the first hypothesis related to the characteristics of sustained interactivity. Since the researcher has no reason to believe that these characteristics will differ from those encountered in prior research, it is hypothesized that

- *the characteristics of sustained interactivity with respect to a well-developed program are similar to those identified in prior research.*

The last set of sub-questions has to do with perceptions about sustained interactivity on the part of disseminators and users of well-developed innovation and whether their receptive perspectives converge. In this case, the assumption inherent in this set of questions is that sustained interactivity is of more concern to disseminators than to users because they are promoting the program innovation. It is therefore hypothesized that

- *disseminators estimate higher than teachers the intensity of sustained interactivity.*

2.10 Study Context

The study used the implementation context (i.e., school settings) of an existing, well-developed school education program called Project WILD. It was developed for teachers in the United States by the Council for Environmental Education (CEE) in the early 1980s. Project WILD is generally not a mandated school program. The Canadian Wildlife Federation (CWF) played a role in developing Project WILD. Through agreement with CEE and based on the US model, CWF created a Canadian program. At the North American level, CEE and CWF, which are both non-government organizations, have separate but similar Project WILD programs, as shown in Figure 2.6. Each organization employs a Project WILD Director; each has separate agreements with 50 state government agencies (in the US) and 10 provincial/territorial agencies (in Canada). Each government agency delivers Project WILD in its jurisdiction. As displayed in Figure 2.7, the same implementation model is generally used, along with a similar teacher's guide. Each agency appoints a Project WILD Coordinator reporting to it. Coordinators disseminate Project WILD to teachers through an introductory workshop generally in schools and provide support services such as newsletters, if funds are available. Coordinators may train facilitators for workshop delivery. About 900,000 US and 90,000 Canadian teachers have participated in workshops. The researcher developed the Canadian Project WILD program based on the US program, is a CWF employee and the Canadian Project WILD Director but is *not* involved in any reporting relationship with coordinators. CEE conducted an evaluation recently to examine Project WILD use in the US by users not known to US Coordinators. There are no international studies of the program. The next chapter outlines the methods that were employed to carry out this study.

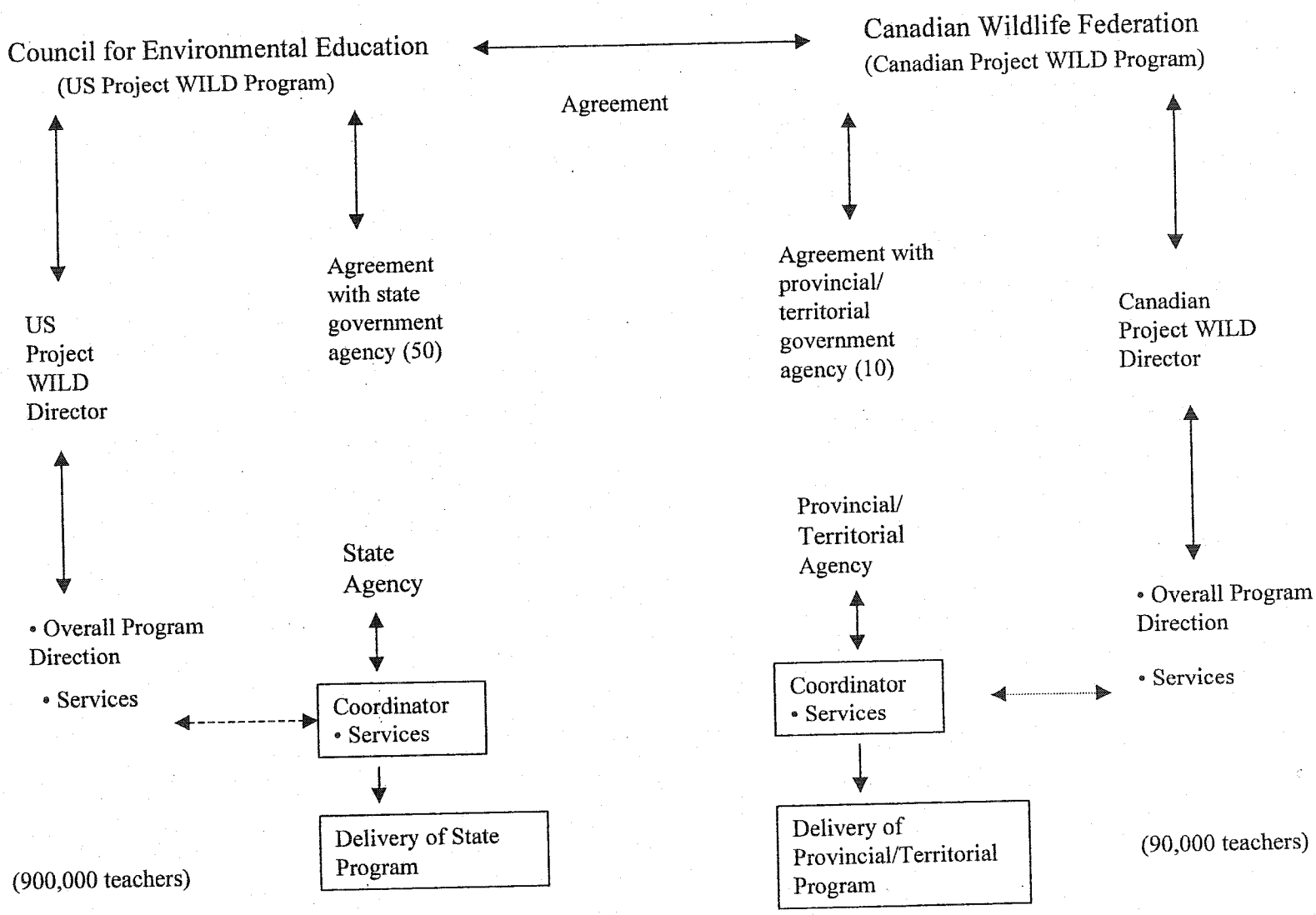

Figure 2.6: General model of the structure of the Project WILD program at the North American level.

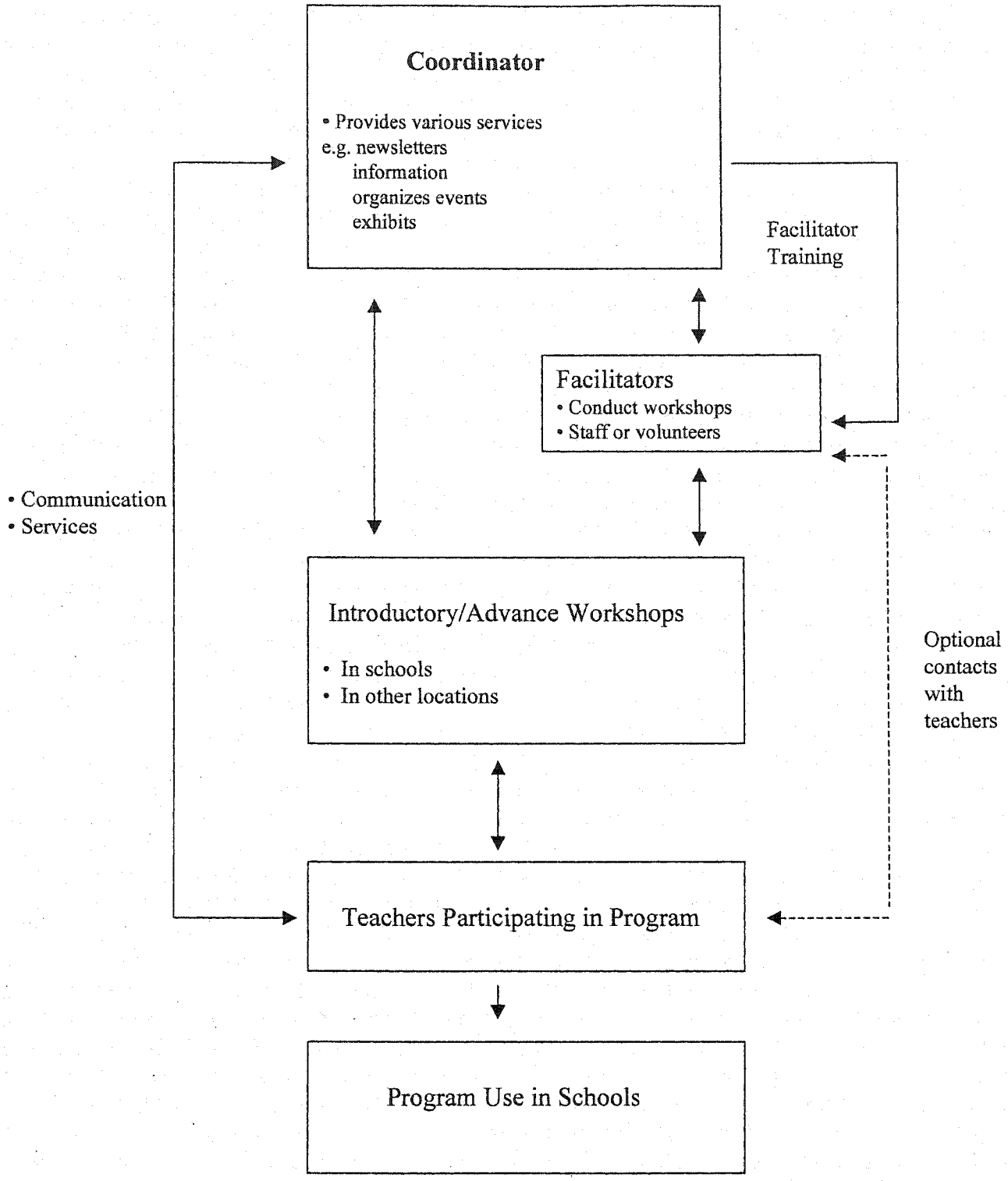

Figure 2.7: General implementation model of the Project WILD program.

CHAPTER 3

Methods

This chapter lays out information about the general research approach and design. It describes the sample, instrumentation and procedures for the study, beginning with those for the study proper and followed by those for the pilot study. Descriptive information is also provided to enhance the reader's knowledge of the achieved sample composition. Data analyses that were used are then described.

3.0 Research Design and General Approach

A single-group, correlational, retrospective design was used to carry out an explanatory study. The research strategy to implement the design for the study was carried out in two phases. The general design of Phase 1 is a survey of teachers who work in school settings across North America and who have attended an introductory workshop on how to use the innovation. The design of Phase 2 is also a survey of Project WILD Coordinators who disseminate the program at the state, provincial and territorial level.[1]

The purpose of Phase 1 was to generate empirical knowledge to answer all the research questions that pertained to the users of the innovation by using a common questionnaire directed

at the target sample of teachers. These questions are as follows:

1. *What are the characteristics of sustained interactivity with respect to a well-developed program innovation?*

2. *What are the users' perceptions of sustained interactivity?*

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[1] The original intent was to conduct interviews with coordinators who disseminate the innovation in order to gather data with respect to their perceptions about sustained interactivity and then compare their perceptions with those of teachers. It became apparent, however, that a comparison would be more effective (and less time consuming) if one could test for significant differences between teachers' and coordinators' perceptions of sustained interactivity through the use of an independent samples t test. A version of the questionnaire that was sent to teachers (that mirrored parts of it) was therefore used for this purpose.

3. *Does program use increase as a function of the degree of sustained interactivity?*

4. *Does process use increase as a function of the degree of sustained interactivity?*

The purpose of Phase 2 was to generate empirical knowledge to answer the two of the remaining research questions, which were related to the Project WILD Coordinators, by using a common questionnaire. The two questions are

1. *What are the disseminators' perspectives of sustained interactivity?*

2. *Do the perceptions of users and disseminators of sustained interactivity converge?*

The research strategy also included a pilot test of the instrument that was used in this study. Its purpose was to gather reliability and validity evidence to ensure the quality of the instrument in its final form. In this chapter, the methods related to the study proper are presented first, followed by those related to the pilot study.

The survey questionnaires were based on the conceptual framework specified on page 42 in Chapter 2. Descriptive analyses were guided by the framework, although responses to open-ended survey questions were content analyzed for emergent patterns.

3.1 Study Proper

3.2 Sample

In this section, sample instrumentation is described for (1) the sample of teachers, and (2) the sample of program coordinators. It begins with a focus on the sample of teachers.

3.2.1 Sample of Teachers

The general intent was to construct a single-group sample to enable an examination of the effect of sustained interactivity as a predictor of use of the innovation within the implementation context of the program. The investigation occurred during the dissemination phase of the program, under conditions that range in levels from high to low to an absence of sustained interactivity. A purposive sampling strategy was selected to achieve this goal.

Unlike random sampling, a purposive sampling strategy limits external validity (Fraenkel & Wallen, 1990). Three factors prohibited random sampling as the preferred choice. First, a data base of all users of the innovation is not available, which precluded the use of a random selection strategy. Second, lack of information about the proportions of users from the total population who had exchanges with disseminators excluded the option of a stratified random sample. Third, resource limitations prohibited the researcher from developing all full data base of all users or to investigate how many users and disseminators had exchanges from the total population of users. As an alternative, the purposive sampling allows for the use of an investigator's personal judgement, based on knowledge of the population, to select a sample that is representative for a specific purpose (Fraenkel & Wallen, 1990). It may provide a basis for replication by other researchers who may be using different subjects and different conditions to study sustained interactivity.

3.2.2 Construction of Sample of Teachers

The challenge of constructing a sample of teachers that would reflect a continuum of all the desired variations of sustained interactivity was resolved by using information available about four basic types of contacts known to exist between users and program coordinators within the user population as the selection criteria for subjects for the study sample. Figure 3.1 illustrates how and where these types of contact fit along a continuum of levels of sustained interactivity conditions. At one end of the continuum, the type of contact associated with a high level of sustained interactivity is direct contact with teachers who are also workshop facilitators. It is labeled as "Level 4: Facilitators". Teachers selected from this stratum were assumed to be subjects that were more likely to be engaged in frequent multiple exchanges (contacts) with program coordinators and had the best potential to possess the highest amounts of sustained interactivity as users of the program in a school setting. Although these workshop facilitators play a role in disseminating the innovation locally, they are viewed strictly as

Table 3.1

Sample Characteristics

Jurisdiction	Category											
	Level 4: Facilitators			**Level 3: Known**			**Level 2: Newsletters**			**Level 1: Unknown**		
	Sample Size	*No. of Responses*	% Response	Sample Size	*No. of Responses*	% Response	Sample Size	*No. of Responses*	% Response	Sample Size	*No. of Responses*	% Response
Jurisdiction A	18	*17*					182	*47*				
Jurisdiction B										20	*3*	
Jurisdiction C				17	*3*					22	*2*	
Jurisdiction D	35	*31*		1	*1*					78	*38*	
Jurisdiction E	2	*2*		66	*10*		59	*4*				
Jurisdiction F	136	*31*					70	*9*				
Jurisdiction G	42	*22*		1	*1*		50	*14*				
Jurisdiction H	1	*1*		119	*12*					6	*2*	
Jurisdiction I	50	*17*								78	*13*	
Jurisdiction J	1	*1*		107	*39*							
Jurisdiction K	4	*1*		19	*6*		30	*7*				
Jurisdiction L							25	*5*				
Jurisdiction M	9	*4*		45	*6*					54	*11*	
Jurisdiction N	19	*8*		6	*0*					75	*8*	
Jurisdiction O	3	*1*		45	*13*		30	*4*				
Jurisdiction P	21	*5*		41	*7*		30	*6*				
Jurisdiction Q				11	*6*					28	*3*	
Jurisdiction R	15	*8*		3	*1*					12	*4*	
Jurisdiction S	3	*0*					24	*5*				
Jurisdiction T	82	*23*								47	*14*	
Jurisdiction U	8	*5*		21	*5*					41	*10*	
Jurisdiction V	7	*3*		42	*11*					39	*5*	
TOTAL	**456**	***180***		**544**	***121***		**500**	***101***		**500**	***113***	
TOTAL % Response/category			**39.5%**			**22.2%**			**20.2%**			**22.6%**

program users under the condition of the highest level of sustained interactivity for the purposes of this study. The type of contact associated with a low level of sustained interactivity is direct contact with teachers who are known to a program coordinator but who are not workshop facilitators. This level is labeled "Level 3: Known". Teachers selected from this stratum were assumed to have had some direct contact (exchanges) with coordinators but were likely to possess less amounts of sustained interactivity than facilitators. Individuals in this stratum, together with facilitators, are viewed as teachers who have had "Direct Contact" with the coordinator.

At the other end of the continuum, Levels 2 and 1 represent the absence of sustained interactivity under two conditions. The first condition is indirect contact through newsletters. It is labeled as "Level 2: Newsletters". Teachers selected for this stratum were assumed to have had only indirect contact with coordinators through a provincial, territorial or state Project WILD newsletter. Finally, the type of contact associated with the lowest end of the continuum is no contact whatsoever. This level is labeled as "Level 1: Unknown". Teachers selected for this stratum were assumed to have had neither direct nor indirect contact with the program coordinator. Teachers within this stratum, along with those in the "Level 2: Newsletter" category, are viewed as individuals who have had "No Direct Contact" with the Project WILD Coordinator.

3.2.3 Development of Mailing List for the Sample of Teachers

As depicted in Table 3.1, a mailing list of 2,000 names of teachers was developed to maximize a spread of teachers across North America[2] along the four dimensions of types of contacts

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[2] Specific jurisdictions are not named to protect the confidentiality of participating coordinators. In general, however, the North American sample refers to 9 jurisdictions in the west (including northwest, central and southwest), 7 in central North America (including north, central and southern areas), and 6 on the eastern side (including the northeast, central and southeast).

AMOUNT OF DIRECT CONTACT WITH PROJECT WILD (PW) COORDINATOR	**No Direct Contact**		**Direct Contact**	
AMOUNT OF SUSTAINED INTERACTIVY (S.I.)	***Amount of Sustained Interactivity Continuum (S.I.)***			
	/ *Absence of S.I.*	/ *Absence of S.I.*	/ *Low S.I.*	/ *High S.I.*
TYPE OF SAMPLE	**Level 1:Unknown**	**Level 2: Newsletter**	**Level 3: Known**	**Level 4: Facilitators**
DESCRIPTION OF SAMPLE	-No known direct contact with PW. Coordinator. -Not on a PW newsletter mailing list.	-No known direct contact with PW. Coordinator. -On a PW newsletter mailing list.	-Known to have direct contact with PW. Coordinator. -Not a facilitator.	-Known to have direct contact with PW. Coordinator. -Is a facilitator.
NUMBER IN SAMPLE	N = 500	N = 500	N = 544	N = 456

Figure 3.1: Construction of sample to reflect sustained interactivity that ranges in levels from high to low to an absence of contacts.

that were discussed in section 3.2.2 of this chapter. Given that 22 jurisdictions participated in the study, of which about 25% (i.e., 5) were from Canada and approximately 75% (i.e., 17) were from the US, the total mailing list generally reflected these proportions. A total of 490 Facilitator and 580 Known names was received originally from coordinators. About 10,000 names within the latter two categories were received. This number seems high but larger jurisdictions, such as F, typically had large data bases with thousands of names (they did their best to filter only names of teachers but record-keeping varied). Other jurisdictions, such as S, could only provide what they had available in small numbers.

An attempt was made to have 500 subjects within each category but the number of facilitators fell short by 44 after addresses were checked for accuracy. As it was desirable to have 1,000 names within each of the "Direct Contact" and "No Direct Contact" components of the sample, this shortfall was replenished with an additional 44 names within the "Known" category in the initial mailing. This process left only five names available to replace undeliverable mail within both the "Facilitators" and "Known" categories. There were adequate numbers from "Newsletter" and "Unknown" lists to replenish undeliverable mail from these categories.

Prior to the mailing of the survey, the addresses of all subjects were checked for accuracy through data bases available on the Internet. The reason for this measure was because a recent US Project WILD national evaluation revealed that out of their list of 2,000 names, over 50% were undeliverable. In this study, only about 5% of the addresses within the "Facilitator" and "Known" categories were out of date (and thus were either corrected or not used) but more than 50% within the "Newsletter" and "Unknown" categories were not found in Internet data bases. In developing a mailing list for these two latter categories, all names were checked and usable ones were obtained from short lists provided by coordinators (such as Jurisdictions R). In the case of very large data bases, every 25th name was selected and checked.

If an address was not found for the 25th name, the next 25th name was searched, and so on, until 500 useable addresses were found in each category.

3.2.4 Rate of Response

The achieved sample for the study was comprised of 515 teachers across North America. A total of 2,000 surveys was sent to potential respondents across 5 Canadian and 17 US jurisdictions. Canadian mailings were dropped in Canada whereas US mailings were dropped in the US. In spite of measures to ensure accuracy of addresses, 6.7% or 135 surveys were undeliverable. Of those, 46 could not be replaced because they were in the "Facilitator" or "Known" categories. Out of a total of 592 responses to the survey, 515 or 87% were usable but the remaining 77 or 13% were not eligible because the respondents were not teachers. Fifty-six were assessed as such based on information they provided in their questionnaire. The remaining 21 respondents advised the researcher by email or telephone that they were either not teachers or they did not have time to complete the questionnaire. As shown in Figure 3.2, the Canadian rate of response was 40% while it was only 29% in the US. The overall response rate was 31.7%.

3.2.5 Possible Reasons for Rate of Response

The response rate was not encouraging but it must be viewed in light of events that occurred around the time of mailing, particularly in the US. The US mailing started at the end of October of 2001. The aftermath of the 9/11 terrorist attacks was still fresh in the mind of the US public. A more critical consideration that may have had more implications on mailing responses, however, was the ensuing "Anthrax scare" of contaminated mail, especially in US eastern regions. In some areas, mail service was shut down for extended periods and persisted into November.

GENERAL FORMULA USED TO CALCULATE RATES OF RESPONSE:

$$\text{Response Rate} = \frac{\text{Number Returned}}{\text{N in sample - (Ineligible + Unreachable)}} \times 100$$

APPLICATION OF FORMULA:

1) For Responses in Canada:

Number returned	= 159 by mail + (24 ineligible)	= 183
N	= 500	
Ineligible	= 16 mail + 3 email + 5 telephone	= 24
Unreachable	= 5 facilitators + 13 known	= 18

$$\text{Response Rate} = \frac{183}{500 - (24 + 18)} \times 100 = 40\%$$

2) For Responses in the United States:

Number returned	= 356 by mail (+ 53 ineligible)	= 409
N	= 1500	
Ineligible	= 40 mail + 11 email + 2 telephone	= 53
Unreachable	= 16 facilitators + 22 known	= 38

$$\text{Response Rate} = \frac{409}{1500 - (53 + 38)} \times 100 = 29\%$$

For Canada + US:

$$\text{Response Rate} = \frac{183 + 409}{2000 - (77 + 56)} \times 100 = \frac{592}{1867} = 31.7\%$$

Figure 3.2: Calculations (de Vaus, 1991) for rates of response of mailing of survey.

The proportions of Canadian responses were higher than those from the US in all categories except the "Known" category. One explanation may be that the Canadian Wildlife Federation's (CWF) name was familiar among Canadian teachers because of CWF's educational promotional mailings. Within the "Known" category, it was noted that most Canadians were from northern regions. They might not typically respond to questionnaires as was indicated by patterns of low returns from these regions within "Newsletter" and "Unknown" categories.

Another observed pattern was low responses from mailings using school addresses as opposed to home addresses. For example, most names on "Facilitator" and "Known" lists contained home addresses (except in Jurisdiction H); most response rates were higher than those from "Newsletter" and "Unknown" lists. For instance, mailing lists in these two latter categories from Jurisdictions F, H, K, L, N, P and Q contained mostly school addresses. Most did not respond. These mailings might not have reached teachers in schools (e.g., if mail service was shut down) or teachers may have been too busy to complete questionnaires in school settings.

Response rates within categories were expected to be highest among facilitators, slightly less from the "Known" strata, fewer from the "Newsletter" sector and the least from "Unknown" lists (assuming that teachers who had more contact would respond at higher rates). Responses were high among facilitators but the relatively low returns within the "Known" category may have been skewed; over 40% of that sample was from eastern North America, where mail service was shut down in some cases during the Anthrax scare. In contrast, about 40% of the "Known" sample was from western regions with but rates of responses were almost double from those from the east.

It was expected that response rates within the "Newsletters" category would be higher than those in the "Unknown" category. Overall, however, newsletter lists generated the least

returns. Western jurisdictions tended to have more newsletters than those in central or eastern North America. Proportionate response rates were slightly higher from the west (about 21%) and in central parts (22%) of North America as opposed to the east (17%). It is possible that the lower response rate from the east were related to the Anthrax scare but the fact that responses from the newsletter sector was generally low may indicate that newsletter recipients were less inclined to respond to the questionnaire.

Finally, the relatively high response from the "Unknown" category was a baffling, albeit delightful, surprise: it suggested that teachers who have not been in contact with the innovation may tend to be as responsive as those that were. This finding inspired the researcher to probe more deeply to into this dimension of the sample, as will be discussed later in this chapter.

Timing of mailings and the length of the questionnaire may also have affected response rates. An 8-page questionnaire may appear daunting in light of teachers' busy schedules. US mailings were sent close to Thanksgiving. November is also a busy time for teachers with report cards or parent interviews. Follow up mailings (middle to end of November) implied receipt of reminders in early December–another busy time with exams and the approach of Christmas break.

Moreover, the fact that the study originated from a Canadian may also account for differences in Canadian and US response rates. While no evidence was received by the researcher to suggest bias based on nationality, it is possible that (1) Canadian teachers were more inclined to respond to the questionnaire, and (2) that teachers would not willingly state a bias.

It is also possible that survey respondents differed from non-respondents in important ways. Five possibilities struck the researcher. First, the relatively high percentage of responses that were returned but not usable for the study (because respondents were not teaching in a school setting) suggests that non-respondents might tend to be informal educators. Second,

almost half of the respondents indicated interest in receiving a summary of this study's findings. This pattern suggests a possible interest in research activities in the field of education–something that might not be shared by non-respondents. Third, the notion of participating in research by responding to a questionnaire implies that respondents may be more inclined to be collaborative. Fourth, the majority of respondents reported that they were using the innovation. This pattern suggests that teachers who use the innovation may be more motivated to respond–something not shared by non-respondents. Fifth, teachers willing to spend the time to complete an 8-page questionnaire about the innovation might be more committed to it or enthusiastic about it than those who did not. These five differences, along with the factors mentioned above, may account for rates of response and the kind of respondents that the survey attracted. The questions that emerge are: Was the achieved sample satisfactory for the study? What are its characteristics?

3.2.6 Assessment of Sample for the Study

As the reader may recall, the intent of generating the study sample was to use a strategy that would maximize variation with respect to the intensity of directness and indirectness of contact between teachers and the program coordinator. This variation within the achieved sample was vital for this study because of its focus in examining if utilization of a well-developed innovation is a direct function of sustained interactivity. The criterion of variation, therefore, was used to assess and determine if the achieved sample contained enough variation to be of any value for the research.

Three strategies were used to make such a determination. First, since questionnaires were colour-coded to reflect the category from which they were derived (e.g., from a mailing list of newsletter recipients and so on), they were simply categorized, and then counted by colour-code. This strategy revealed a fairly reasonable distribution along a sustained interactivity continuum (reflected in response numbers shown in Table 3.1) albeit high among

facilitators. Second, after data input, the ratio of 297 respondents who had contact with the coordinator versus 216 who did not suggested a fairly good balance for variability. While colour-coding and examining general ratios were reasonable ways to draw conclusions about variability within the sample in terms of contact, the researcher noted many discrepancies during data entry within the colour-coded surveys about reported contacts (e.g., those assumed to have no contact reported contacts).

This observation prompted the researcher to undertake a third strategy by analyzing more closely the proportions of respondents who actually reported (1) absolutely no contact, (2) only indirect contact, (3) direct contact but were not facilitators, and (4) direct contact and were facilitators. This approach revealed that the number of respondents who reported that they had no contact whatsoever (i.e., 64) with the innovation was actually lower than what was implied by the first strategy that was employed, while those that had "only indirect contact" with the coordinator totaled 152 respondents. Moreover, 159 fell into the "direct contact and were facilitators" category while 136 were in the "direct contact but were not facilitators" grouping. Variation between these strata of the sample was checked by conducting descriptive analyses of some constructs that were to be used for this study. The results showed that there was variation. (For the interested reader, these analyses are located in Appendix C.) Based on the results of the three strategies employed, the researcher concluded that the sample was satisfactory for the study.

3.2.7 General Description of Responses

The descriptive characteristics of the achieved sample of respondents are located in Appendix D. All respondents selected for the study were teachers teaching in a school setting. Of the 515 respondents in the study sample, 84% worked as regular classroom teachers, 7% were librarians or resource teachers and18% selected "other". Those in this latter category were predominately teachers without a regular classroom, such as music or physical education

teachers. Almost 80% taught at the elementary level, with 15% teaching high school. Over half had 15 or more years of teaching experience, with slightly more than a third reporting 21 or more years. Almost 70% were from the US. Over 70% were females (responses by gender are available from the author for interested readers). Type of teaching setting was almost equally spread between urban, suburban and rural areas. Only 9% preferred to respond anonymously. Of the 92% responding confidentially, 51% agreed to be interviewed. Most teachers indicated interest in the resources offered, but only 45% indicated interest in the study findings. The overall sample, however, was skewed toward larger jurisdictions (see Table 3.1 on page 57), which tended to be in the western part of North America and had more subjects available for the study. While the spread of jurisdictions across North America was fairly well balanced with 9 from the west, 7 from central regions and 6 from the east, almost half of the respondents were from the west (48.5%), with about a quarter each from central and eastern parts.

Over half of the teachers attended introductory workshops four or more years ago. Slightly over a third received facilitator training. Twelve per cent were not using the innovation, although slightly more than 4% were active in the program in other ways. Six per cent were thinking about using it while 82% indicated instrumental use of the innovation. Of these, just over a third used the program seven or more times a year but most were using it six times or less, with almost a third using it three or less times. Of the teachers who completed item 1.4a, the majority indicated use of the innovation on their own, in a modified form to fit students' needs and in a set of lessons/activities on topics that they teach.

These characteristics suggest that the sample was largely female, teaching at elementary levels, where most were using the innovation and tended to be from larger jurisdictions.

3.2.8 Sample of Disseminators

The sample of disseminators consisted of 23 coordinators who administer the innovation at provincial, territorial and state levels throughout North America (in one

jurisdiction, 2 coordinators administer the innovation). All work for government wildlife agencies. The original intent was to interview them for their perceptions about sustained interactivity to examine the extent to which their views of it converged with those of teachers. Over the course of the study, however, a survey strategy emerged as being more productive for this purpose. Responses by coordinators to the survey are discussed in detail in Chapter 8.

3.2.9 Representativeness of the Sample

The researcher believes that sufficient care was taken to develop study samples that are representative of the program innovation throughout North America. The strata from which teachers were selected, the variations of sizes of jurisdictions, and the administrative and implementation roles of coordinators are typical across all jurisdictions offering the innovation. These elements, together with the broad geographical spread and distribution of jurisdictions of varied sizes across North America enabled the creation of samples of teachers and coordinators that is representative of the innovation within an international context. Such samples would also reflect other well-developed (i.e., pre-packaged, complete) program innovations that are like Project WILD and that use the same kind of dissemination approach (i.e., driven by provincial, territorial or state level coordinators).

3.3 Instruments

3.3.1 Questionnaire for Teachers

An 8-page questionnaire for teachers was developed and checked closely for continuity and clarity of phrasing.[3] A copy of the questionnaire is provided in Appendix D. The instrument is divided into 12 parts and is comprised mostly of closed-form questions with some open-ended ones. The Introductory part focuses on identifying the type of teacher responding, years of experience with

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[3] In spite of careful proofreading by three people, two errors were found after it was mailed: item 1.5 repeated "Projects WILD activities" and item 12.2 did not include 7 or 11 years of experience (although teachers marked in 7 or 11 on the questionnaire if that were their case).

the innovation and level of training as a facilitator. Respondents were invited to skip to Part 1 if they were not facilitators.

Part 1 invites respondents to describe their use of the innovation. The idea for item 1.0 drew on prior research (Cousins & Leithwood, 1993; Larsen, 1985). It seeks to situate a user along a scale ranging from no use (items 1.0a and 1.0b) through to conceptual (item 1.0c) and instrumental use (items 1.0d to 1.0g). Respondents selecting "no instrumental use" options (items 1.0a to 1.0d) were asked to skip to Part 2. Items 1.1 through to 1.4 were modeled on CEE's US Project WILD Evaluation and invited teachers to describe how they were using the innovation.

Part 2 invites respondents to describe their feelings about the innovation. The intent in this section was to capture data respecting process use and detailed information about conceptual

use of the innovation. Part 3 focuses on descriptions of respondents' school context. It seeks to determine amount and depth of collaboration among teachers in their school. Part 4 requests respondents to describe their discussion about the innovation (i.e., gathering data about social processing). Part 5 asks respondents to describe their involvement and engagement in the innovation and the extent to which it is institutionalized within their school and school district (i.e., items 5.6 to 5.9). Items for these sections were constructed based on research covered in the literature review (e.g., Cousins & Leithwood, 1993; Cousins et al., 1994; Greene, 1988a; Little, 1990; Louis & Dentler, 1988; Patton, 1997)

Parts 6, 7 and 8 focus on the number and nature of indirect and direct contacts with the program innovation and with the coordinator, as well as follow up. Respondents who indicated no direct contact with a Project WILD Coordinator were invited to skip to Part 11. Those who had direct contact were requested to complete Parts 9 and 10. Part 9 asked respondents for detailed descriptions of their interactions with the coordinator. The intent was to draw data

about users' perceptions of sustained interactivity. Items in this section were constructed based on Huberman's research (1990). Part 10 focuses on users' description of the importance of benefits arising from such contacts. This section seeks to determine levels of intensity of sustained interactivity. Items in this part were constructed based on Klein and Gwaltney's (1991) research.

All respondents were invited to complete Parts 11 and 12. Part 11 asks teachers to rate the importance to them of selected characteristics of a program coordinator. Several scholars have noted the importance of users' perceptions of disseminator characteristics with respect to use. Items for this section were based on prior research (e.g., Cousins & Leithwood, 1986; Greene, 1987, 1988a; Huberman & Cox, 1990; Marsh & Glassick, 1988; Muthard & Falice, 1982; Patton, 1994, 1997). Finally, Part 12 inquires into relevant background information from respondents.

3.3.2 Questionnaire for Disseminators (i.e., Program Coordinators)

A 3-page questionnaire (see Appendix E) was developed and checked closely for continuity and clarity of phrasing. This instrument is a version of the questionnaire that was sent to teachers. It mirrors five parts of the teachers' instrument to enable a comparison between disseminators and users of the innovation along five dimensions: (1) intensity of direct contact with the innovation, (2) perceptions of interactivity, (3) follow up, (4) benefits of sustained interactivity, and (5) characteristics of a program coordinator. The only difference between this instrument and the parts it mirrored within the teachers' instrument was a slight wording change to reflect the receiver (i.e., the disseminator). Finally, the last part of the instrument was an open-ended question that asked disseminators to describe how their interactions with users of the innovation affected them. This dimension was included to explore reciprocal effects between coordinators and users as it was an important feature of the model being tested in this study.

3.4 Procedures

3.4.1 Permission and Consent

Permission was sought and obtained from all participating coordinators to participate in the research, use the mailing lists that they provided, to be candidates for interviews and to be part of the disseminating sample for the study (see Appendix F for letter of invitation and consent forms). The challenge of creating a purposive study sample that was based on type of contact with a program coordinator required the voluntary cooperation and participation of jurisdictions that administer Project WILD. To generate such interest, the researcher floated the idea of the research to potential participants at two annual Project WILD Coordinator Meetings. The first presentation was made in Canada in 1999, followed by a second in the US in 2000. There were 42 jurisdictions attending these events out of a possible 57 who, at the time, had active coordinators in place to administer the program in North America. From this pool, 7 Canadian and 23 US coordinators indicated interest in participating the research. When the research could start in 2001, several coordinators changed jobs or were too busy to participate in a meaningful way. The result was that 23 coordinators could devote enough time to participate in the research.

One major concern for the researcher was to conduct the pilot study such that a survey package would be available for a mailing in the fall of 2001. Another concern to make sure that there was proper permission in place by users and coordinators to use mailing lists that were provided by the coordinators. To achieve the goal of timing for the study proper, obtain consent and meet the requirement to ensure that permission was in place to use mailing lists, the researcher telephoned and emailed all coordinators, individually, who indicated prior interest in participating in the study, starting at the end of June 2001 through to July. The purpose was to confirm interest in participating in the study, inform them of the mailed invitation to participate, generate interest in the validity study, and confirm if they had permission from users

of their program for the use of their names to be contacted for research about the innovation. They confirmed interest in participating as disseminators for the study and that they had permission from users for the use of their names for Project WILD program activities, which included research. Confirmation in writing was provided through signed consent forms. A draft of the consent form was sent by email and fax for their review to (1) ensure that its wording on the point about having users' permission to be contacted was clear, as well as all other elements that the university required, and (2) to enable coordinators to suggest anything that was missing. Over the course of this process, one coordinator asked that the original consent form be more specific and extend provisions of confidentiality for names as well as other elements, such as addresses, telephone numbers and all electronic mechanisms in which such elements may be contained. The researcher checked if other coordinators wanted a similar provision. The original form was thus revised for this purpose. A revised copy was sent by fax and email.

A hard copy for signature was sent in January. The reason why a hard copy was not sent in September was because an element in the survey changed: that is, the survey responses were no longer going to be solely "anonymous" as was originally intended but rather they could also be "confidential". The researcher contacted all coordinators by telephone in September to advise them of this change. Coordinators agreed with the change; the revision was made within the final consent form. All coordinators were also given an opportunity to review the final questionnaire and the contents of the survey package prior to its mailing to ensure that no element was missing and to ensure that their names and addresses were accurate. This process enabled the researcher to meet the timing needs of the study, the requirements for informed consent, and ensure that permission was in place for the researcher's use of the mailing lists provided by coordinators.

3.4.2 Procedures Respecting the Survey Questionnaire to Teachers

Respondents were sampled as described previously in the sampling section of this chapter. All addresses were processed into the computer, carefully proofread and mailing labels were produced. Each respondent received a survey package (see Appendix D for artifacts) containing (1) a questionnaire booklet (colour-coded for the respective sample stratum that described the respondent), (2) a covering letter addressed to the recipient, (3) a flyer that offered resources for early responses, (4) a sheet that provided contact information for the provincial, territorial or state coordinator, including names of former coordinators over the past 5 years, the name of the provincial, territorial or state newsletter (if applicable), and the provincial, territorial or state Project WILD web site address (if applicable), and (5) a self-addressed, postage-paid return envelope. All respondents were offered the opportunity to receive resources. Those who wished to remain anonymous but receive resources had the option of completing and returning the flyer separately from the questionnaire or e-mailing or faxing the researcher. Those who wished to remain confidential had the option of completing and returning the flyer, together with their completed questionnaire, with the assurance that the flyer would not be attached to the questionnaire. Resource limitations meant that only English-speaking teachers could participate, although the Project WILD program is available in French in Canada and in Spanish in the US.

Upon receiving the survey package, an identifying code number was assigned in order of receipt of the questionnaire both on the surface of the envelope and on the questionnaire. The same code number was assigned on returned flyers so that addresses could be verified for mailing purposes. Otherwise, they were not associated with the questionnaires.

Members in the sample were each mailed a follow-up letter two and a half weeks following the initial mailing (see Appendix D). The initial mailing was spread out over 5 working days as it was not possible to drop all the mail on the same day (i.e., they did not all fit

into the car in the case of the US mailing). The US mailing was mailed from Odgensburg, New York; the Canadian mailing was mailed from the Canadian Wildlife Federation office in Kanata, Ontario. Teachers who responded early (i.e., within two weeks) were eliminated from the follow up mailing of the reminder but all respondents received a poster as a thank you for participating (see Appendix D). At the time of the follow up mailing of the reminder letter, there were no responses received from ineligible respondents. A number of respondents, however, indicated through email that their returned questionnaire crossed in the mail with the follow up letter. Names of respondents who responded early to the survey were drawn for educational resources in December; all respondents were included in a draw in January for a print (see Appendix D).

3.4.3 Procedures Respecting the Survey Questionnaire to Disseminators

Respondents were sampled as described previously on page 53 of this chapter. As noted earlier, coordinators had expected to be interviewed. The researcher telephoned all coordinators prior to faxing a questionnaire to them to ensure that the change in the research approach was acceptable. All coordinators agreed. Each received a 3-page questionnaire, as mentioned earlier (see Appendix E), along with a covering letter that thanked them for their willingness to participate. Because the fax route was chosen, a self-addressed, postage-paid return envelope was not provided. All coordinators were given the option of responding anonymously or confidentially.

Upon receiving the questionnaire, an identifying code number was assigned in order of receipt of the questionnaire on the surface of it. It was not necessary to send a reminder letter because respondents returned the questionnaire within two to three weeks of receiving it.

3.4.4 Minimizing Observer Bias

Given the researcher's role as the Canadian Director of Project WILD, special care to minimize observer bias was undertaken to ensure that the study was driven (1) by a well-

justified conceptual framework, (2) by item development for the instrument that was firmly grounded on prior research and (3) by pilot-test results of the instrument. A conceptual framework, which emerged from the literature, was presented on page 42 in Chapter 2. Prior to the study, a 20-page protocol (see Appendix G for sample pages) was created as a guide to develop items, all of which were either based on, or drawn directly (and adapted) from, prior research. Section 3.3.1 (see page 65) presented an overview of that body of research but detailed descriptions follow in Chapters 4, 5 and 6. The instrument was designed by systematically corresponding all items with all factors within the conceptual framework that were relevant for the study. Finally, the instrument was tested for reliability and validity in a pilot prior to the study proper, the results of which guided refinements to it. The pilot is described in the last segment of this chapter.

While the researcher's position required careful measures to minimize observer bias, her position also implies the availability of special knowledge about, and experience with, the innovation that has merit as a resource. For example, drawing attention to aspects of the findings, given the data, that struck the researcher may be helpful in providing useful insight for the reader.

3.5 Plan of Analysis

The research questions specified earlier in this chapter and the format of the data were the primary criteria in selecting methods for analysis. All statistical analyses were conducted using SPSS Version 10.0 software. Questions pertaining to self-reported behaviours and opinions were answered by using descriptive statistical summaries. To enrich the description and work toward reducing the large set of variables into a more readily interpretable form, several summary and scale variables were computed.

Several scale variables were computed by taking linear combination averages of sets of Likert-type items. Item sets were determined on the basis of the conceptual framework for the

study. They enabled the researcher to interpret results more easily as average scores were on the same metric. Specifications for variable construction are provided in the following chapters.

Relationships among variables were examined by using bivariate and regression procedures. Intercorrelation matrix using Pearson correlation coefficients were examined for patterns among variable sets. Hierarchical linear regression was used to statistically control for the covariates that were being used in this study and obtain more precise estimates of the effects of predictors. Independent samples t tests were employed to test for differences between the users of the innovation and the disseminators of it along the dimension of their perceptions of sustained interactivity. Finally, written comment data were typed and categorized by question. Items were content analyzed and emergent patterns were recorded. The next and final part of this chapter presents methods for a pilot study that was conducted prior to the study proper.

3.6 Pilot Study

As the reader may recall, the research design included a pilot test of the instrument. The general design of the pilot study, and its results, are discussed in this segment of the study.

3.6.1 General Design

The researcher developed the instrument for the study. The research strategy to carry out the study therefore included a pilot test of the instrument prior to the study proper. The general design of this pilot phase incorporated mixed quantitative and qualitative methods: a survey of teachers and informal conversation interviews.

3.6.2 Purpose

The main purpose of the pilot phase of this study was to gather data to enable reliability and validity analyses of the survey instrument that was to be sent to teachers. A secondary purpose was to gather qualitative data from teachers to better understand the nature of sustained interactivity and ask for opinions on how the content and design of the questionnaire could be improved.

3.6.3 Samples

Using a convenience sampling method, a sample of 100 teachers was generated to reflect the four dimensions of directness of contact with the coordinator as was called for with respect to the sample for the study proper, with equal numbers (i.e., 25) within each dimension. A response rate of 65% was considered adequate to conduct a reliability analysis (Crocker & Algina, 1986). A sample of 23 coordinators, including the CEE Executive Director, was available to participate in a content validity study, of which 17 responded by mid-August 2001 when they were needed. A sample of 5 teachers was generated for interviews. Each respectively reflected the four dimensions mentioned above, with the inclusion of an extra teacher in the "not known to have contact with the program" category to enable more feedback from this sector.

3.6.4 Instruments

An 8-page draft of the survey questionnaire that was to be directed to teachers for the study proper was developed and checked closely for continuity and clarity of phrasing, along with a covering letter and an educational kit (see Appendix H). Questionnaires were colour-coded to reflect the dimensions from which they were selected to enable easier identification for data entry into SPSS version 10.0. Provision was made within the questionnaire for respondents to indicate if they agreed to be interviewed and offer opinions about the quality of the instrument and sending incentives to prompt responses. A 6-page questionnaire, with a cover letter, was created to enable coordinators to provide voluntarily and confidentially opinions about the instrument for the validity study (see Appendix I). The researcher also made informal notes to guide her informal conversation interviews with the 5 individuals who agreed to an interview (see Appendix J).

3.6.5 Procedures

The source for survey candidates was from 3 coordinators and the researchers' data base of contacts. Given the time constraints to conduct a pilot test, and the time of the year (i.e., June-July), the researcher relied heavily on her data base for teachers for the test. First, she contacted, at the end of June and in July 2001, by telephone, 100 Canadian and US teachers from her data base that fit the requirements for the sample, of which 80 were available. Most names were from surveys that participants completed in workshops about the innovation and all indicated that they wanted further contact about the program. Some names were teachers who were in previous contact with her. Another 20 teachers were contacted in cooperation with coordinators, each of whom had provided lists of names for the study of users who indicated interest in being contacted about the innovation. The researcher received permission from coordinators to telephone teachers in their program. There were 20 teachers available to participate. In all cases, the researcher introduced herself, stated that their state or provincial coordinator had given permission to call them, outlined the project and then invited them to participate in the pilot.

Following the survey, 5 potential interviewees who had indicated on their completed questionnaire that they were willing to participate in an interview were contacted by telephone. They were asked if they would consent to 15- to 20-minute taped telephone interview at their convenience. During this initial contact, the researcher advised them of the consent process, read the contents of the consent form (see Appendix J) that would be sent to them and outlined the purpose of the interview. The interviews were scheduled in mid September during a time of the interviewees' convenience. As their written consent form to be interviewed and to have the interview taped was not in the hands of the researcher at the time of interview, the researcher followed Oppenheim (1992) regarding interviewing procedures: the researcher re-confirmed with interviewees, just before the scheduled interview was to begin, if she had their consent to

(1) be interviewed and (2) have the interview taped. The purpose of the interview was re-confirmed and the contents of the consent form were read. When they agreed that they had given their consent to be interviewed and to have the interview taped, it was only then that the tape recorder was turned on. Their consent to be interviewed and to have the interview taped was then re-confirmed on tape and the contents of the consent form was read and acknowledged. The interviews were taped on a regular tape recorder and are in a secure location in her office, as was promised to the interviewee, as are the signed consent forms from interviewees.

Timing for the pilot started at the end of June through to mid-July 2001. The draft survey was sent by regular mail, with a postage-paid, self-addressed return envelope and an educational kit, on the day that teachers agreed to participate. Within two weeks of each mailing, a thank you letter was sent, with another educational kit, as a reminder about the survey (see Appendix H).

All coordinators indicated interest in participating in the validity study during telephone conversations with the researcher. Because numbers of participants were higher than expected, an instrument was created to help them review the draft teacher survey questionnaire, as mentioned earlier. It was sent by fax and email for timing purposes (preferred methods by participants) in July. As mentioned earlier, most coordinators were able to provide feedback by mid August of 2001.

3.6.6 Reliability and Validity

Data provided by 65 teachers who voluntarily participated in the pilot and returned a completed draft survey instrument enabled an assessment of the instrument's reliability. For each scale variable, Cronbach's alpha was used a measure of internal consistency. Reliability analyses (see Appendix K) revealed that all scaled variables to be used for the study proper were over 0.70–an acceptable range for research (Crocker & Algina, 1986)–with the exception

of the "Orientation to Change" variable (which was changed in the final version of the instrument).[4]

Content validity was investigated by inviting all participating coordinators, including the CEE Executive Director (all of whom are regarded as knowledgeable about Project WILD) to provide opinions in an organized review about the appropriateness of items about the innovation contained in the draft instrument. As mentioned earlier, 17 of the 23 coordinators were able to return by mid-August, in writing, a completed feedback form designed for this task. They were asked if the draft instrument adequately addressed content about the innovation and if any dimensions related to it were missing. Their feedback indicated that all dimensions about the innovation were well covered in the draft questionnaire. Apart from suggestions for improvements and word changes, no serious omissions were identified. Based on their feedback, the validity of the content of the instrument about the innovation was considered acceptable. Data from the reliability and content validity investigations guided improvements of the instrument.

Further, teachers were also invited to provide data for improvements. Information offered by teachers and coordinators about the content of the draft instrument was carefully recorded, including marginal comments. Data from each respondent were identified by assigning a record number and its source to create an overall list of comments (see Appendix L for sample data). A careful content analysis of the data revealed two important insights for the researcher. First, the design required some

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[4] Because of the researcher's unfamiliarity, at the time of conducting the reliability study, with scale construction, she did not develop scales for the constructs of *follow up, users' perception of quality of product,* and *level of implementation.* While data were examined with respect to these variables, they were not analyzed appropriately. This limitation only became apparent to the researcher when she conducted reliability investigations during the study proper. As the reader will discover in later chapters of this study, this limitation did not seriously affect the reliability of measures for the study proper.

important changes, the most obvious being skip patterns for easy movement through the instrument. Second, confusion about key terms warranted more clarity, especially regarding the meaning of "direct" and "indirect" contact, "coordinator" and "teachers".

Data from all respondents contributed to revisions in the cover letter, the questionnaire's appearance (e.g., font size) and flyer copy. Interviewees' suggestions about content to appear on the survey packet's envelope were incorporated. Advice about copy lay-out for the flyer and mailing envelope was sought from a professional designer. All comments from the thesis supervisor were incorporated into the final package. Final content was sent to coordinators for a final review for omissions. Based on the pilot results, the researcher concluded that the instrument was reliable and its content about the innovation was valid. Given that items for constructs contained within the conceptual framework were rooted in or adapted from prior research, the researcher was confident of their validity. Reliability and validity for two constructs–*users' orientation to change* and *level of commitment*–was limited since only one or two indicators were used but the instrument's length became a major constraint to the addition of more items.

3.7 Summary of Methods

The methods that were undertaken enabled the researcher to carry out a study on the effects of sustained interactivity of the utilization of a well-developed innovation. The piloting process enabled an assessment to be made about the reliability and validity of the instrument. The findings, at the time, gave confidence to proceed in developing the final instrument for the study proper. An assessment of the achieved sample for the study proper suggested sufficient variability to enable the researcher to draw conclusions about the effects of sustained interactivity under varying conditions of directness of contact between the program coordinator and the users of the innovation. The next five chapters describe findings arising from analyses that were subsequently carried out.

CHAPTER 4

Characteristics of Sustained Interactivity

This chapter partially addresses one of the main research questions posed in this study:

What are the characteristics of sustained interactivity with respect to a well-developed program innovation?

To find partial answers to this question, analyses were undertaken of teachers' response patterns to the variables that form the *sustained interactivity* construct. These analyses also enabled the researcher to find answers for one of the second set of research questions presented in Chapter 2:

What are the users' perceptions of sustained interactivity?

As the reader may recall, the conceptual framework guiding this study identified five constructs–interactive processes–that were drawn from prior research and defined them as characteristics of sustained interactivity. Empirical research (Cousins & Leithwood, 1993) revealed that multiple exchanges between disseminators of knowledge and users of it can possess characteristics associated with interactive processes. Within the conceptual framework (see page 41), these processes are cast between disseminators of knowledge and its actual use by users and are regarded as the variables that influence the amount and the quality of sustained interactivity. They reflect interconnections between the world of the disseminator and that of the user and among users in terms of (1) *social processing* of information, (2) *engagement* of users in a study or project, (3) *involvement* of users in delivery of innovations, (4) *ongoing contact* between users and disseminators, and (5) *follow-up* between users and disseminators (Huberman, 1990).

Based on this work, nine variables were developed to operationalize the sustained interactivity construct: *social processing, engagement/ involvement, type of indirect contact, type of direct contact, ongoing indirect contact, ongoing direct contact, follow up, users'*

perceptions of sustained interactivity, and *intensity of sustained interactivity*. The latter two variables did not emerge as characteristics of interactive processes in the literature. The researcher added them to capture dimensions of users' perceptions of their exchanges with disseminators and the intensity of those interactions. The characteristics associated with those dimensions, together with those that relate to interactive processes, are defined as "characteristics of sustained interactivity".

The first of the four parts of this chapter will explain how the sustained interactivity variables were operationalized, and how items for the nine variables were developed to justify the approach that was taken to create them. This first segment will also analyze teachers' responses patterns with respect to related variables at the item level, and, then at the scale variable level in the second part of the chapter after having reduced the data set using scale variable construction techniques. Appendix D shows response patterns by item. The third section presents conclusions about characteristics that emerged through these analyses. These will be re-visited in Chapter 7 in light of findings from regression analyses. In the fourth and final section, intercorrelations among variables that form the sustained interactivity construct are presented.

4.1 Description of Response Patterns

The focus in this segment is on describing response patterns at the item level for each of the nine variables that form the sustained interactivity construct and outlining item formulations.

4.1.2 Social Processing

4.1.2.1 Formation of Items for Social Processing

Social processing is a term coined by Louis and Dentler (1988) to describe the social process of collegial interaction–a collaborative activity (Marks & Louis, 1999)–to consider "how and whether information is relevant to the work context" (Louis & Dentler, 1988, p. 48).

They found that the amount and influence of social processing was associated with use of an innovation.

In this study, the program coordinator is seen to be indirectly involved in collegial interactions about the innovation within a school setting by virtue of his or her role in delivering the innovation to teachers. That is, the coordinator is the provider of the innovation to primary recipients (initial recipients) of it and to secondary recipients who are teachers to whom primary recipients passed on information about the innovation (Louis & Dentler, 1988). Direct or indirect contact between a coordinator and primary recipients occurs generally prior to interactions about the innovation among primary and secondary recipients within their school setting. These contacts may be ongoing (directly or indirectly) between a coordinator with primary and/or secondary recipients. This view casts social processing as sustained interactivity since the implementation model of the innovation (see page 50 in Chapter 2) prescribes that initial recipients receive the innovation from a disseminator of it in a workshop process. While the coordinator not always the person who conducts workshops (but may provide facilitators to deliver the innovation locally), the linkage between a coordinator as a provider of knowledge to teachers as recipients of it exists (indirectly or directly) since that role is fundamental to the delivery of the innovation.

The researcher drew on three sources of empirical literature for ideas on how to develop items for social processing. First, the work of Louis & Dentler's (1988) revealed the use of a 4-point scale to measure the amount of social processing. It ranged from no social interaction (1) to reports of both informal and formal discussions about information (4). They used a similar scale to measure the influence of group social processing (which ranged from "very important" to "not at all important") on use outcomes that they established. They asked respondents to indicate how important meetings or discussions were in affecting the way they thought about information. They also asked whether meetings or discussions were influential in encouraging

other teachers to use information. Second, given that social processing is a collaborative activity, the researcher drew on empirical findings from teacher collaboration literature. She found that high but deep levels of collaboration enhance use (see page 182 in Chapter 6). This finding suggested that deeper levels of group discussions about the innovation may be important regarding the use of it. This view presented the challenge of determining *how* to measure depth of social processing. For guidance, the researcher turned to a third source of literature–organizational learning–for ideas on how items may be formed to capture the dimension of depth of talk.

Organizational learning literature suggests that organizations that provide an opportunity for collaborative work and for social processing possess learning characteristics (Cousins, 1996; Cousins & Walker, 2000; Leithwood & Louis, 1999).

> Such organizations are not only collaborative but inquiry-focussed and prone to professional sharing and discussion of information, support the social interpretation of information, stimulate staff to rethink conceptions, and challenge basic assumptions (Cousins & Walker, 2000, p. 31).

Organizational learning is seen to occur when actions in organizations are improved through better understanding (Shulha & Cousins, 1997). It is a process (Marks & Louis, 1999) where the outcome is "new knowledge, skills or tools for increasing learning" (p. 711). Learning occurs at individual and then at collective levels. A deep level of collective learning occurs when assumptions about practice are made explicit and critiqued (Shulha & Cousins, 1997).

This way of looking at organizations assumes the presence of a context for the social processing of knowledge (Louis & Simek, 1991) to occur. It also assumes that social processing is synonymous with "team learning" where the goal of its member is to "forge consensus about organizational performance and action they might take for its improvement" (Marks & Louis, 1999, p. 713). While this thesis is not measuring organizational learning, this perspective helped to guide the researcher's thinking on *when* the dimension of deeper levels of collective

learning was more likely to be indicated. This thinking suggested merit in formulating items that could indicate a presence of a *propensity* by respondents' to engage in deeper levels of social processing. That is, a propensity to engage in collective discussion about the innovation to the extent that it may have influenced how they thought about things and their decisions to make changes.

With these thoughts in mind, items were developed for social processing (see items 4.0, 4.5, 4.6 and 4.7 on page 3 in Part 3 of Appendix D) along a continuum of the depth of it. At the end of least depth is the action of individual teachers who reported that they told other teachers about the innovation. It was followed by greater amounts of discussions among teachers about it, as perceived by respondents. These reports represented a somewhat deeper level of social processing. Discussions about the innovation that influenced how teachers thought about the innovation, from a respondent's perspective, are cast as an indicator of a deep level of social processing. The deepest level is seen to be indicated when discussions among teachers influenced changes in behaviour (making changes), from a respondent's perceptive. Data regarding the frequency and depth of social processing were captured by using a 5-point Likert-type frequency scale, which ranged from never (1) to always (5).

It should be noted that the latter two items (i.e., items 4.6 and 4.7 on page 3 in Part 3 of Appendix D) are *not* considered to measure organizational learning outcomes but because they hint at a linkage to outcomes, they may be somewhat limiting. Data, however, are limited solely to perceptions of individual respondents about what appeared to be an outcome *to them* from group discussions. As such, these data merely serve as a reference of how deep the social processing activity may have been. Claims about the occurrence of organizational learning are not appropriate in the absence of data collection directly from other teachers participating in the discussions (which is outside of the parameters for this study) to confirm perceived outcomes by individuals.

Alternatively, deeper collaborative reflection as defined in this study may indicate the possible presence of a condition (i.e., capacity) for organization learning (Shulha & Cousins, 1997). This association is reasonable since organizational learning cannot occur in the absence of it or in the absence of a forum or a context for it (Marks & Louis, 1999). Given that this study has an interest in exploring organizational learning, it is worth noting that conditions for it might be indicated because of the inclusion of items to detect the presence of deeper levels of social processing. Further indicators that are specific to asking respondents about the context of their school settings are addressed under the subject of teacher collaboration on page xx in Chapter 5, which provide further exploratory data along this dimension.

4.1.2.2 Description of Response Patterns: Social Processing

As shown in Table 4.1, responses related to social processing among teachers about the innovation leaned on average toward the less frequent end of the scale (i.e., less than 3.5) with the exception of item 4.0. In general, there was wide variability, with standard deviations ranging from 0.87 to 1.09. The one item in which the level of frequency was highest was 4.0: I enjoy telling my colleagues about Project WILD. The item in which the lowest scores were observed was 4.5: Project WILD stimulates much discussion among colleagues at my school.

The data suggest that while most teachers talk about the innovation with colleagues, the innovation does not generate much discussion among them–perhaps an indicator that a well-developed innovation does not inspire collective talk. Items 4.6 and 4.7, however, probed for the presence of deeper levels of social processing. The mean scores associated with these items ranked second and third, suggesting that although collective discussion about the innovation leaned toward the low end of the scale, such deliberations had some influence for over a third of the teachers about how they thought about things (e.g., how they teach about wildlife) and their decisions to make changes (e.g., changes in teaching about wildlife, changes in thinking

Table 4.1

Characteristics of Social Processing about the Innovation among Teachers at Their School Setting

Questionnaire Item	Response Distribution[a]					Mean	SD	N	Rank	95% C.I[b]	
	Ne	R	S	F	A					Lower	Upper
4.0) I enjoy telling my colleagues about Project WILD.	6%	15%	39%	23%	17%	3.32	1.09	476	1[c]	3.22	3.42
4.5) Project WILD stimulates much discussion among colleagues at my school.	32%	41%	23%	3%	1%	1.99	0.87	482	4	1.91	2.07
4.6) Discussions about Project WILD have made my colleagues and I reconsider how we think about things (e.g., how we teach about wildlife).	28%	35%	31%	5%	2%	2.19	0.96	469	2	2.10	2.28
4.7) Discussions among my colleagues about Project WILD lead to decisions to make changes (e.g., how we teach about wildlife, what we think about the environment).	31%	32%	29%	6%	2%	2.14	0.97	464	3	2.05	2.22

[a] Ne = Never (1); R = Rarely (2); S = Somewhat (3); F = Frequently (4); A = Always (5).

[b] C.I. = Confidence interval.

[c] 1 = highest level of social processing; 4 = lowest level of social processing.

about the environment). Item 4.8 will explore examples of the changes (i.e., use of innovation) in Chapter 5.

These data also suggest that there is considerable variation within the four items. The most is associated with the amount of talk by individual teachers about the innovation; the least relates to the amount of discussion about the innovation among colleagues. While the amount of variability was less across the remaining two items, the data indicate a fairly wide but consistent distribution of responses. In general, about a third of the teachers never engage in social processing while about a third do so rarely, and about a third do so somewhat or more frequently.

4.1.3. Engagement/Involvement

4.1.3.1 Formation of Items for Engagement/Involvement

As shown in Appendix D (see Part 5, page 3), there were five items that focused on capturing data regarding the frequency of engagement and involvement of teachers with the innovation, using a 5-point Likert-type frequency scale, which ranged from never (1) to always (5). The idea for these variables, and how to distinguish them, was drawn from Cousins and Leithwood (1993). *Involvement* is defined as taking an active part in the delivery of the innovation. *Engagement* is viewed as a lesser degree of involvement with the innovation and is associated with activities such as receiving or looking for information about the innovation from the coordinator or sharing ideas about it with the coordinator. Based on these definitions, engagement was viewed as occupying the low end of a continuum that reflects how involved a teacher may be with the innovation, with involvement located at the higher end.

The researcher also drew on Klein and Gwaltney"s (1991) knowledge dissemination framework. They proposed that disseminated programs serve four functions: spread (one-way diffusion of information to increase awareness); choice (assisting users to compare alternative resources); exchange (interchange of information, materials or perspectives), and

implementation (technical assistance, training, and other forms of support to change attitudes or behaviour). Huberman (1994) suggested that these functions form a continuum of intensity of interactive effort on the part of the disseminator, where least intense effort is associated with spread and the most intense effort is associated with implementation. Huberman's suggestion prompted the researcher to propose that these four functions may serve as a guide in situating varying forms of engagement and involvement along the continuum of dissemination functions. With these ideas in mind, a list of the five items is presented below to reflect a continuum of engagement and involvement, where the first represents the lowest level of engagement through to the last item, which defines the highest level of involvement. References within square brackets identify (1) which items are associated with engagement and involvement, and (2) where they fit within Klein and Gwaltney's (1991) framework.

5.2. I contact the government wildlife department because of Project WILD. [Engagement/Spread]

5.3. I share ideas about Project WILD with the ... Coordinator. [Engagement/Exchange]

5.0. I try out new activities because of information provided by the Project WILD Coordinator. [Involvement/Implementation]

5.1. I present Project WILD at my school site (e.g., at meetings). [Involvement/Implementation]

5.4. I help host Project WILD workshops at my school. [Involvement/Implementation]

4.1.3.2 Description of Response Patterns: Engagement/Involvement

As displayed in Table 4.2, responses leaned, on average, toward the less frequent end of the scale. In general, there was a high amount of variability within each item, with most standard deviations being in the range of 1.06 to 1.07, with the exception item 5.3. The one item that reflected the highest average level of frequency was 5.0: I try out new activities because of information provided by the Project WILD Coordinator. The two items in which

Table 4.2

Characteristics of Teachers' Engagement/Involvement in Innovation

Questionnaire Item	Response Distribution[a]					Mean	SD	N	Rank	95% C.I[b]	
	Ne	R	S	F	A					Lower	Upper
5.0) I try out new activities because of information provided by the Project WILD Coordinator.	24%	21%	41%	12%	3%	2.50	1.07	477	1[c]	2.41	2.60
5.1) I present Project WILD at my school site (e.g., at meetings).	47%	26%	18%	6%	3%	1.90	1.06	479	3	1.81	2.00
5.2) I contact the government wildlife department because of Project WILD.	46%	22%	23%	8%	1%	1.97	1.06	486	2	1.88	2.07
5.3) I share ideas about Project WILD with the Project WILD Coordinator.	60%	22%	13%	3%	2%	1.64	0.94	484	5	1.56	1.73
5.4) I help host Project WILD workshops at my school.	66%	13%	12%	6%	3%	1.65	1.06	487	4	1.56	1.75

[a] Ne = Never (1); R = Rarely (2); S = Somewhat (3); F = Frequently (4); A = Always (5).

[b] C.I. = Confidence interval.

[c] 1 = highest level of engagement/involvement; 5 = lowest level of engagement/involvement.

average levels of frequencies were the lowest were 5.3: I share ideas about Project WILD with the Project WILD Coordinator, and 5.4: I help host Project WILD workshops at my school.

The trend of responses toward the low end of the scale suggests that teachers are generally neither highly engaged nor involved with the innovation in school settings. Of the types of engagement/involvement included in the questionnaire, however, the ranking of the average mean scores suggests that teachers tend to (1) try out activities (an involvement/implementation function) provided by the coordinator, (2) engage in it by contacting the government wildlife department (an engagement/spread function), and (3) implement it by presenting it at their school (an involvement/ implementation function). Least frequent forms of involvement are associated with exchanges (i.e., sharing ideas) about the innovation with the coordinator and implementing it by hosting workshops at their school. The data, however, suggest that such engagement and involvement varies widely, as suggested by the standard deviations. Although most teachers try out new activities provided by the program coordinator, almost a quarter never does and over 60% do so only rarely or somewhat. The majority of teachers never or rarely contacts wildlife agencies about the innovation or present or host it at their school but a tiny segment–less than 10%–does so frequently or always. Least variation is associated with engagement in exchanging ideas with the coordinator–most teachers tend not to engage in this activity.

4.1.4 Indirect Contact with Innovation

4.1.4.1 Formation of Items for Indirect Contact with Innovation

Two basic forms of contact were defined in this study: One is indirect contact. It is defined as contact with the innovation that does not involve being in contact directly with the coordinator. The second form is direct contact. It is defined as being in contact directly with the coordinator about the innovation. In this section of the chapter, the focus is on indirect contact.

In this study, indirect is seen for what it is: It means that there is a lack of direct exchange with the coordinator. Alternatively, an indirect contact is a form of an exchange that indirectly involves the coordinator (e.g., the coordinator is associated with the presence of a web site, mailings of publications and so on). It is included in this study for this reason and so that the effects between direct and indirect contact with the disseminator on use of the innovation may be measured and thus distinguished.

Part 6 of the questionnaire (see Appendix D, page 4) captured data about indirect contact. Wording for the heading for this section (i.e., This section asks you to describe your general contacts with Project WILD) was created based on pilot results. The results indicated that the term "indirect contact" in the questionnaire confused teachers and that it was too confusing to distinguish it from the term "direct contact". Thus, the term "general contacts" was used to refer to "indirect contact". As shown in Appendix D (see page 4, Part 6), teachers were invited to identify the type, and frequency, of indirect contact they had with the innovation. A 5-point Likert-type of frequency scale was used to capture data that ranged from never (1) through to always (5). Items for three types of indirect contact were developed based on the researcher's knowledge of the program and her assumptions (verified by the pilot study) of types of indirect contact that were likely to occur in the program. Teachers were invited to identify other forms of such contacts with the innovation under the option of "Other".

4.1.4.2 Description of Response Patterns: Type of Indirect Contact

As displayed in Table 4.3, responses leaned toward the less frequent end of the 5-point frequency scale, especially for the latter two items (i.e., 6.0b and 6.0c). In general, variability was unstable, with standard deviations ranging between 1.42 and 1.13. Variability within item 6.0a showed a wider spread of responses. The item that reflected the highest average level of frequency of indirect use was 6.0a: Received a regular publication, such as a Project WILD newsletter or a wildlife magazine. The items in which the levels of frequency were the least

Table 4.3

Characteristics of Indirect Contact with Program Innovation

Questionnaire Item	Response Distribution[a]					Mean	SD	N	Rank	95% C.I.[b]	
	Ne	R	S	F	A					Lower	Upper
6.0) Since taking the Introductory Project WILD Workshop, indicate how often you have											
a. Received a regular publication, such as a Project WILD newsletter, wildlife magazine.	21%	14%	16%	31%	18%	3.10	1.42	505	1[c]	2.98	3.23
b. Visited a Project WILD web site (or a related web site).	43%	21%	23%	11%	2%	2.09	1.13	502	2	1.99	2.19
c. Contacted the Project WILD office for information.	47%	20%	21%	9%	2%	2.00	1.13	501	3	1.90	2.10

[a] Ne = Never (1); R = Rarely (2); S = Somewhat (3); F = Frequently (4); A = Always (5).

[b] C.I. = Confidence interval.

[c] 1 = highest level of indirect contact; 3 = lowest level of indirect contact.

were 6.0b: Visited a Project WILD web site (or a related web site), followed by 6.0c: Contacted the Project WILD office for information.

These data suggest that the majority of teachers have had some indirect contact with the innovation: Many receive a regular publication related to the content of the innovation (e.g., a newsletter). Slightly more than half reported that they visit a web site associated with, or related to, the innovation and that they contacted the office responsible for the innovation for information purposes. The most frequent form of indirect contact with the innovation is through publications related to the innovation. Of the three items, variation across this item (i.e., item 6.0a) was the greatest. Almost half of the teachers engage in this form of contact quite frequently but less than a third receive such publications somewhat or only rarely. The least frequent form of indirect contact with the innovation was associated with contacts with the office responsible for the innovation and visits to web sites related to, or about, the innovation. Patterns of responses for these two items, however, also varied widely. About half reported no contact; slightly less than half made such contact rarely or somewhat, with a small segment doing so more frequently.

4.1.4.3 Analysis of "Other" Forms of Reported Indirect Contact

Teachers were invited to indicate other forms of indirect contact and to rate their frequency; 29 respondents completed this section of the questionnaire. Of these, 6 said they were in indirect contact in the following ways: one indicated contact with a district Project WILD Coordinator (it is not known what was meant by "district"); one said contact was made by networking with other facilitators; one explained that contact was made with the Project WILD office to book a workshop for a PD Day, and 3 reported that they requested resources through the Project WILD office. The remaining 23 were variations of direct contact that teachers had with the program coordinator. They reported receiving e-mails, writing curriculum materials, volunteering for Project WILD events, doing workshops because they were

facilitators, or requiring constant contact because they were involved in a project with the coordinator. All 23 teachers completed Part 8 of the questionnaire, which requested information about their contacts with the coordinator. Thus, of the 29 reported forms of indirect contact under "other", only 2 were new forms of indirect contact that were not covered in the list of three items within Part 6 of the questionnaire (i.e., contact with a "district" coordinator and with other facilitators). The researcher interpreted the low number of "other" occurrences of indirect contacts as an indicator that her list well represented the type of indirect contacts in which most teachers might engage.

4.1.5 Ongoing Indirect Contact

4.1.5.1 Formation of Items for Ongoing Indirect Contact

Appendix D (see Part 6, page 4) shows that two items were included in the questionnaire to capture information about the frequency of ongoing indirect contact. The first item (i.e., item 6.1) invited teachers to specify the number of times they had engaged in indirect contact over the past year. The "past year" was defined as starting in October 2000 and ending in October 2001. This 12-month period was selected for two reasons. The first reason was to define a specific block of time that teachers could use, in common, to report their number of indirect contacts over a 12-month period. The second reason was to make it easy for teachers to respond to the item by using a time frame that would coincide roughly with the timing of receipt of the questionnaire–that is, the 12-month period at the time of receiving the questionnaire. The researcher thought that teachers might find it easier to remember how often they had contact with the innovation within the year prior to receiving the questionnaire (versus a calendar or an academic year). Teachers were invited to indicate the number of contacts that would apply to them where they could select options from "No Contact" through to "5 or more contacts", and specify the number of contacts if they had 5 or more contacts. The actual number that each teacher provided in response to this item was the number that the researcher inputted

into the SPSS version 10.0 program. The number "0" was used for "No Contact", "1" was used for one contact, and so on, up to "50" for 50 reported contacts. The second item (i.e., item 6.2) invited teachers to indicate if their level of contact over the past year was less, more or the same as in previous years.

As shown in Appendix D (see Part 6, page 4, item 6.2), the majority of teachers maintained the same level of indirect contact as in previous years but for less than a quarter the frequency of contact was less while for a few it was more. These proportions, in themselves, are limited in ascertaining the distribution of indirect contacts that were more typical for teachers. The researcher, therefore, used information provided in item 6.2 as a basis to scale a set of new values that may better reflect teachers' typical patterns of ongoing indirect contacts with the innovation. This procedure is described below.

4.1.5.2 Procedure Used to Calculate Ongoing Indirect Contact

The procedure that was applied to scale these new values was as follows: First, responses for "less" were coded as "1"; responses for "same" were coded as "2", and responses for "more" were coded as "3" into SPSS version 10.0. Second, three conditional statements were specified which created a new scaled variable scaled as follows: If number of contacts was "less", then the number of reported contacts in item 6.1 was multiplied by 0.50. The idea of using a multiplier of 0.50 was to lower the number of reported contacts over the past year in order to arrive at a number of contacts for specific respondents that was less. If the response was "same", then the number of reported contacts in item 6.1 was multiplied by 1. The idea of using a multiplier of 1 was to keep the number of reported contacts over the past year the same for teachers who said their contacts were the same as in previous years. Finally, in the response was "more", then the number of reported contacts in item 6.1 was multiplied by 1.5. The idea of using a multiplier of 1.5 was to increase the number of reported contacts over the past year

that might be more typical for them. The values under the new scaled variable were used as the basis to describe indirect contacts that were typical for teachers.

4.1.5.3 Description of Response Patterns: Ongoing Indirect Contact

Table 4.4 displays the distribution of responses for items 6.1 and 6.2 with respect to ongoing indirect contact over the past year and over previous years. As indicated in footnotes "c" and "d", the number of indirect reported contacts over the past year (item 6.1) ranged from 0 ("No Contact") through to a maximum of 50 contacts. For item 6.2, the number of projected typical indirect contacts ranged from 0 through to 56 contacts (i.e., rescaled variable described in Section 4.1.5.2).

Table 4.4 also displays the distribution of responses of raw data, starting with 0 for "No Contact" through to the proportion that indicated 17 or more contacts under "17+". Table 4.4 reports the average frequency of contacts associated with both items but these may be somewhat unreliable because outliers at the high end of the scale. Variability within these items indicates a wide spread of responses. It is also noted that of the 502 teachers who completed item 6.1, only 449 provided data for item 6.2.

These data suggest that last year's pattern of indirect contacts with the innovation might be less than what was typical in previous years. There was also wider variability among teachers with respect to their ongoing indirect contact with the innovation during the last year as compared with their typical responses in previous years. The patterns of response distributions for both items, however, suggest that about a third of the teachers had no indirect contact with the innovation, almost half had between one to 4 contacts, and less than a quarter had 5 or more contacts. Only a small segment of the sample had 9 or more indirect contacts in the last year and in previous years, of which a very small proportion had very high levels of indirect contact at 17 or more. These data, however, may be limiting: about 10% of the teachers who completed item 6.1 did not respond to item 6.2.

Table 4.4

Characteristics of Indirect Contact with the Innovation in Year 2001 and in Previous Years

Questionnaire Item	Response Distribution[a]									95% C.I.[b]		
	0	1-4	5-8	9-12	13-16	17+	Mean	SD	N	Rank	Lower	Upper
YEAR 2001												
6.1) Indicate the number of times you have engaged in the forms of contact mentioned in question 6.0 during the past year (from October of last year to October of this year).												
All Respondents	34%	50%	7%	5%	2%	2%	3.01	4.82	502	2[cd]	2.59	3.43
PREVIOUS YEARS												
6.2) Is this number of contacts more, less, or the same as in previous years? (Number of contacts were determined by calculating number of contacts reported in item 6.1 x 0.50 for less; 6.1 x 1 for the same, and 6.1 x 1.5 for more).												
All Respondents	31%	48%	11%	5%	2%	2%	3.38	5.77	449	1[e]	2.85	3.91

[a] 0 = 0 contact; 1-4 = 1-4 contacts; 5-8 = 5-8 contacts; 9-12 = 9-12 contacts; 13-16 = 13-16 contacts; 17+ = 17 or more contacts.

[b] C.I. = Confidence interval.

[c] 1 = highest number of contacts; 2 = lowest number of contacts.

[d] Number of contacts ranged from 0-50.

[e] Number of contact ranged from 0-56. Increases in the range of contacts were due to transformations of the data.

4.1.6 Direct Contact with Project WILD Coordinator

4.1.6.1 Formation of Items for Direct Contact

As shown in Appendix D (see Part 8, page 5), item 8.0 invited teachers to skip to Part 11 of the questionnaire if they had no direct contact with the program coordinator. To ensure that teachers understood what was meant by the term "Project WILD Coordinator", an explanation was provided (i.e., that the Project WILD Coordinator is the person responsible for Project WILD in your state, province, or territory and is identified in the attached violet form). Teachers who had direct contact with the coordinator were asked to complete Parts 8, 9 and 10 before moving onto Part 11. They were invited to indicate if they had such a direct contact (i.e., item 8.0). An explanation was provided to clarify the meaning of "direct contact": "an interpersonal contact, such as talking with the Coordinator at a workshop or on the telephone". Slightly more than half (i.e., 297) of the 513 teachers who completed this section of the questionnaire indicated that they had direct contact.

Part 8 of the questionnaire captured data regarding the type and frequency of teachers' direct contact with the program coordinator. In this respect, this part of the questionnaire was similar to Part 6, which focused on gathering the same kind of information about indirect contacts with the innovation.

Item 8.1 consisted of six parts. Each part identified a different type of direct contact. These types were selected as a result of recommendations made by interviewees during the pilot test of the questionnaire. Provision was also made for teachers to indicate other types of direct contact that were not covered by these sub-items. A 5-point Likert-type frequency scale was used to capture data with options that ranged from never (1) through to always (5).

4.1.6.2 Description of Response Patterns: Type of Direct Contact

As displayed in Table 4.5, six types of direct contacts were included in the questionnaire with responses leaning toward the less frequent segment of the 5-point frequency

Table 4.5

Characteristics of Type of Direct Contact Among Respondents with Program Coordinator

Questionnaire Item	Response Distribution[a]					Mean	SD	N	Rank	95% C.I.[b]	
	Ne	R	S	F	A					Lower	Upper
8.1) Indicate how often you have had **DIRECT** contacts with the Project WILD Coordinator:											
a. Direct contact through the telephone.	22%	23%	38%	12%	4%	2.54	1.09	282	5[c]	2.41	2.66
b. Direct contact through the e-mail.	50%	17%	17%	13%	3%	2.00	1.20	278	6	1.86	2.15
c. Direct contact through regular mail or fax.	19%	18%	45%	15%	3%	2.66	1.04	281	2	2.54	2.78
d. Direct contact at face-to-face meetings.	15%	29%	42%	23%	3%	2.60	0.97	284	3	2.49	2.72
e. Direct contact at Project WILD-related activities (e.g., curriculum development projects).	23%	20%	39%	13%	6%	2.59	1.15	278	4	2.46	2.73
f. Direct contact at conferences or workshops (e.g., advanced Project WILD workshops).	12%	19%	42%	18%	9%	2.93	1.11	282	1	2.80	3.06

[a] Ne = Never (1); R = Rarely (2); S = Somewhat (3); F = Frequently (4); A = Always (5).

[b] C.I. = Confidence interval.

[c] 1 = highest direct contact; 6 = lowest direct contact.

scale. Variability was somewhat unstable, indicating a fairly wide spread of responses. The two items that reflected the highest level of average frequency among teachers were 8.1f: Direct contact at conferences or workshops (e.g., advanced Project WILD workshops) and 8.1c: Direct contact through regular mail or fax. The one item that reflected the lowest frequency was 8.1b: Direct contact through the e-mail.

These data suggest that slightly more than half of the teachers who are in direct contact with the coordinator have such contact at conferences and workshops, through regular mail or fax, or at face-to-face meetings as opposed to activities related to the innovation or the telephone or e-mail. There was a fair amount of variability among teachers, with most variation associated with the use of e-mails. This finding suggests that some teachers might be reluctant to use, or not have access to, electronic forms of communication.

4.1.6.3 Analysis of "Other" Types of Direct Contact

Teachers were invited to indicate other types of direct contact that were not covered by the 6 types provided by the researcher. Only 7 respondents completed this option within the questionnaire. Of these, 4 elaborated on the kind of Project WILD events that they attended (i.e., they assisted at events associated with the innovation or professional development days or did curriculum work). Three others said they interacted with the coordinator because the coordinator was delivering a university course or they picked up workshop supplies from the coordinator or attended a retreat associated with the innovation. Based on the low numbers of "other" occurrences of direct contacts, the researcher concluded that her 6 items in the questionnaire covered most types of direct contacts that teachers likely had with the coordinator.

4.1.7. Ongoing Direct Contact

4.1.7.1 Formation of Items for Ongoing Direct Contact

Appendix D (see Part 8, page 5) shows that there were two additional items (i.e., items 8.2 and 8.3) included in the questionnaire to capture information about the frequency of ongoing direct contact. Both items are re-worded versions of items 6.1 and 6.2, which were discussed in Section 4.1.5.1 (see page 93) and pertained to ongoing indirect contacts with the innovation. The first item (i.e., item 8.2) invited teachers to specify the number of times they engaged in direct contact with the program coordinator over the past year, where the "past year" was defined as starting in October 2000 and ending in October 2001. As previously mentioned with respect to ongoing indirect contact, this 12-month period of time was chosen so that teachers would have a common time frame within which to respond; the time frame was selected so teachers could more easily recall how often they had direct contact with the coordinator within the year prior to receiving the questionnaire.

The second item (i.e., item 8.3) invited teachers to indicate if their level of contact over the past year was less, more or the same as in previous years. Appendix D (see Part 8, page 5, item 8.3) shows what proportions of responses were less, more or the same as in previous years. These data suggest that the slightly more than half of teachers maintain the same level of contact as in previous years but for about a quarter the frequency of contact was less while slightly less than a quarter it was more. These proportions in themselves are limited in ascertaining the distribution of direct contacts that were more typical for respondents. The researcher, therefore, applied the same scaling type of procedure that was described earlier in the "Ongoing Indirect Contacts" section (see page 93) with regard to items 8.1 and 8.2 to develop new scaled values that may better reflect respondents' typical patterns of direct contacts with the coordinator.

4.1.7.2 Description of Response Patterns: Ongoing Direct Contact

Table 4.6 displays the distribution of responses for items 8.2 and 8.3 of ongoing direct contacts over the past year and over previous years. As indicated in footnotes "c" and "d", the number of direct reported contacts over the past year (i.e., item 8.2) ranged from 0 ("No Contact") through to a maximum of 50 contacts. For item 8.3, the number of projected typical ongoing direct contacts ranged from 0 through to 75 contacts (i.e., based on the scaling procedures). Table 4.6 also displays the distribution of responses of raw data, starting with "0" for No Contact" through to the proportion that indicated 17 or more under "17+". It reports the average frequency of contacts for both items but these may be somewhat unreliable because outliers at the high end of the scale. Variability within these items indicates a wide spread of responses. Of the 300[1] respondents who completed item 8.2, only 241 responded to item 8.3.

These data suggest that last year's pattern of direct contacts with the innovation might be less than what was typical in previous years. There was also wider variability among teachers with respect to their ongoing direct contact with the program coordinator during the last year as compared with their typical responses in previous years. The patterns of response distributions for both items, however, suggest that about a quarter of the teachers had no direct contact with the coordinator, almost half had between 1 to 4 contacts, and a quarter, more or less, had 5 or more contacts. Only a small segment of the sample had 9 or more direct contacts in the last year and in previous years, of which a tiny proportion had very high levels of direct contact at 17 or more. These data may be limiting: about 20% of the teachers who completed item 8.2 did not complete item 8.3.

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[1] Three teachers who completed this section did not indicate "yes" for item 8.0 to show that they had direct contact with the coordinator. The researcher did not alter the data.

Table 4.6

Characteristics of Direct Contact with the Program Coordinator in Year 2001 and in Previous Years

Questionnaire Item	Response Distribution[a]										95% C.I.[b]	
	0	1-4	5-8	9-12	13-16	17+	Mean	SD	N	Rank	Lower	Upper
YEAR 2001												
8.2) Indicate the number of times you have been in DIRECT contact with the Project WILD Coordinator during the past year (from October of last year to October of this year).												
All Respondents	29%	48%	10%	3%	1%	2%	2.77	4.79	300	2[cd]	2.23	3.32
PREVIOUS YEARS												
8.3) Is this number of contacts more, less, or the same as in previous years? (Number of contacts were determined by calculating number of contacts reported in item 8.2 x 0.50 for less; 8.2 x 1 for the same, and 8.2 x 1.5 for more).												
All Respondents	25%	49%	18%	4%	0%	3%	3.43	6.66	241	1[e]	2.59	4.28

[a] 0 = 0 contact; 1-4 = 1-4 contacts; 5-8 = 5-8 contacts; 9-12 = 9-12 contacts; 13-16 = 13-16 contacts; 17+ = 5 or more contacts.

[b] C.I. = Confidence interval.

[c] 1 = highest number of contacts; 2 = lowest number of contacts.

[d] Number of contacts ranged from 0-50.

[e] Number of contacts ranged from 0-75. Increases in the range of contacts were due to transformations of the data.

4.1.8 Follow Up

4.1.8.1 Formation of Items for Follow Up

The follow-up variable was developed because Huberman (1990) pointed to this factor as important in examining effects of sustained interactivity regarding use of an innovation. Two aspects of follow up were of interest to the researcher: the type and the amount of follow up generated by coordinators and by teachers. To examine these dimensions, two items were created as shown in Appendix D (see Part 7, page 4). The first (item 7.0) invited teachers to indicate the type of follow up that they received from the coordinator. A check-list of three options was offered in the questionnaire along with the provision to add more kinds of follow up received from the coordinator under the "Other" option. The second item (i.e., item 7.1) asked teachers to supply information about follow up that they initiated with the program coordinator. As with item 7.0, a check-list of three options was presented but respondents also had the option of supplying additional information about follow up that was not covered within the questionnaire. The types of follow up that were listed as prescribed options for both items were based on the results of the pilot study and on the researcher's knowledge about the innovation. In total, there were eight items associated with follow up. An analysis of responses associated with the type and the amount of follow up is presented below.

4.1.8.2 Type of Follow Up

Items 7.0 and 7.1 within the questionnaire reflected different kinds of follow up. In addition to examining how respondents responded to the items, however, the researcher was also interested in grouping these types of follow up with respect to the kind of dissemination function that they serve. For this purpose, she drew on Klein and Gwaltney's (1991) framework of dissemination functions to create categories for types of follow up. Looking at the items through the lense of their framework, items were categorized as serving the following types of functions (identified in square brackets):

7.0. My Project WILD Coordinator

a. Provided me with response to a request that I indicated in a workshop survey. [Spread]

b. Invited me to attend advanced Project WILD workshops or similar events because I indicated an interest. [Implementation]

c. Placed my name on a mailing list or a list serve to receive wildlife-related information. [Spread]

7.1. My Project WILD Coordinator

a. Provided updates for my records ... so I could be easily contacted. [Spread]

b. Shared my views about a wildlife-related topic. [Exchange]

c. Provided information on how to become more involved in the program. [Implementation]

Response patterns for item 7.0 (see page 4 in Part 7 in Appendix D) indicate that more than half of the study sample reported that their names were placed on a mailing list or a list serve by the coordinator to receive information associated with the content of the innovation. Almost half were sent invitations to attend advanced workshops because they indicated an interest (i.e., solicited information). About a quarter of the teachers reported that they received a response from the coordinator that they requested in a workshop survey form. A smaller percentage reported that they received other forms of follow up that were offered by the coordinator. Based on teachers' recollection of what kind of follow up they have received from coordinators, these data suggest that coordinators generate different types of follow up and the type of that follow up varies among the study sample. The data also suggest that follow up activities by coordinators tend to be associated with spread and implementation functions. That is, coordinators add teachers' names on mailing lists to supply them with information related to the content of the innovation (i.e., spread of information for awareness) and to invite them to participate in advanced training opportunities or events (i.e., participation in activities associated with implementation of the innovation).

Appendix D also displays descriptive statistics next to item 7.1, which asked about follow up received by the coordinator that was initiated by teachers. Almost a third of the teachers requested and received information on how to become more involved in the innovation. About a quarter took the initiative of providing coordinators with information to update their records so they could be easily contacted. Slightly less than a quarter shared views about a wildlife-related topic with the coordinator while fewer initiated other forms of follow up. These data suggest that teachers generate different types of follow up with the coordinator and the type of that follow up varies among the study sample. The data also suggest that the majority of teachers do not initiate any follow up. When they do, however, they are more likely to ask for information associated with implementation functions (i.e., about how to become more involved in the innovation) or provide information related to spread functions (i.e., supply updates for their records to ensure that they may be easily contacted).

4.1.8.3 Analysis of Follow Up under the "Other" Option

A content analysis was conducted of responses to the "Other" option for items 7.0 and 7.1. The researcher drew on Klein and Gwaltney's framework of dissemination functions to categorize information provided under the "Other" options. A record was made of each teachers' response and coded (see Appendix M). Table 4.7 summarizes responses identified under the "Other"options regarding coordinator-initiated and teacher-initiated follow up. Each table summarizes the content that teachers supplied. It shows the categories of dissemination functions to which the content relates under the heading "Type of Dissemination Function" and the proportion of teachers who identified a type of follow up that was associated with a particular kind of dissemination function. These proportions provide a break-down of how the respondents responded to items 7.0d and item 7.1d.

Table 4.7

Summary of Follow Up Under the "Other" Option Initiated by Program Coordinators and by Teachers

Summary of "Other" Follow Up	Type of Dissemination Function	% of Response
INITIATED BY PROGRAM COORDINATORS		
Sent Unrequested Information	SPREAD	25%
Provided Follow Up to Workshops	EXCHANGE	8%
Sent Invitations to Events	IMPLEMENTATION	22%
Asked for Assistance to Implement the Program	IMPLEMENTATION	33%
Invited Teacher to Participate in Other Projects	IMPLEMENTATION	12%
TOTAL		100%
INITIATED BY TEACHERS		
Supplied Specific Information Requested by Teacher	SPREAD	26%
Responded to Requests to Talk	EXCHANGE	12%
Provided Assistance with Use of PW Activities	IMPLEMENTATION	6%
Provided Assistance Associated with PW workshops	IMPLEMENTATION	27%
Participated at School /District Site	IMPLEMENTATION	15%
Other	NONE	14%
TOTAL		100%

As shown in Table 4.7, about two thirds of "Other" follow up initiated by coordinators was associated with implementation functions; a quarter related to spread (i.e., receiving newsletters) and less than 10% pertained to exchanges. A similar pattern emerged for teacher-initiated follow up: almost half of the follow up initiated by teachers corresponded with implementing the innovation, slightly more than a quarter was associated with spread and slightly more than 10% involved exchanges. These data suggest that "Other" follow up tends toward the deeper implementation functions.

4.1.9 Users' Perceptions of Sustained Interactivity

4.1.9.1 Formation of Items for Users' Perceptions of Sustained Interactivity

The focus of Part 9 of the questionnaire (see Appendix D, page 5) was to answer the following research question:

What are the users' perceptions of sustained interactivity?

The variable created to address this question (i.e., *users' perceptions of sustained interactivity*) is also part of the general sustained interactivity construct that was developed for this study.

The development of this variable drew on Huberman's (1990) emergent sustained interactivity model. As discussed in Chapter 2, interpersonal links between disseminators and users, spread over the life of an innovation, are at the core of the model as the key to use. These networks are ongoing contacts between users and disseminators. Figure 2.3 (see page 19) illustrates the outcomes of such linkage on the use of an innovation that were found by Huberman (1990). The model favours a constructivist approach by including social interactions as a part of it. Users are seen as active participants in reconstructing knowledge and may transform it but the direct, continued involvement of a skilled disseminator attenuates that effect. There are reciprocal effects: users learn the meaning of the innovation and may re-frame their vision of practice; disseminators/developers learn which parts of an innovation are meaningful to the user and may rethink their innovation. The researcher drew from Huberman's

sustained interactivity model to identify specific actions on the part of the disseminator of the innovation, and the users of it, that had the potential to contribute toward the reconstruction of the meaning of the innovation for the user. Table 4.8 displays a list of such actions and shows which items in Part 9 of the questionnaire were designed as indicators of specific actions, starting with item 9.0 through to items 9.8[2]. These actions start with interest generation by the coordinator (identified as the first effect of sustained interactivity in Huberman's model) through to involvement of the user of the innovation in future projects. Items associated with these actions were used to generate data about teachers' perceptions of sustained interactivity and are grounded on their experience of their interactions with the coordinator.

Part 9 of the questionnaire captured data along most, but not all, of the dimensions reflected in Huberman's model. The outcome "Appropriate climate for sharing" was omitted because such climates were identified in item 8.1. "Awareness of findings" (i.e., innovation) was omitted because the user would already be aware of the innovation. "Negotiation of local meaning" and "Contextualizing of findings" (i.e., of the innovation) were omitted because the coordinator would not typically enter users' workplaces regarding the innovation under study. "Micropolitical influences" was omitted because the study is not focusing on these influences although item 4.1 (i.e., My colleagues at my school support Project WILD.) may serve as an indicator of possible influences. "Strengthening inter-organizational ties" is covered under item 5.2 (i.e., I contact the government wildlife department because of Project WILD).

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[2] Item 9.9 was added to help teachers recall examples of programs in which they became involved because of their contact with the coordinator.

Table 4.8

Development of Items Based on Outcomes Arising from Huberman's (1990) Sustained Interactivity Model

Outcomes[1]	Associated Items
Interest Generation Disseminator generated Interest in the innovation.	9.0) My first contact with the Project WILD Coordinator increased my interest in Project WILD.
Time Commitment Amount of time spent with user from users' perspective.	9.1) Compared with other programs, the Project WILD Coordinator has spent a lot of time with me.
Relevance Coordinator helped user see relevance of innovation.	9.2) The Project WILD Coordinator helped me determine how Project WILD was relevant to my teaching.
Assimilation Coordinator helped user see how innovation fits with what the user is teaching.	9.3) The Project WILD Coordinator helped me determine how the program fits with what I teach.
Creating Meaning User learning the meaning of the program.	9.4) The Project WILD Coordinator added to my learning about topics covered in Project WILD.
Mutual Correction User was able to point out if innovation fits in his or her context.	9.5) I added to the Project WILD Coordinator's understanding about how Project WILD fits with what I teach.
Reciprocal Influences User changed her or his thinking because of exposure to the coordinator.	9.6) The Project WILD Coordinator has helped me gain a new understanding about wildlife-related topics. 9.7) My views about wildlife-related topics have changed as a result of this new understanding.
Involvement in Future Projects Extent to which involvement in innovation led to involvement in related programs.	9.8) My contact with the Project WILD Coordinator led to more become involvement in other wildlife/ environmental education programs. 9.9) An example of a related program is _____ (Please specify).

[1] The outcome "Appropriate climate for sharing" was omitted because such climates were already identified in item 8.1. "Awareness of findings (i.e., innovation)" was omitted because the user would already be aware of the innovation. "Negotiation of local meaning" and "Contextualizing of findings (i.e., of the innovation) were omitted because the Coordinator would not typically enter the user's workplace with respect to the innovation under study. "Micropolitical influences" was omitted because the study is not focusing on these influences although item 4.1 (i.e., My colleagues at my school support Project WILD.) may serve as an indicator of possible influences. "Strengthening inter-organizational ties" is covered under item 5.2 (i.e., I contact the government wildlife department because of Project WILD.)

4.1.9.2 Description of Response Patterns: Users' Perception of Sustained Interactivity

As shown in Appendix D (see Part 9, page 5), there were nine items created to capture data along the dimension of the *users' perception of sustained interactivity*. Teachers who indicated that they had direct contact with the coordinator in item 8.0 were invited to complete this section of the questionnaire. Of the 515 teachers in the sample, 297 were eligible to respond. A 4-point agree-disagree Likert-type scale was used to capture data.

Table 4.9 displays descriptive statistics for each of these items: Responses leaned, in general, toward the agreement end of the 4-point scale. Variability was reasonably stable across items. The three items with which respondents agreed the most were

9.0. My first contact with the Project WILD Coordinator increased my interest in Project WILD.

9.4. The Project WILD Coordinator added to my learning about topics covered in Project WILD.

9.6. The Project WILD Coordinator has helped me gain a new understanding about wildlife topics.

The three items with which respondents tended to disagree were

9.1) Compared with other programs, the Project WILD Coordinator has spent a lot of time with me.

9.5) I added to the Project WILD Coordinator's understanding about how Project WILD fits with what I teach.

9.7) My views about wildlife-related topics have changed as a result of this new understanding.

These data suggest that, in general, most teachers were positive and optimistic about their interactions with program coordinators–an encouraging finding. Most teachers tended to agree strongly that their first contact with the coordinator increased their interest in the innovation. Most agreed fairly strongly that such contact added to their learning about the innovation and generated new understandings about related topics. This finding suggests that such interactions may influence conceptual and process use, which will be examined in the next chapter. There was however some variability: About 10% disagreed. Teachers were in less agreement that coordinators spent more time with them as compared with other programs–an

Table 4.9

Characteristics of Users' Perceptions of Sustained Interactivity

Questionnaire Item	Response Distribution[a]								95% C.I.[b]	
	SD	D	A	SA	Mean	SD	N	Rank	Lower	Upper
9.0) My first contact with the Project WILD Coordinator increased my interest in Project WILD.	1%	9%	46%	45%	3.35	0.74	286	1[c]	3.27	3.42
9.1) Compared with other programs, the Project WILD Coordinator has spent a lot of time with me.	4%	31%	51%	15%	2.77	0.74	266	9	2.68	2.86
9.2) The Project WILD Coordinator helped me determine how Project WILD was relevant to my teaching.	3%	14%	61%	23%	3.03	0.69	276	4	2.94	3.11
9.3) The Project WILD Coordinator helped me determine how the program fits with what I teach.	2%	16%	64%	18%	2.97	0.65	271	5	2.89	3.05
9.4) The Project WILD Coordinator added to my learning about topics covered in Project WILD.	2%	8%	62%	28%	3.16	0.65	282	2	3.08	3.24
9.5) I added to the Project WILD Coordinator's understanding about how Project WILD fits with what I teach.	5%	22%	61%	13%	2.82	0.71	260	8	2.73	2.90
9.6) The Project WILD Coordinator has helped me gain a new understanding about wildlife topics.	2%	9%	64%	25%	3.12	0.64	283	3	3.05	3.20
9.7) My views about wildlife-related topics have changed as a result of this new understanding.	4%	26%	52%	19%	2.85	0.76	271	7	2.76	2.94
9.8) My contact with the Project WILD Coordinator led to more involvement in other wildlife/ environmental education programs.	4%	27%	45%	26%	2.90	0.81	272	6	2.80	3.00

[a] SD = Strongly Disagree (1); D = Disagree (2); A = Agree (3); SA = Strongly Agree (4).

[b] C.I. = Confidence interval.

[c] 1 = highest agreement; 9 = lowest agreement.

interesting finding that suggests that about a third of the teachers may have more contact with other similar coordinators. Teachers also tended to agree less that their contact with the coordinator led to changes in their views about wildlife-related topics as a result of their new understandings or that they added to the coordinator's understanding about how the innovation fits with what they teach. Chapter 8 will offer an opportunity to examine coordinators' views of teachers' influence on them.

Finally, Huberman's model suggests that sustained interactivity encourages disseminators and users to stay involved in future projects. Item 9.8 probed this dimension by asking teachers if contact with the coordinator led to involvement in other related programs. Almost two-thirds of the 272 teachers who completed this item agreed, where most identified, astonishingly, over 127 examples of different programs in which they participated as a result of such contact. This finding suggests strong support that sustained interactivity encourages lasting linkages that may carry on beyond the innovation.

4.1.10 Intensity of Sustained Interactivity

4.1.10.1 Formation of Items for Intensity of Sustained Interactivity

As shown in Appendix D (see Part 10, page 6), there were 10 items associated with the variable "Intensity of sustained interactivity". Respondents who indicated that they had direct contact with the coordinator in item 8.0 were invited to complete this section of the questionnaire. Of the total sample of 515, 297 were eligible to participate. A 4-point very important/not important Likert-type scale was used to capture data.

The development of this variable drew on Klein and Gwaltney's (1991) knowledge dissemination framework. As the reader may recall, Klein and Gwaltney (1991) cast dissemination as serving four functions: spread (i.e., one-way diffusion of information to increase awareness); choice (i.e., assisting users to compare alternative resources); exchange (i.e., interchange of information, materials or perspectives), and implementation (i.e., technical

assistance, training, and other forms of support to change attitudes or behaviour). Huberman (1994) pointed out that these functions form a continuum of a level of effort on the part of the dissemination. These four functions can be viewed as different levels of intensity of interactive contact between users and disseminators, where the least intense may be associated with a one-way flow of information through to implementation as being the most intense. With this notion in mind, the researcher used the ideas of spread, exchange and implementation as a basis for indicators of intensity, as follows:

- **No intensity** (i.e., spread) is defined as a one-way, passive contact to spread awareness (e.g., contact through a publication such as a newsletter or magazine). No level of intensity is associated with this form of contact because of the lack of interpersonal contact between the disseminator and user of the innovation.
- **Low intensity** (i.e., spread) is defined as a one-way, active contact to spread information (e.g., contacting the disseminating organization/program coordinator to request information, such as pamphlets).
- **Medium intensity** (i.e., exchange) is defined as an interactive contact, such as exchanging information or sharing of perspectives (e.g., social processing), where the contact is direct with the coordinator.
- **High intensity** (i.e., implementation) is defined as ongoing interactive contact where some form of action is evident (e.g., technical assistance was provided; participation in training has occurred; engagement and involvement in the innovation) because of interaction with the coordinator is evident.
- **Very high intensity** (i.e., implementation) is defined as an ongoing interactive exchange where the coordinator or the user has identified that some kind of change has

occurred because of their exchanges (e.g., a new understanding of topics covered by the innovation on the part of the user or changes in some aspect of the innovation because of a coordinator's insight into what a user needs).

Table 4.10 shows indicator items for each level of intensity, starting with low intensity (i.e., item 10.0a) through to a very high level of intensity (i.e., item 10.0j). Each item is framed as a benefit received by teachers that arose because of their contact with the coordinator. The list of items in Part 10.0 displays indicators of these benefits. The order in which they appear in the questionnaire reflects varying levels of intensity, as defined in the paragraph above, with the exception of item 10.0k. This item invited respondents to identify and indicate the importance of other benefits that they received as a result of their contact with the coordinator. Indicators of no intensity (e.g., receiving an unrequested newsletter) were omitted because of the lack of interpersonal contact between coordinators and users of the innovation. No assignment of a level of intensity was given to item 10.0k as responses to it may vary. Only respondents who indicated that they had direct contact with the coordinator were invited to rate the level of importance to them of each benefit that they received from the coordinator.

The general idea behind creating a set of 10 items that would range in varying levels of intensity was 1) to capture as much data as possible between low and very high levels of intensity and 2) to enable the researcher to arrive at an average measure of the amount of intensity for each respondent. The researcher's assumption was that a rating of higher importance of a particular benefit would indicate a more intense exchange with the program coordinator with respect to that benefit. Similarly, a lower rating of importance would be an indicator of a less intense exchange with a particular benefit. She assumed that creating a set of 10 items that spans a range of activities that represent low to very high levels of intensity increased her chances of capturing data along this spectrum. The ultimate goal was to have sufficient data to derive an average measure for intensity of sustained interactivity for each

Table 4.10

Level of Intensity and Dissemination Functions Associated with Items in Part 10.0 of the Questionnaire

Questionnaire Item		Level of Intensity	Dissemination Function
10.0) I would describe the importance of benefits that I have gained because of my contact with the Project WILD Coordinator as follows:			
a.	Helped me get information (e.g., to share with my students or other teachers or for myself).	Low	Spread
b.	Encouraged me to talk with the Coordinator and share my point of view about topics of interest (e.g., about an aspect of conservation or environmental education).	Medium	Exchange
c.	Led me to learn more about technical things, such as wildlife conservation.	Medium	Exchange
d.	Led me to share my professional knowledge about teaching with the Coordinator.	Medium	Exchange
e.	Led me to invite the Coordinator to help organize an event (e.g., field trip, conferences).	High	Implementation
f.	Led me to invite wildlife personnel to speak at my school.	High	Implementation
g.	Led me to gain more training (e.g., at advanced or Facilitator Project WILD workshops).	High	Implementation
h.	Encouraged me to make suggestions to enhance Project WILD (e.g., creating new materials to complement Project WILD activities).	High	Implementation
i.	Helped me gain a new understanding about topics covered in Project WILD.	Very High	Implementation
j.	Contributed to thinking about wildlife-related topics in a new way.	Very High	Implementation

respondent to situate him/her along a continuum of levels of intensity that would range from low to very high to an absence of sustained interactivity.

4.1.10.2 Description of Response Patterns: Intensity of Sustained Interactivity

Table 4.11 displays the descriptive statistics associated with intensity of sustained interactivity, with most responses leaning, on average, toward the important end of the 4-point scale of importance (i.e., greater than 2.5). In general, the amount of variability was high with standard deviations ranging from 0.80 to 1.06. The three items which were rated as more important were

10.0a) Helped me get information (e.g., to share with my students or other teachers or for myself).

10.0i) Helped me gain a new understanding about topics covered in Project WILD.

10.0h) Contributed to thinking about wildlife-related topics in a new way.

The three items that were rated as less important were

10.0d) Led me to share my professional knowledge about teaching with the Coordinator.

10.0b) Encouraged me to talk with the Coordinator and share my point of view about topics of interest (e.g., about an aspect of conservation or environmental education).

10.0e) Led me to invite the Coordinator to help organize an event (e.g., field trip, conferences).

These data suggest that the most important benefit of contact with the coordinator–receiving help to get information–is associated with the spread function and is located in the low intensity range (i.e., requiring the lowest amount of interactive activity). The next two most important benefits of contact have to do with learning–receiving help to gain new understanding about the innovation–and thinking about wildlife-related topics in a new way. This finding suggests that benefits that are particularly important to most teachers are associated with implementation functions and with higher levels of intensity (i.e., requiring more interactive activity to achieve the benefit). Responses, however, varied within these items.

Table 4.11

Characteristics of Intensity of Sustained Interactivity

Questionnaire Item	Response Distribution[a]								95% C.I.[b]	
	NI	SI	I	VI	Mean	SD	N	Rank	Lower	Upper
10.0) I would describe the importance of benefits that I have gained because of my contact with the Project WILD Coordinator as follows:										
a. Helped me get information (e.g., to share with my students or other teachers or for myself).	3%	18%	44%	35%	3.11	0.80	278	1[c]	3.11	3.02
b. Encouraged me to talk with the Coordinator and share my point of view about topics of interest (e.g., about an aspect of conservation or environmental education).	20%	32%	35%	13%	2.41	0.95	254	9	2.29	2.52
c. Led me to learn more about technical things, such as wildlife conservation.	9%	28%	47%	16%	2.71	0.84	272	5	2.61	2.81
d. Led me to share my professional knowledge about teaching with the Coordinator.	17%	37%	34%	13%	2.43	0.91	254	8	2.31	2.54
e. Led me to invite the Coordinator to help organize an event.	34%	27%	28%	11%	2.15	1.02	212	10	2.01	2.29
f. Led me to invite wildlife personnel to speak at my school.	18%	28%	38%	16%	2.51	0.97	234	6	2.38	2.63
g. Led me to gain more training (e.g., at advanced or Facilitator Project WILD workshops).	15%	17%	33%	35%	2.88	1.06	245	4	2.74	3.01
h. Encouraged me to make suggestions to enhance Project WILD (e.g., creating new materials to complement Project WILD activities).	21%	29%	34%	16%	2.46	0.99	249	7	2.33	2.58
i. Helped me gain a new understanding about topics covered in Project WILD.	7%	18%	52%	23%	2.91	0.83	268	2	2.81	3.01
j. Contributed to thinking about wildlife-related topics in a new way.	9%	20%	48%	23%	2.84	0.88	270	3	2.73	2.94

[a] NI = Not Important (1); SI = Somewhat Important (2); I = Important (3); VI = Very Important (4).

[b] C.I. = Confidence interval.

[c] 1 = highest importance; 10 = lowest importance.

While the mean rank of item 10.0g (Led me to gain more training) was third, the wide spread of responses within this item suggests strong differences in the importance of being more involved (through more training) in the innovation. For almost a third, more training tended to be less important but for over a third, it was very important.

The least important benefits of contact tended to be more medium intensity activities– sharing professional knowledge about teaching, sharing views about the innovation. The least important benefit of contact (i.e., inviting the coordinator to help organize an event) was a high intensity activity. This finding suggests that teachers (1) might not be generally inclined to share their expertise with coordinators, or (2) they might not be asked by coordinators to share their expertise, or (3) they might place more importance on being reactive recipients of benefits provided by coordinators as opposed to being proactive participants in sharing their expertise about the innovation. Further, an activity such as inviting a coordinator to help organize an event might not be especially relevant. The data showed that 13% (not shown in the table) of the teachers indicated that such activity did not apply to them. Response distributions, however, did vary somewhat within these items, especially with respect to item 10.0e with a standard deviation of 1.06. While the majority rated its importance as either somewhat or not important, over a third identified it as important or very important.

The next segment of the analysis investigates other benefits that were identified by respondents but were not included in the set of 10 benefits created by the researcher. The interest was to determine if her list was an adequate representation of benefits.

4.1.10.3 Analysis of "Other" Benefits

Teachers were invited to identify and rate the importance of other benefits that they received from their contacts with coordinators. Seventeen teachers provided 12 examples of benefits that were not covered in the original list of options in Part 10.0 of the questionnaire. Examples of benefits were: "friendship"; " Coordinator provided networking opportunities";

"Led me to become a better teacher. I learned better teaching methods"; "Helped me make connections between wildlife topics and other content areas"; "Understanding of state wildlife laws and regulations"; "Personal touch with each facilitator makes us want to share Project WILD with others"; "His enthusiasm"; "Gave me self confidence with the subject matter"; "Helped me renew my dedication to environmental education"; "Funding for projects"; "Helped me set up workshops"and supplying educational videos/newsletters/support materials. In all cases, benefits that were added under the "Other benefits" options were described as very important to the respondents. Overall, the findings suggest that the researcher's list of 10 benefits, while adequate for the purpose for which it was intended, was not exhaustive.

Item 10.1 within Part 10 of the questionnaire (see Appendix D, page 6) invited teachers to identify the most important aspects of their contact with the coordinator. An analysis of data from this section is located in Chapter 8 as it was used to draw comparisons between teachers' and coordinators' perceptions of sustained interactivity.

4.2 Scale Variable Construction and Description

The objective of this section of the thesis is to provide the reader with a description of how scale variables that form the sustained interactivity construct were constructed and how the scale variable for sustained interactivity was formed. The reason why one scale variable for sustained interactivity was established was so that one measure could represent sustained interactivity and be used as the predictor (i.e., independent) variable for the subsequent regression analysis. This section discusses the procedures that were undertaken to meet that objective. It starts by outlining how the variables that form the sustained interactivity were constructed, and then it proceeds to discuss how the data were reduced to create a measure for sustained interactivity.

As the reader may recall, the sustained interactivity construct in this study is defined as consisting of nine variables: *Social Processing, Engagement/Involvement, Type of Indirect*

Contact, Ongoing Indirect Contact, Type of Direct Contact and Ongoing Direct Contact, Users' Perception of Sustained Interactivity, Intensity of Sustained Interactivity and *Follow Up.* Each variable is a construct that was identified in the conceptual framework that was developed by the researcher to guide this study. As was described in the preceding descriptive section of this chapter, items were created for each of these constructs for data collection purposes. In most cases, more than one item was created for each construct. The challenge, therefore, was to reduce the data into meaningful constructs–that is, scale variables–in a form where one may readily interpret their meaning. Table 4.12 is the result of meeting that challenge. What follows below is a description of the procedure that was used to carry out this task and how the researcher created these scale variables.

4.2.1 General Description of Procedure Used to Create Scale Variables

First, as shown in Table 4.12, root items for each construct were grouped under the particular constructs with which they were associated. The numbers next to the items refer to their number in the questionnaire. Second, a mean score for all items associated with a particular construct was determined by summing the scores and dividing the sum by the number of items. This procedure created a scale variable for the construct on the same metric as the original items (e.g., if the original scale was 1 to 5, the construct's values were based on a scale of 1 to 5). In order to maximize the number of valid cases, strict listwise deletion of missing cases was slightly relaxed. That is, in order to be included, respondents had to have provided a valid response to a minimum of 75% to 80% of the variables in the list. In cases where complete data were not available, the calculation of the mean was based only on the items for which valid data was provided. For each scale variable, Cronbach's alpha was calculated as a measure of internal consistency. In some cases, a single item was removed from the calculation of the scale variable if doing so improved the reliability substantially.

Table 4.12

Scale Variable Construction: Sustained Interactivity

Variable Name and Description	Scale	Mean[1]	SD	N	Alpha
Sustained Interactivity consists of a set of 9 variables as presented below:					
1) **Social Processing**[2] (Mean of 4 items on a 5-point Likert from always (5) to never (1) scale. • 4.5) Project WILD stimulates much discussion among colleagues at my school. • 4.6) Discussions about Project WILD have made my colleagues and I reconsider how we think about things (e.g., how we teach about wildlife). • 4.7) Discussions among my colleagues about Project WILD lead to decisions to make changes (e.g., how we teach about wildlife, what we think about the environment).	1-5	2.11	0.86	470	.91
2) **Engagement/Involvement** (Mean of 5 items on a 5-point Likert always (5) to never (1) scale. • 5.0) I try out new activities because of information provided by the Project WILD Coordinator. • 5.1) I present Project WILD at my school site (e.g., at meetings). • 5.2) I contact the government wildlife department because of Project WILD. • 5.3) I share ideas about Project WILD with the Project WILD Coordinator. • 5.4) I help host Project WILD workshops at my school.	1-5	1.93	0.78	481	.81

(continued)

[1] Statistics were rounded off to second decimal point.

[2] Item 4.0 was dropped following a reliability analysis which suggested that reliability of the *social processing* would improve if it were deleted.

Table 4.12

Scale Variable Construction: Sustained Interactivity (con't)

Variable Name and Description	Scale	Mean	SD	N	Alpha
3) **Intensity of Indirect Contact:** (Mean of 3 items on a 5-point Likert from always (5) to never (1) scale.) 6.0) Since taking the Introductory Project WILD Workshop, indicate how often you have • a. Received a regular publication, such as a Project WILD newsletter, wildlife magazine. • b. Visited a Project WILD web site (or a related web site). • c. Contacted the Project WILD office for information.	1-5	2.39	0.98	499	.70
4) **Ongoing Indirect Contact:** (Number of contacts on a 6-point scale from 0-5 from no contact (0) to 5 or more contacts (5).	0-5	2.09	1.89	502	n.a.[3]
5) **Intensity of Direct Contact:** (Mean of 6 items on a 5-point Likert from always (5) to never (1) scale.) 8.1) Indicate how often you have had **DIRECT** contacts with the Project WILD Coordinator: • a. Direct contact through the telephone. • b. Direct contact through the e-mail • c. Direct contact through regular mail or fax • d. Direct contact at face-to-face meetings. • e. Direct contact at Project WILD-related activities (e.g., curriculum development projects). • f. Direct contact at conferences or workshops (e.g., advanced Project WILD workshops).	1-5	2.54	0.76	274	.80
6) **Ongoing Direct Contact:** (Number of contacts on a 6-point 0-5 scale from no contact (0) to 5 or more contacts (5).	0-5	2.01	1.79	300	n.a.

(continued)

[3] n.a. = Not applicable.

Table 4.12

Scale Variable Construction: Sustained Interactivity (con't)

Variable Name and Description	Scale	Mean	SD	N	Alpha
7) **Users' Perception of Sustained Interactivity** (Mean of 9 items on a 4-point Likert strongly agree (4)/ strongly disagree (1) scale. • 9.0) My first contact with the Project WILD Coordinator increased my interest in Project WILD. • 9.1) Compared with other programs, the Project WILD Coordinator has spent a lot of time with me. • 9.2) The Project WILD Coordinator helped me determine how Project WILD was relevant to my teaching. • 9.3) The Project WILD Coordinator helped me determine how the program fits with what I teach. • 9.4) The Project WILD Coordinator added to my learning about topics covered in Project WILD. • 9.5) I added to the Project WILD Coordinator's understanding about how Project WILD fits with what I teach. • 9.6) The Project WILD Coordinator has helped me gain a new understanding about wildlife topics. • 9.7) My views about wildlife-related topics have changed as a result of this new understanding. • 9.8) My contact with the Project WILD Coordinator led to more involvement in other wildlife/environmental education programs.	1-4	3.00	0.52	251	.90

(continued)

Table 4.12

Scale Variable Construction: Sustained Interactivity (con't)

Variable Name and Description	Scale	Mean	SD	N	Alpha
8) **User Benefits of Sustained Interactivity**[4] (Composite of 9 items on a 4-point Likert very important (4)/not important (1) scale.) 10.0) I would describe the importance of benefits that I have gained because of my contact with the Project WILD Coordinator as follows: • a. Helped me get information (e.g., to share with my students or other teachers or for myself). • b. Encouraged me to talk with the Coordinator and share my point of view about topics of interest (e.g., about an aspect of conservation or environmental education). • c. Led me to learn more about technical things, such as wildlife conservation. • d. Led me to share my professional knowledge about teaching with the Coordinator. • f. Led me to invite wildlife personnel to speak at my school. • g. Led me to gain more training (e.g., at advanced or Facilitator Project WILD workshops). • h. Encouraged me to make suggestions to enhance Project WILD (e.g., creating new materials to complement Project WILD activities). • i. Helped me gain a new understanding about topics covered in Project WILD. • j. Contributed to thinking about wildlife-related topics in a new way.	1-4	2.71	0.67	238	.89

(continued)

[4] Item 10.0e was dropped following a reliability analysis, which suggested that the reliability of *Intensity of Sustained Interactivity* scale would be improved if it were deleted.

Table 4.12

Scale Variable Construction: Sustained Interactivity (con't)

Variable Name and Description	Scale	Mean	SD	N	Alpha
9) **Follow Up** (Sum of contacts of 2 items on a 7-point 0 to 6 scale from no follow up (0) to high follow up (6). Items are presented below.)	0-6	2.06	1.83	515	n.a.
7.0) Since taking the Introductory Project WILD Workshop, indicate any kind of follow-up that you have received, if any, from the Project WILD Coordinator in your state, province or territory. My Project WILD Coordinator • a. Provided me with response to a request that I indicated in a workshop survey. • b. Invited me to attend advanced Project WILD workshops or similar events because I indicated an interest. • c. Placed my name on a mailing list or a list serve to receive wildlife-related information.					
7.1) Since the Introductory Project WILD Workshop, indicate any kind of follow-up, if any, that you have initiated with the Project WILD Coordinator in your state, province or territory. My Project WILD Coordinator • a. Provided updates for my records (e.g., change of address/ e-mail) so I could be easily contacted. • b. Shared my views about a wildlife-related topic. • c. Provided information on how to become more involved in the program.					
Number of coordinator-initiated contacts on a 4-point 0-3 scale from no follow up (0) to high follow up (3).	0-3	1.33	1.08	515	n.a.
Number of teacher-initiated contacts on a 0-3 scale from no follow up (0) to high follow up (3).	0-3	0.73	0.97	515	n.a.

(continued)

Table 4.12

Scale Variable Construction: Sustained Interactivity (con't)

Variable Name and Description	Scale	Mean	SD	N	Alpha
10) **Sustained Interactivity** (Mean of 9 constructs on a probability scale of 0 to 1. Constructs are presented below.)	0-1	0.49	0.17	190	.85

- Social processing.
- Engagement/Involvement.
- Intensity of indirect contact.
- Ongoing indirect contact during past year.
- Intensity of direct contact.
- Ongoing direct contact during past year.
- Users' perceptions of sustained interactivity.
- Benefits of sustained interactivity.
- Follow up.

4.2.2 Descriptions of Construction of Scale Variables for Individual Constructs

The section begins with a detailed description of how scale variables were formed for each of the nine variables that constitute the *sustained interactivity* construct. It concludes by showing how these variables were calculated to result in a generic measure for sustained interactivity. As mentioned on page 118, Table 4.12 displays a list of the root items for each construct along with the descriptive statistics of the scale variable. Each item is cross referenced to the questionnaire.

4.2.2.1 Scale Variable: Social Processing

As displayed in Table 4.12, the predictor variable, *Social Processing*, was constructed by averaging responses to three items on a 5-point frequency scale. Item 4.0 was dropped as the reliability analysis revealed reliability would improve with its deletion. This scale variable represented the intensity of teachers' discussion about the innovation among their colleagues within their school settings. The reliability of the social processing scale was very high, but the mean score reveals that respondents were not very active in talking about the innovation at their schools. A reasonable amount of variation was noted, however. As complete data were not available for this variable, strict listwise deletion of data was relaxed.

4.2.2.2 Scale Variable: Engagement/Involvement

Engagement/involvement with the innovation was constructed by averaging responses to five items, all rated on a 5-point frequency scale. This scale variable represents the intensity of engagement or involvement in the innovation. The reliability of the engagement/involvement scale is very high, but the mean score reveals that respondents were generally not very engaged or involved in the innovation but there was a reasonable amount of variation. As complete data were not available for this variable, strict listwise deletion of data was relaxed.

4.2.2.3 Scale Variable: Intensity of Indirect Contact

The *intensity of indirect contact* was constructed by averaging responses to three items that referred to three examples of types of indirect contact that respondents would generally make with the innovation, all rated on a 5-point frequency scale. The reliability of the indirect contact scale was within an acceptable range of 0.70 for research purposes. The mean score reveals that respondents were not very active in making different types of indirect contacts with the innovation but there was considerable variation.

4.2.2.4 Scale Variable: Ongoing Indirect Contact

Table 4.12 shows a measure for *ongoing indirect contact* with the innovation: pertaining to ongoing indirect contacts that respondents reported over the past school year (i.e., year 2000 to year 2001). The 6-point scale for indirect contacts was created by re-coding raw score values that ranged from 0 to 56 contacts to form a Likert-type of frequency scale that ranged from no contact (0) to 5 or more contacts (5). The mean score of 2.09 reveals that the average number of contacts tends toward the lower end of the scale and were about two indirect contacts over the past school year. There was, however, considerable variability.

4.2.2.5 Scale Variable: Intensity of Direct Contact

The *intensity of direct contact* was constructed by averaging responses to six types of direct contact with the program coordinator, all rated on a 5-point frequency scale. This scale variable represented 6 examples of types of direct contacts that respondents were assumed to make with the innovation. The reliability of indirect contact was high. The mean score reveals that respondents were fairly active in making different types of direct contacts with the coordinator but there was some variation. As complete data were not available for this variable, strict listwise deletion of data was relaxed.

4.2.2.6 Scale Variable: Ongoing Direct Contact

The 6-point scale for direct contacts during the past school year was created by re-coding raw score values that ranged from 0 to 50 contacts to form a Likert-type of frequency scale that ranged from no contact (0) to 5 or more contacts (5). The average mean score of 2.01 reveals that ongoing indirect contact tends toward the low end of the scale and that respondents generally had about 2 direct contacts over the past school year. There was considerable variability.

4.2.2.7 Scale Variable: Users' Perception of Sustained Interactivity

The *Users' Perception of Sustained Interactivity* was constructed by averaging responses to 9 items in the questionnaire, all rated on a 4-point agree/disagree Likert-type of scale. This scale variable represented how teachers perceived their exchanges (i.e., contacts) with the program coordinator. As the reader may recall, items for this scale were developed based on Huberman's (1990) sustained interactivity model. Only teachers who had direct contact with the coordinator were invited to complete these items. The reliability of the users' perception of sustained interactivity scale is very high. The mean score of 3.00 along a scale of 1 to 4 reveals that respondents' perceptions of their exchanges with program coordinators were quite positive, with a low amount of variation with a standard deviation at 0.52. As complete data were not available for this variable, strict listwise deletion of data was relaxed.

4.2.2.8 Scale Variable: Benefits of Sustained Interactivity

The *Benefits of Sustained Interactivity* variable was constructed by averaging responses to 9 out the10 data items that were originally developed for this construct. All items were rated on a 4-point Likert-type of not important/ very important scale. A reliability analysis conducted for this set of items revealed that reliability would be improved if item 10.0e were deleted (i.e., item 10.0e: Led me to invite the Coordinator to help organize an event). As complete data were not available for this variable, strict listwise deletion of data was relaxed.

This scale variable represented the user benefits of respondents' exchanges with program coordinators by asking respondents to assess the importance of benefits, if any, that they received because of their contact coordinators. The researcher's underlying assumption was that a rating of higher importance of a particular benefit would be an indicator of a more intense exchange with respect to that benefit. Similarly, a lower rating would be an indicator of a less intense exchange associated with a particular benefit. Only teachers who had direct contact with the coordinator were invited to complete these items.

The reliability of the benefits of sustained interactivity scale is very high. The mean score of 2.71 along a 4-point scale reveals that respondents' generally rated the benefits of their exchanges with coordinators as fairly important and hence fairly intense, but some variation was noted.

4.2.2.9 Scale Variable: Follow Up

A 7-point scale was created by summing the number of *follow up* events reported in two items and then re-coding the data to form a Likert-type of frequency scale that ranged from no follow up (0) to high follow up (6). This scale variable represented the amount of follow up between coordinators and teachers. The mean score suggests that follow up between teachers and coordinators tends to be quite low. There is, however, considerable variation.

The two items that were summed to create the *follow up* variable were also scaled separately to represent teachers' perceptions of coordinator-initiated follow up and the amount of teacher-initiated follow up with coordinators. In each case, a 4-point scale was created by summing the number of follow up events reported and then re-coded to form Likert-type of frequency scales that ranged from no follow up (0) to high follow up (3). The mean score of 1.33 along the 4-point scale for coordinator-initiated follow up is higher than that of 0.73 for teachers but there is a fair amount of variation, with standard deviations at 1.08 for teachers' perceptions of coordinator-initiated follow up and 0.97 for that relating to teachers.

4.2.2.10 Scale Variable: Sustained Interactivity Composite

As the reader may recall, the *sustained interactivity* construct in this study is defined as consisting of nine scale variables: *social processing, engagement/involvement, type of indirect contact, ongoing indirect contact, type of direct contact, ongoing direct contact, users' perception of sustained interactivity, intensity of sustained interactivity* and *follow up*. The intent was to use them to form a composite variable to represent *sustained interactivity*.

Sustained interactivity was created by averaging measures for each of the nine scale variables after converting each to a probability metric (i.e., variables were added together and then divided by nine). This procedure retained the integrity of original scales but enabled the creation of a scale variable for the sustained interactivity construct. A reliability analysis was conducted; Cronbach's alpha was at 0.85. This result suggested that the combination of measures from the constructs is a reliable measure. Strict listwise deletion was used in creating this scale variable. This decision had a significant effect in reducing the number of cases included in the measure.

4.3 Conclusions about Characteristics of Sustained Interactivity

This chapter partially addressed the question: *What are the characteristics of sustained interactivity with respect to a well-developed program innovation?* This segment presents conclusions about characteristics of sustained interactivity that surfaced, given the data from analyses at the item and at the scale variable levels. Table 4.13 (see Appendix N) summaries these characteristics for the reader's convenience.

The general picture that emerged for the researcher, given the data, is a sample of 515 teachers that varies fairly widely along most dimensions of sustained interactivity that were considered in this study. Nonetheless, general patterns emerged. Conclusions about overall patterns will be discussed first, followed by specific patterns associated with each of the variables for sustained interactivity that were examined in this study.

1. Indicators of sustained interactivity tend to be higher and more positive for teachers in contact with the coordinator than for the general sample. Data associated with variables that included all sample members tended toward the lower ends of scales (i.e., *social processing, engagement/ involvement, intensity of indirect contact* and *ongoing contact*, and *follow up*). In contrast, data associated with variables that considered only teachers who were in direct contact with the coordinator tended toward the higher ends of scales (i.e., *intensity of direct contact, users' perceptions of sustained interactivity* and *benefits of sustained interactivity*) except for ongoing direct contact. The directions of these patterns suggest that sustained interactivity is higher among teachers in contact with coordinators–an encouraging finding since it was expected.

2. Social processing among teachers about well-developed innovation is fairly low. While the innovation does not generate much collective discussion, individual teachers enjoy talking about it with colleagues at their schools. This finding suggests that teachers who have attended a workshop about the innovation may play an important role in spreading information about it among colleagues. When collective discussion does occur, albeit infrequently, it appears to inspire deeper levels of discussion that seem to influence how teachers think about things and their decisions to make changes (from respondents' perspectives). About a third of the teachers indicated that deep levels of social processing stimulated changes. (These reported changes will be examined in Chapter 5.) This characteristic suggests that there may be a presence of organizational learning conditions among a small segment of the sample. It is not known, however, if other teachers who engaged in such discussions in particular school settings also participated in a workshop about the innovation or shared similar views with respondents.

3. Engagement and involvement in well-developed innovation is low. Although engagement and involvement is low, one pattern among the types of activities selected in this study stands out: *individual* teachers tend to be more involved in implementing it by trying out *new*, related

activities from the coordinator. This finding surfaces again a pattern of individual effort. It also suggests that sending new materials prompts more involvement. A small segment of teachers also presents the innovation at events like meetings, with a tinier one hosting workshops at schools, suggesting that a very small, but very highly involved, sliver of teachers are delivering the innovation. The researcher wondered if this finding might be an influence of facilitators. While slightly more teachers take time to contact wildlife agencies about the innovation, most do not share ideas with the coordinator. This finding suggests that teachers may generally have no reason to discuss things with a coordinator, or be invited to do so, or their inquiries might be handled by others.

4. Intensity of indirect contact with the innovation tends to be somewhat low. Indirect contact through mailed publications is somewhat frequent (but it is not known if teachers read them). Contacts that require taking an initiative, like visiting web sites or contacting the innovation office, are fairly low but teachers might not need to seek actively indirect contact with the innovation (perhaps because many receive publications) or they might not have electronic access to it.

5. Amount of follow up between teachers and coordinators is very low. Type of follow up is associated mostly with spread and implementation functions. Coordinators generate more follow up than teachers. Given that coordinators administer the innovation, a higher rate of follow up from them than with teachers was expected. What is interesting is that the type of follow up tended to be the same: that is, teachers usually asked for (or were sent unrequested) information about the innovation or they requested for (or were invited to engage in) more involvement in it.

6. Ongoing indirect with the innovation occurs among the *majority* of teachers but the average rate is low and is decreasing. Contact varies widely, with an average of about *two* a year.

7. Ongoing direct contact with coordinators also occurs among the *majority* of teachers in such contact. The average rate is low and is also decreasing. Direct contact varies widely. The average is *two* a year. Average rates of direct and indirect contacts are the same–suggesting that two contacts might be typically expected–and both are decreasing. Reasons for the decline are unknown and require more research. Proportionately more teachers maintain contact with coordinators than with the innovation, which suggests that interpersonal contact might be more lasting.

8. Intensity of direct contact with the coordinator is moderate. Teachers in contact with coordinators have such contact somewhat frequently in a variety of ways. This finding suggests the presence of many mechanisms for direct contact but the strategy that promotes the highest frequency of such contact is at venues such as workshops and conferences, followed by contact through regular mail or faxes. These findings suggest that teachers who attend workshops or conferences in the first place may be more likely to have direct contact with the innovation. E-mail is the least frequent mode of direct contact, which suggests that teachers might be reluctant to use it or not have access to it or that coordinators might not tend to communicate through it.

9. Exchanges (sustained interactivity) between coordinators and teachers tend to be viewed with optimism. The finding that most teachers perceived their exchanges with coordinators as generally positive and rewarding is encouraging. The finding of fairly strong agreement that coordinators stimulated teachers' interest in the innovation, contributed to their learning about it and generated new understandings, suggests possible implications for conceptual use of the innovation. Agreement that interactions enhanced an understanding of how the innovation was relevant to what was being taught suggests possible consequences for its use in practice. Although teachers agreed less that interactions changed their views about topics covered in the innovation, what their views were (i.e., the same or different) is unknown. This aspect requires more research as it is beyond this study. Teachers agreed less that they add to coordinators'

understanding about the fit of the innovation to what is taught (this element is explored further in Chapter 8). Teachers agreed least that coordinators spent more time with them compared with other programs–thus some may interact more in other programs. Interactions tended to lead to involvement in other programs, suggesting that sustained interactivity encourages lasting ties.

10. Interactions between teachers and coordinators regarding the well-developed innovation are fairly intense and the benefits of exchanges are generally perceived as fairly important. The most important benefit of interaction gained by teachers is associated with the least amount of intensity for coordinators (i.e., receiving help to get information related to the innovation). This finding suggests that interactions that supply teachers with information may have important implications for enhancing use of the innovation (assuming that such information is used). More broadly, it may indicate that interactions that provide teachers with what they want may be important. The next two most important benefits of interaction were associated with implementing the innovation and require high to very high intensity efforts on the coordinators part: that is, interactions with the coordinator helped teachers gain new understandings about the innovation and contributed to thinking about wildlife-related topics in a new way. The importance of these findings re-confirms findings from Part 9 in the questionnaire, namely that interactions with coordinators may contribute to teachers' learning about the innovation. This finding suggests implications for conceptual use of the innovation by teachers. Indeed, the pattern of "learning" emerging as a consequence of interactions with coordinators for teachers is interesting. It suggests that coordinators play an educative role by enhancing teachers' learning–"teaching" teachers about the innovation–which is acknowledged as important by teachers.

4.4 Relationship among Scale Variables

This final segment of Chapter 3 presents the relationship among scale variables. Table 4.14 shows zero-order intercorrelations among the scale variables. A bivariate analysis was selected to generate a Pearson product-moment intercorrelation matrix to determine the strengths of association among the scale variables. A one-tailed test was selected as correlations were expected to be positive. The researcher drew on Shavelson (1988) as a guide to judge the magnitude of a correlation coefficient (i.e., a measure of the strength of associations between two variables). He suggested that the magnitude of the correlation coefficient was high at .80 or above; moderate at .40 to .60, and low at .30 or below.

As reflected on Table 4.14, correlation coefficients were positive and significant, ranging in magnitude from .22 to .71, that is from low to moderately high. The moderate size of most correlations suggests that the scale variables are measuring different constructs and assumptions about multicolinearity[5] will not be violated for the ensuing hierarchical linear regression analysis.

The sustained interactivity scale variable was included in the analysis to examine its relationship with the components that formed this composite variable. Correlations between it and its components were positive and significant, ranging in size from .48 to .80, and were

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[5] Multicolinearity refers to the absence of orthogonality in a set of independent variables (Farrar & Glauber, 1967, p.100, cited in Pedhazur, 1982, p. 233). "Orthogonality means at right angles (90°). When two variables are orthogonal, they are independent of each other... Multicollinearity is absent when a matrix of variables is orthogonal" (Pedhazur, 1982, p. 233). Mulicolinearity is often defined in terms of high intercorrelations among predictors (e.g., Abrami, Cholmsky & Gordon, 2001; Shavelson,1988; Stevens, 1986). Instances of high multicolinearity pose a threat to the interpretation of regression coefficients as indices of effects. This condition may lead to distortions in estimations of the magnitudes of regression coefficients and reversals of their signs (Pedhazur, 1982). What constitutes high multicolinearity was an issue for the researcher. Pedhazur (1982) suggested that the severity of it in a correlation matrix is a judgement. After noting that Pedhazur (1982) referred to a correlation of .85 as being "high" (p. 237), the researcher opted to use Shavelson's (1988) suggested levels of the magnitude of a correlation coefficient as being in the high range when correlations were .80 or higher.

Table 4.14

Zero-order Intercoorelations among Predictor Variables (Pairwise deletion of missing data, N = 190 - 515)

	1	2	3	4	5	6	7	8	9	10
PREDICTOR VARIABLES										
1. Social Processing	–									
2. Engagement/Involvement	.47***	–								
3. Intensity of Indirect Contact	.35***	.64***	–							
4. Intensity of Direct Contact	.31***	.66***	.54***	–						
5. Ongoing Indirect	.24***	.48***	.69***	.44***	–					
6. Ongoing Direct	.22***	.46***	.46***	.58***	.58***	–				
7. Perceptions of S.I.	.42***	.39***	.36***	.49***	.25***	.34***	–			
8. Intensity/Benefits of S.I.	.35***	.48***	.40***	.55***	.25***	.36***	.71***	–		
9. Follow Up	.28***	.62***	.69***	.52***	.52***	.32***	.31***	.41***	–	
10. Sustained Interactivity	.48***	.75***	.75***	.80***	.67***	.75***	.62***	.68***	.71***	--

Note. S.I. = Sustained Interactivity; * = * $p < .05$; ** $p < .01$; *** $p < .001$.

generally moderately high, as expected. The highest size of the correlation was between sustained interactivity and the intensity of direct contact, as expected.

Table 4.14 reveals also the strength of interrelationships among the predictor variables. The strongest correlation was between intensity of sustained interactivity and users' perceptions of sustained interactivity (moderately high). Correlations were also moderately high between follow up and intensity of indirect contact, and intensity of indirect contact and ongoing indirect contact. The weakest correlation was between social processing and ongoing direct contact, followed by social processing and ongoing indirect contact. Correlations between the intensity of sustained interactivity and ongoing indirect contact, and users' perceptions of sustained interactivity and ongoing indirect contact were also weak.

4.5 Summary

Generally, there was a reasonable amount of variation within the sample along all the dimensions that comprise the sustained interactivity scale variable. This finding is encouraging for the ensuing regression analysis as the researcher is seeking to examine use of the innovation under varying conditions of sustained interactivity among users and disseminators of the innovation. Relaxing strict listwise deletion of data slightly, however, will limit results. Scale variables were found to be positive and significant and to be measuring different constructs.

This chapter sought partial answers to the first main research question–*What are the characteristics of sustained interactivity with respect to a well-developed program innovation?* It also found answers for one of the second set of questions presented in Chapter 2: *What are the users' perceptions of sustained interactivity?* Two dominant but contrasting characteristics emerged about well-developed innovation during its implementation phase. First, social processing, engagement/ involvement, follow up and the intensity of indirect contact tend to be low as are ongoing direct and indirect contacts, which are also decreasing. Second, the intensity of direct contact and of sustained interactivity tends to be high, benefits of exchanges are

generally seen as important and users' perception of sustained interactivity are fairly positive and optimistic. These overall patterns are encouraging as they suggest that sustained interactivity is higher among teachers who have contact with coordinators. Given that prior research suggests that all factors considered in this study contribute to enhanced use of innovation and given that their levels were found to be a mix that ranges from low to fairly high prompts the question of what the implications of this mix might be for utilization. The next chapter, Chapter 5, further explores this dimension.

The finding that teachers may typically have two direct and two indirect contacts with the innovation provides an important benchmark to judge future trends of contact. The fairly low level of social processing and engagement and involvement was disappointing as it suggests that well-developed innovation does not stimulate much collective discussion or promotion of it in schools during its implementation phase. The rates of decreasing contact may be indicators of lesser interest. On the other hand, teachers' positive reception of their interactions with coordinators and their ratings of the importance of the benefits arising from their interactions are exciting findings. They suggest that these types of linkages are rewarding for teachers–they seem to be receiving considerable benefits through their interactions with coordinators. Whether these interactions contribute toward enhancing use will be examined in Chapter 7 of this study.

CHAPTER 5

Characteristics of Use of the Innovation

The reader will recall that the two main research questions of this study were:

Does program use vary as a function of the degree of sustained interactivity?

Does process use vary as a function of the degree of sustained interactivity?

To find partial answers to these questions, descriptive analyses were undertaken of teachers' response patterns to measures of *use* in this study.

As discussed earlier, this study investigates *use* from two perspectives. Within the conceptual framework (see Figure 2.5 on page 42) that is guiding this study, the variables associated with use are located under the heading of "Use". The first perspective is *use of the program innovation*. It refers to the two conventional constructs of use that are cast in the framework as a continuum. Instrumental use is located at one end; conceptual use (i.e., educative use, being enlightened, learning) is at the other. The notion of no use is implied as being the absence of use (not reflected in the framework). Instrumental use is the decision to use the innovation; the construct called *level of implementation* is regarded as a special case of it. Level of implementation is defined as putting the innovation into practice in terms of adopting the innovation, implementing it, stabilizing its use and then institutionalizing it by building it into the school organization. The second perspective *process use*. It relates to how users are affected by virtue of their participation in, or proximity to, the innovation. As will be shown in the ensuing descriptions, the basis for the formulation of items for the *use of the program innovation* and *process use* constructs were derived from prior research.

The first of the four parts of this chapter will explain how the variables associated with use were operationalized, and how items for them were developed to justify the approach the approach that the researcher took to create them. The first part will also analyze teachers' response patterns at the item level. Response patterns by item appear in Appendix D. Then, in

the second segment of the chapter, response patterns will be analyzed further at the scale variable level after having reduced the data set by using variable construction techniques. The third section presents conclusions about characteristics that emerged through these analyses. The fourth and final section shows the intercorrelations among the variables that form the use constructs.

5.1 Description of Response Patterns

The focus is this first segment is on describing response patterns at the item level for each variable associated with *use*. It also describes item formulations.

5.1.1 Use of the Program Innovation: Level of Program Use

As was mentioned in the introduction to this chapter, *use of the program innovation* refers to the continuum of use where instrumental use is at one end and conceptual use is at the other. A variable was created to enable a clear understanding as to where respondents were situated along this continuum with respect to their current use of the program innovation. The variable is called *level of program use*. This segment of the chapter discusses how this variable was operationalized, followed by a description of response patterns at the item level.

5.1.1.1 Formation of Item for Level of Program Use

Item 1.0 within the questionnaire (see Appendix D, Part 1 on page 1) was adapted from Cousins and Leithwood's (1993) study of knowledge use in school settings. It was designed to situate a teacher's current use of the innovation at a particular level of use. There are seven levels of use, which ranged from items 1.0a through to 1.0g. Teachers were invited to indicate how they use the program innovation by selecting one of the options that best described their current use of the innovation. These options were piloted tested prior to the study proper. Originally, the researcher did not make a provision to include item 1.0b (i.e., I am not using Project WILD but I am involved in the program in other ways). The results of the pilot study,

however, indicated that some teachers wanted the opportunity to indicate that they were still involved in the innovation even though they were no longer using it in their classroom.

Collectively, these levels formed a 7-point scale. At the scale's low end was the decision to make "no use" of the innovation at all (1); at the high end was the decision to select activities from each section of the activity guide that was associated with the innovation and use them in a form modified by a teacher to fit her/his needs (7). Item 1.0c focused on conceptual use of the innovation (i.e., thinking about using the innovation). The remaining four items (i.e., items 1.0d to item 1.0g) span a range of instrumental uses–that is, the decision to use the innovation in direct and specific ways. At the lowest end, this range starts with making specific plans to use the innovation, followed by using selected activities from the teacher's guide that is associated with the innovation. At the higher end, the range includes selecting and using activities from each of the seven sections of the activity guide as they were presented, and finally, using activities from each of the sections of the guide in a form modified to fit respondents' needs.

5.1.1.2 Description of Response Patterns: Level of Program Use

As displayed in Table 5.1, responses related to the level of use of the program innovation leaned toward instrumental use of the innovation. There was considerable variation among the users, however, with the standard deviation at 1.60. These data suggest that most teachers are using the innovation instrumentally but such use varied. Slightly more than half of the sample uses activities from the guide that fit day-to-day needs. Almost a quarter uses the innovation as it was intended (i.e., selecting one activity from each section of the guide), of which many use it at the highest level of use by modifying activities to fit their needs. A tiny sliver is making plans to use it. Less than 20% of the teachers are not using it instrumentally: a small segment decided not use it at all but some are still involved in it in other ways. A smaller segment is also thinking about using the innovation (i.e., conceptual use).

Table 5.1

Characteristics of Level of Program Use

Type of Use	Response Distribution	N	Mean	SD	95% C.I.[a] Lower	Upper
No Use	8%	473	4.81	1.60	4.66	4.95
No Use but still involved	4%					
Conceptual use	6%					
Instrumental use:						
a. Making plans to use	3%					
b. Using selected activities	56%					
c. Using activities as presented from each section of the guide	7%					
d. Using activities in modified form from each section of guide	16%					
TOTAL	100%					

[a] C.I. = Confidence interval.

5.1.2 Use of the Program Innovation: Level of Implementation

5.1.2.1 Level of Implementation: Formation of Items

As the reader may recall, the overall basis for how to conceptualize the construct of *level of implementation* drew on the work of planned educational change theorists. They typically divide the change process into three or four processes (e.g., Fullan, 1991; Glaser, Abelson & Garrison, 1983; Huberman & Crandall, 1982; Huberman & Miles, 1984; Zaltman & Duncan, 1977). These processes were defined earlier but are repeated here for the reader's convenience: *initiation* or *adoption* (process that leads up to and initiates decision to adopt an innovation); *early/later implementation* (putting an innovation into practice); *stabilization* (stabilizing innovation use), and *institutionalization* (change built into the system). These processes may be cast as a continuum of different levels of instrumental uses (i.e., levels of implementation), where initiation may be located at one end and institutionalization at the other.

The researcher drew on Miles and Huberman (1984) to define *level of implementation* as a continuum of processes that generally start with adopting an innovation (initiation), then putting it into practice (implementation), during which time its use may become stabilized and then institutionalized as part of the system within which it is used. These notions are reflected in the conceptual framework guiding this study. In this study, however, the prime focus of interest is on the implementation phase (which includes the stabilization and institutionalization phases) as opposed to the initiation or adoption phase. As well, in this study, level of implementation is regarded as a special case of instrumental use. Items that were formed for the *level of implementation* construct, therefore, capture data on how teachers are using the innovation in their practice through to how well it is entrenched within the school organization system. The interest in exploring the extent to which the innovation was

institutionalized within the users' workplace stems from Miles and Huberman's (1984) suggestion that use of an innovation is enhanced if it is embedded in a system.

The researcher also relied on the work of Hall, Loucks and Rutherford (1975) Levels of Use of an innovation to help refine degrees of implementation and stabilization. In this respect, she drew on four concepts from their work (Hall et al., 1975), as follows:

- **Routine Use**: use of the innovation is stabilized. Few, if any, changes are being made in ongoing use. Little preparation or thought is being given to improving the innovation use or its consequences.
- **Refinement**: user of the innovation varies use of the innovation to increase impact on students; variations are based on knowledge of short- and long-term consequences for students.
- **Integration**: user is combining own efforts to use the innovation with related activities of colleagues to achieve a collective impact on students within their common sphere of influence.
- **Renewal**: user re-evaluates the quality of use of the innovation, seeks major modifications of, or alternatives to, the present innovation to increase impact on students, explores new developments in the field, and explores new goals for self and the team.

These four concepts were used as a guide to form items as indicators for the implementation and stabilization components of *level of implementation*. The sections that follow specify the items for each of these four constructs and describe patterns of responses for them.

5.1.2.2 Routine Use: Formation of Item

As displayed in Appendix D (see Part 1, page 1) item 1.1 was created to capture data with respect to routine of use of the innovation. The researcher did not explore if teachers made improvements to activities since this dimension was beyond the scope of the study. Instead,

they were invited to indicate how often they typically use the innovation during a regular school year by checking one of four options, starting with 1 to 3 times through to 10 or more times. Of the 515 teachers who returned the questionnaire, 423 completed this item.

Appendix D shows that most teachers who responded to this item reported that they used the innovation 6 or less times during a regular school year: About a third uses it 3 times or less; about the same proportion uses it 4 to 6 times. The remaining third uses it more often, where 20% uses the innovation 10 or more times. These data suggest that the majority of teachers use the innovation less than 6 times during a regular school year, but a small segment uses it more often.

5.1.2.3 Refinement: Formation of Items

Two items within the questionnaire were used to serve as indicators for *refinement*: items 1.2 and 1.3 (see Appendix D, Part 1, page 1). Item 1.2 invited teachers to indicate the kind of activities that they use with their students. Eight options were offered: 7 represented examples of different types of activities that are available within the activity guide while the eighth requested respondents to specify other types. Alternatively, item 1.3 invited teachers to provide reasons for selecting the activities. In this case, 6 options were offered: 5 were examples of reasons; the sixth accommodated teachers to offer other reasons. The researcher's reasoning in using these items as indicators for refinement were based on two assumptions: First, teachers would need to be somewhat familiar with the innovation to make selections of different and appropriate types of activities for use in the classroom that could increase impact on students and fit their learning needs. Such choices imply some consideration of short- and long-term consequences for students. Second, teachers would have underlying reasons for selecting activities. Presumably, their choices would be based on a variety of factors: a mix of reasons associated with their students' interests, their curriculum, accomplishing outcomes and

ease of using the innovation. Given these assumptions, the two items were considered reasonable indicators of refinement.

5.1.2.4 Description of Patterns of Responses of Types of Refinement

Appendix D shows that 430 teachers completed items 1.2 and 1.3. Regarding item 1.2, the majority of teachers used science activities, many also used physical activities. Slightly more than half used writing/ reading/ discussing activities. About a third used construction/arts and crafts projects and Language Arts activities but less than a quarter used activities for student research projects and Social Studies activities. A small proportion used other kinds of activities.

These data suggest that teachers mostly use science activities, followed by physical activities. There was variation but activities related to student research projects were used least.

An analysis was conducted to determine what kind of "Other" activities are used. While only 24 respondents completed this "Other" option, 10 said they selected activities for math and graphing; 3 identified outdoor education as their choice and 2 indicated that they used activities for co-operative group skill-building. The remaining 9 teachers identified a variety of ways that they use the innovation: for music, art, geography, service learning, library skills, drama, French immersion, simulation, environmental games, inquiry activities and family and consumer science.

With respect to item 1.3, the data shows that most teachers selected particular activities because their content fits their curriculum and they thought students would enjoy them. This finding suggests that most teachers based their choices on how well activities fit curriculum and serve students' interests. About two-thirds also chose activities to accomplish education standards or outcomes and were easy to adapt to suit student learning. Almost half, however, said that they learned their selected activities at a Project WILD workshop. This finding

suggests that half of the teachers tend not to use other activities within the guide that were outside of the workshop.

Finally, a small segment of teachers (29) had reasons other than those prescribed within item 1.3: 6 integrated activities with other programs; 3 used activities suited for varied group sizes; 3 selected activities for school clubs while 2 worked with activities with coordinators to fit the innovation with curriculum standards. The remaining 11 teachers said that their reasons were based on ease in getting materials and that activities reinforce math analysis, reflect important concepts, are fun and work, enable students to learn by doing and work with realistic activities, lend to older students teaching younger ones and enrich gifted programs and First Nations culture. These data suggest that most "other" reasons related to promoting students' interests.

5.1.2.5 Formation of Items for Integration of the Innovation

Item 1.4 within the questionnaire (see Appendix D, Part 1, page 2) was used to serve as an indicator for *integration* of the innovation. Teachers were invited to select one of two options for three sets of questions that explored how they use the innovation in their classroom and the extent to which they use it in co-operation with colleagues at their school setting. This focus deviated somewhat from Hall's et al. (1975) definition of integration: they emphasized collaborative efforts among teachers to achieve a collective impact. The researcher included the focus of collaborative efforts but she also wanted indicators for individual efforts related to modifying the innovation to suit students' needs and using it as coherent sets of lessons to teach a topic. These dimensions (i.e., cooperation with colleagues, modifying the innovation and use of it as sets of lessons) were viewed as higher forms of integrating the innovation for impact on students. Responses for these higher forms of integration were coded as "2" while the lower forms of integration (i.e., use of innovation on their own, as presented in the activity guide and as individual lessons) were coded as "1" in SPSS.

5.1.2.6 Integration: Description of Patterns of Responses

As shown in Appendix D, 352 to 369 out of 515 respondents completed item 1.4. There were no marginal comments in any of the questionnaires that indicated why many skipped this item; it is assumed that some skipped this section because they were not using the innovation but perhaps the item's structure was too complex. Of those that did complete it, the majority tended to use the innovation on their own, in a modified form and as sets of lessons.

These data suggest that teachers tend not to collaborate with their colleagues to increase the impact of the innovation with students but rather they do so on their own with their own students by modifying it and drawing sets of lessons from it for teaching purposes. There is variation however. About a quarter of the respondents co-operates with colleagues and uses activities as presented and as individual lessons. The high proportion of teachers who say they modify activities is interesting because it suggests that more teachers modify the innovation to fit their needs than was implied in item 1.0.

5.1.2.7 Renewal: Formation of Items

The researcher used Hall's et al. (1975) definition of *renewal* as a guide in forming items for this construct (see page 145 for the definition). She drew on the evaluative aspects of the use of the innovation, and whether alternatives were explored, from Hall's et al. (1975) definition because these dimensions were more relevant for the study. As shown in Appendix D (see Part 4, page 3), three items (i.e., items 4.2, 4.3 and 4.4) served as indicators of renewal. Data were captured along a 5-point Likert frequency scale that ranged from never (1) through to always (5).

5.1.2.8 Renewal: Description of Patterns of Responses

As displayed in Table 5.2, responses leaned on average toward the less frequent end of the scale. In general, there was some variation, with standard deviations ranging from 0.94 to 0.98. The one item in which frequency was the highest was 4.2: I make plans with my

Table 5.2

Characteristics of Renewal

Questionnaire Item	Response Distribution[a]					Mean	SD	N	Rank	95% C.I.[b]	
	Ne	R	S	F	A					Lower	Upper
4.2) I make plans with my colleagues to use Project WILD in our classrooms.	19%	33%	36%	10%	2%	2.44	0.98	480	1[c]	2.35	2.53
4.3) My colleagues and I compare how we each use Project WILD.	28%	39%	27%	4%	2%	2.13	0.94	478	2	2.04	2.21
4.4) My colleagues and I compare Project WILD with other wildlife education programs.	39%	38%	18%	4%	2%	1.93	0.94	478	3	1.84	2.01

[a] Ne = Never (1); R = Rarely (2); S = Somewhat (3); F = Frequently (4); A = Always (5).

[b] C.I. = Confidence interval.

[c] 1 = highest effort for renewal; 3 = lowest effort for renewal.

colleagues to use Project WILD in our classrooms. The one item in which frequency was the lowest was 4.4: My colleagues and I compare Project WILD with other wildlife education programs.

These data suggest that some collective effort is made to make plans to use the innovation and compare its use among colleagues but little effort is directed at comparing it with other similar education programs. There is, however, some variation. A small proportion of teachers frequently or always compares their use of the innovation with other programs but the majority does so only rarely or somewhat. Almost a quarter never compares the how they use the innovation with colleagues and over a third never compare it with other programs.

5.1.2.9 Institutionalization: Formation of Items

The researcher drew from the work of Huberman and Miles (1984) as a general guide to create items for instituationalization. Huberman and Miles (1984) examined the relationship between the amount and quality of local adaptations of innovation and successful implementation of it, and identified factors that contribute to sustaining change. They concluded that stabilization of an innovation typically occurred with mastery of new practice (especially with follow up assistance) together with strong school and school district endorsement, and users who are committed to the innovation and support change. Institutionalization of an innovation required some administrative pressure, lack of local resistance, teacher-administrator harmony, transformations of the innovation rooted into local structures, enough assistance for stabilized use of it by other users, and durability.

The researcher drew from *some* of these findings as the basis upon which to develop items for the institutionalization construct. The area of particular interest for her with respect to the focus of the present study was the extent to which colleagues and administrators (both at the school building and school district levels) support the innovation. She also thought that school-level and school district-level interest in including the innovation in *their own* teaching

units would also serve as indicators of the extent to which efforts were being made to institutionalize the innovation by making it more part of their system. It is recognized, however, that the institutionalization variable will be *limited* because it draws solely on the perceptions of respondents. Their data cannot be verified in the absence of data collection directly from administrators and colleagues within their school settings (which is outside of the parameters for this study). Nonetheless their perceptions are important as they provide an insight for the researcher whether or not respondents perceive administrative and collegial support for the innovation and whether or not they see any indications of efforts to build the innovation into the system by incorporating it into school and school district resources for practicing teachers.

As is shown in Appendix D (see Parts 4 and 5, pages 3 and 4), five items (items 4.1, 5.6, 5.7, 5.8 and 5.9) were created for the institutionalization construct. Data were captured along a 5-point Likert frequency scale that ranged from never (1) through to always (5).

5.1.2.10 Institutionalization: Description of Patterns of Responses

As displayed in Table 5.3, responses for three items leaned toward the more frequent end of the scale while those for two items leaned toward the less end. There was considerable variability with standard deviations ranging from 0.93 to 1.33. The item in which the frequency was the highest was 5.9: My school district administration supports my involvement in Project WILD. The item in which frequency was the lowest was 5.8: My school district includes Project WILD activities in district-wide teaching units.

These data suggest that there is fairly strong support for the innovation among colleagues and administrators at the school-building and school district levels. However, about 20% of the respondents indicated that items 5.7 and 5.9 were not applicable (not shown in Table 5.3). Marginal notes from 15 respondents provided some insight into possible reasons: 10 said they had a new principal while the remaining 5 did not know if their school district supports the innovation. The researcher also examined data arising from item 1.9a (see

Table 5.3

Characteristics of Institutionalization

Questionnaire Item	Response Distribution[a]					Mean	SD	N	Rank	95% C.I.[b]	
	Ne	R	S	F	A					Lower	Upper
4.1) My colleagues at my school support Project WILD.	7%	19%	45%	21%	9%	3.04	1.01	459	1[c]	2.95	3.13
5.6) Teachers at my school add Project WILD activities into teaching units.	17%	34%	39%	9%	2%	2.45	0.93	469	4	2.37	2.53
5.7) My principal supports requests to attend Project WILD workshops.	16%	10%	31%	23%	20%	3.22	1.31	393	3	3.09	3.35
5.8) My school district includes Project WILD activities in district-wide teaching units.	37%	26%	24%	9%	5%	2.19	1.17	421	5	2.08	2.30
5.9) My school district administration supports my involvement in Project WILD.	16%	8%	31%	22%	23%	3.28	1.33	401	2	3.15	3.41

[a] Ne = Never (1); R = Rarely (2); S = Somewhat (3); F = Frequently (4); A = Always (5).

[b] C.I. = Confidence interval.

[c] 1 = highest level of institutionalization; 5 = lowest level of instiutionalization.

Appendix D, Part 1, page 2) which asked teachers if lack of support from school administration or colleagues prevented them from using the innovation. Of the 441 respondents who completed this item, about 6% indicated lack of support. This finding, combined with the findings mentioned above, tends to support the view that there seems to be general administrative support for the innovation.

The data also suggest that activities associated with the innovation tend not to be included in teaching units by teachers or by school districts. However it was noted that almost 15% of the respondents who completed item 5.8 said that it did not apply to them. Marginal comments from 5 teachers provided insight into one possible reason: all 5 said they did not know if their school district included the innovation in district-wide units. These findings suggest that while colleagues and administrators tend to support the innovation, the innovation tends not to be embedded as part of the system. This finding may be related to the fact that the innovation is a recommended resource rather than a mandated program. Except for one respondent, all teachers confirmed this point in item 1.10, which collected data on this topic. Finally, the data also suggest considerable variability among teachers regarding all items within the institutionalization construct, especially with the two associated with administrative support (items 5.7 and 5.9). This finding suggests that teachers are fairly widely spread apart with respect to most items associated with this construct.

5.1.3 Conceptual Use

5.1.3.1 Formation of Items for Conceptual Use

Conceptual use is the educative use of information (i.e., enlightenment, learning): This idea of use is based on the premise that one learns from knowledge and such learning bears on one's thinking and actions (Cousins & Leithwood, 1993, 1986; Kennedy, 1984; Weiss, 1983). In this study, items for conceptual use were modeled on the work of Cousins and Leithwood (1993). Three items were created to capture data regarding conceptual use along a 4-point

agree/disagree Likert-type of scale (i.e., items 2.1, 2.2 and 2.5), as shown in Appendix D (see Part 2 on page 2).

5.1.3.1 Description of Response Patterns: Conceptual Use

As displayed in Table 5.4, responses leaned, on average toward the agree end of the scale. In general, variability was fairly stable, with standard deviations ranging from 0.58 to 0.79. The one item with which respondents agreed the most was 2.2: I have gained new knowledge because of Project WILD. The one item with which respondents agreed the least was 2.5: I have changed my thinking as a result of Project WILD (e.g., about wildlife, teaching).

Average mean scores for gaining new understandings and new knowledge because of the innovation were very high for a 4-point scale. These data suggest that most teachers were very positive and optimistic about the learning that they gained from the innovation but there was a small segment that disagreed. While there was less agreement that the innovation changed teachers' thinking, over half of the teachers agreed that it did. Variability associated with this dimension, however, was somewhat higher compared with the other items, suggesting a wider spread of opinion about the extent to which the innovation was an influence in change in thinking.

5.1.4 Process Use

Process use relates to how users are affected because of their participation in, or proximity to, the innovation. As the reader may recall, the concept was drawn from the evaluation use domain where an important distinction has recently emerged between utilization of evaluation findings and the impact that the process of being involved in an evaluation may have (Patton, 1994; Shulha & Cousins, 1997). Patton (1997) defined it as being indicated by "individual changes in thinking and behavior, and program or organizational changes...that occur among those involved in evaluation as a result of the learning that occurs during the evaluation process" (p. 90). Cousins and Leithwood's (1993) potent findings point to the

Table 5.4

Characteristics of Conceptual Use

Questionnaire Item	Response Distribution[a]								95% C.I.[b]	
	SD	D	A	SA	Mean	SD	N	Rank	Lower	Upper
2.1) Project WILD has helped me a gain new understanding about topics it covers.	1%	4%	58%	38%	3.32	0.58	505	2[c]	3.27	3.37
2.2) I have gained new knowledge because of Project WILD.	1%	4%	51%	45%	3.39	0.61	507	1	3.34	3.45
2.5) I have changed my thinking as a result of Project WILD (e.g., about wildlife, teaching).	4%	37%	42%	17%	2.72	0.79	477	3	2.65	2.79

[a] SD = Strongly Disagree (1); D = Disagree (2); A = Agree (3); SA = Strongly Agree (4).

[b] C.I. = Confidence interaval.

[c] 1 = highest agreement; 5 = lowest agreement.

importance of process use to sustained interactivity: each interactive process refers to how users are affected because of their participation in or proximity to the innovation.

5.1.4.1 Formation of Items for Process Use

The development of items for the process use construct drew from the work of several scholars. Greene (1988a) categorized process use effects as cognitive, affective and political. The cognitive dimension includes learning new skills and knowledge development (Cousins, 1995a, 1995b, 1996). The affective dimension includes feelings of self-worth and program ownership (Cousins, 1995a, 1995b; Cousins & Earl, 1995; Greene, 1988a; Patton, 1997). At the political level, participation gave voice for users (Greene, 1988a) or a form of recognition or empowerment (Cousins 1995a, 1995b). Involvement in process may also lead to organizational development (Patton, 1997), such as organizational learning (Shulha & Cousins, 1997).

This literature formed the basis for how process use was conceptualized in this study. As the reader may recall, within the conceptual framework that is guiding this study, *process use* is divided into two segments: effects at individual and organizational levels. At the individual level, Greene's (1988a) three categories of effects were used to help organize the overall framework for cognitive, affective and political effects. At the organizational level, the category of organizational learning was drawn from Shulha and Cousins (1997). Measuring this latter dimension is beyond this study's scope. Social processing, however, is inherent in creating capacity for organizational learning (Marks & Louis, 1999) and is a part of sustained interactivity. The social processing construct therefore included that dimension, to the extent that it captured perceptions of respondents about how collective discussions about the innovation may have influenced thinking and decision-making among teachers (see page 80). In this segment, the reported changes arising because of teachers' collective deliberation about the innovation are highlighted but its focus is on effects regarding cognitive affective and political categories.

As shown in Appendix D (see Part 2, page 2), item 2.3 relates to the cognitive category, items 2.7, 2.8 and 2.9 relate to the affective category (e.g., self-worth and ownership) whereas items 2.6, 2.10 and 2.11 are associated with the political category (e.g., voice, recognition and empowerment). Data were captured along a 4-point Likert-type of scale that ranged from strongly disagree (1) to strongly agree (4).

5.1.4.2 Description of Response Patterns: Process Use

As displayed in Table 5.5, responses leaned toward the high agreement end of the scale. In general, there was some variation, with standard deviations ranging from 0.65 to 0.82. The item in which there was strongest agreement was 2.8: I have learned new skills because of Project WILD. The item with which there was least agreement was 2.11: My involvement in Project WILD has furthered my career.

The data suggest that the majority of teachers were generally optimistic and positive about how they were affected because of their participation in the innovation. Most notable was the strong agreement among teachers that they learned new skills and felt more confidence in teaching about the innovation. Agreement was also evident among teachers that the innovation made them feel positive about their work and strengthened their commitment to it, although about 20% disagreed. Teachers agreed less that participation in the innovation gave them voice or was an important influence on their work but there was variation. Most variation was with recognition and empowerment (i.e., item 2.11): Over half disagreed but a small segment strongly agreed, with 12% saying it did not apply. A quarter of the sample disagreed that involvement in the innovation gave them voice or strongly agreed but 8% said it did not apply. These data suggest fairly strong differences within the sample along these dimensions. One dimension that was explored further was the effect of participating in the innovation with respect to learning new skills. The next segment surfaces what teachers said.

Table 5.5

Characteristics of Process Use

Questionnaire Item	Response Distribution[a]								95% C.I.[b]	
	SD	D	A	SA	Mean	SD	N	Rank	Lower	Upper
2.3) I have learned new skills because of Project WILD (e.g., teaching in the out-of-doors).	1%	9%	50%	41%	3.30	0.66	494	1[c]	3.24	3.36
2.6) Project WILD has had an important influence on my work.	2%	24%	57%	18%	2.90	0.69	486	6	2.84	2.96
2.7) Project WILD makes me feel positive about my work..	2%	14%	62%	22%	3.05	0.65	481	4	2.99	3.11
2.8) Project WILD has increased my confidence in teaching about wildlife.	2%	8%	58%	33%	3.21	0.66	495	2	3.15	3.27
2.9) The more I know about Project WILD, the more I feel committed to it.	1%	17%	57%	25%	3.07	0.67	484	3	3.01	3.13
2.10) Being involved in Project WILD makes me feel like I have a say in something important.	3%	22%	55%	21%	2.93	0.73	469	5	2.86	3.00
2.11) My involvement in Project WILD has furthered my career.	9%	45%	34%	13%	2.51	0.82	445	7	2.44	2.59

[a] SD = Strongly Disagree (1); D = Disagree (2); A = Agree (3); SA = Strongly Agree (4).

[b] C.I. = Confidence interval.

[c] 1 = highest agreement; 7 = lowest agreement.

5.1.4.3 Content Analysis of New Skills Acquired because of the Innovation

Item 2.4 (see Appendix D, Part 2, page 2) invited teachers to specify new skills that they learned as a result of the innovation. Out of a possible 515 respondents, over half completed this item. A record was made of each new skills reported by teachers. These were categorized into two broad themes: those related to wildlife and those pertaining to new teaching skills. Figure 5.1 (see Appendix O) displays a list of reported new skills: about three quarters of the teachers acquired new teaching skills while about a quarter gained new wildlife-related skills. Table 5.6 provides a breakdown of types of skills that were most frequently cited: how to use game activities, followed by ways of student management, emerged as the most prevalent, in addition to a host of other skills.

5.1.4.4 Content Analysis of Examples of Changes Reported by Respondents

Item 4.8 (see Part 3 in Appendix D on page 3) invited teachers to indicate examples of changes that they said occurred as a result of collective deliberations about the innovation. Almost 20% of the study sample provided data. A content analysis was conducted of the reported changes. Each change was recorded. When it was noticed that numbers of changes were (1) fairly high and very similar, and (2) either related to changes in teaching practice or to attitudes about wildlife and the environment, two general categories and several sub-categories were created to capture emergent themes (see Figure 5.2 in Appendix P). One of the general categories included reported changes related to teaching practices while the other was for reported changes in thinking. SPSS was used to keep track of the information. The analysis indicated a list of 71 different changes.

Figure 5.2 (see Appendix P) shows that over 80% of the 95 teachers who completed item 4.8 reported changes in teaching practices while slightly less than 20% identified changes in attitudes about wildlife and the environment. Table 5.7 breaks these two categories down and shows the proportions of teachers associated with various sub-categories along these

Table 5.6

Types of New Skills Acquired by Teachers because of Their Participation in the Innovation

Type of Skill	% of Respondents N = 281
Using game activities	21%
Ways of student management	5%
Integrating with other subjects	3%
Simulations	3%
Doing group activities	3%
Using parks as a resource	3%
Using a hands-on approach	3%
Teaching outside	2%
Team-building	1%
Carrying capacity	1%
Tracking	1%
Identifying wildlife habitat needs	1%
Identifying trees	1%
Physically acting out concepts	1%
New knowledge	1%
Camouflage	1%
How to use resources available	1%
How to plan outdoor activities	1%
Other	47%
TOTAL	100%

Table 5.7

Reported Changes in Attitudes about Wildlife and in Teaching Practices Arising because of Discussions about the Innovation Among Teachers

Description of Change	% of Repondents N = 95
Related to Teaching Practices:	
To do habitat projects.	21.1%
To make greater use of out-of-doors.	18.9%
To integrate Project WILD activities into existing teaching units/curriculum topics.	12.6%
To make more use of hands-on or physical activities.	9.5%
To shift to an interdisciplinary teaching approach.	4.2%
To let students form opinions/gain better understanding.	3.2%
To create special events around Project WILD.	2.1%
To contact wildlife agencies.	2.1%
Other.	2.1%
To integrate Project WILD activities for different grades.	2.1%
To encourage other teachers to use Project WILD activities.	2.1%
To collaborate more.	1.1%
To make more use of simulation activities.	1.1%
Related to Wildlife and Attitudes about Wildlife	
Change in Attitudes: Wildlife Issues.	12.6%
Change in Attitudes: Wildlife/Environment.	5.3%
TOTAL	100%

dimensions. Almost one quarter reported that collective deliberation led to doing habitat projects for educational purposes, followed by greater use of the out-of-doors and integrating Project WILD activities into existing teaching units and curriculum topics. Most reported changes related to wildlife had to do with changes in attitudes about wildlife issues. These data suggest that deeper levels of social processing led to reported changes in teaching practices and attitudes about wildlife among almost 20% of the teachers in the study. The results suggest that there may be the presence of organizational learning conditions among a small segment of the sample.

5.2 Scale Variable Construction and Description

The objective of this section of the thesis is to provide the reader with a description of how scale variables for the constructs of *level of program use*, *level of implementation* and *process use* were constructed. The reason why three scale variables were created was so that data would be reduced to three measures (i.e., the criterion variables) for the ensuing hierarchical regression analysis. This section discusses the procedures that were undertaken to meet this objective. It starts by outlining how the variables that form each of the three variables were constructed, and then proceeds to discuss how these variables were reduced to create three measures for the constructs. The procedures that were used to create scaled variables and deal with missing data are the same as those described in the Chapter 4. All items for each construct were checked for reliability, using Cronbach's alpha. Items were deleted if they did not substantially contribute toward reliability. As shown in Table 5.8, the reliability of all the scale variables is sufficiently high (i.e., over 0.70 or over) for research purposes.

5.2.1 Scale Variable: Level of Program Use

As displayed in Table 5.8, *level program use* is represented by the mean of one item (i.e., item 1.0) on a 7-point Likert-type of frequency scale. This scale variable represents the level of program use by respondents. It consists of a set of seven sub-items, each of which refer

Table 5.8

Scale Variable Construction: Criterion Variables

Variable Name and Description	Scale	Mean[1]	SD	N	Alpha
CRITERION VARIABLES:					
1) **Level of Program Use** (1 item on a 7-point Likert-type scale from no use (1) to highest use (7). 1.0) Indicate which options **BEST** describes your current use of Project WILD. a. I decided **not** to use the program. b. I am not using Project WILD but I am involved in the program in other ways. c. I am thinking about using Project WILD as a teaching resource. d. I am making specific plans to use Project WILD in my classroom. e. I am using selected activities from Project WILD that fit my day-to-day needs. f. I am using at least one activity from each section of Project WILD during a school year in the form that the activities were presented in the Activity Guide. g. I am using at least one activity from each section of Project WILD during a school year in a form modified to fit my needs.	1-7	4.81	1.60	473	n.a.[2]

(continued)

[1] Statistics were rounded off to second decimal point.

[2] n.a. = Not applicable.

Table 5.8

Scale Variable Construction: Criterion Variables (con't)

Variable Name and Description	Scale	Mean	SD	N	Alpha
2) **Level of Implementation Composite:** (Mean of 5 constructs on a probability scale from no implementation (0) to most implementation (1). Constructs are presented below.) 1. Routine use. 2. Refinement. 3. High integration. 4. Renewal 5. Institutionalization	0-1	0.43	0.20	481	.76
2.a) **Routine Use:** (1 item on a 5-point Likert-type of scale from no routine use (0) to high routine use (4). 1.1) During a regular school year, I typically use Project WILD activities: • a. 1-3 times • b. 4-6 times • c. 7-9 times • d. 10+ times.	0-4	1.88	1.29	502	n.a.

(continued)

Table 5.8

Scale Variable Construction: Criterion Variables (con't)

Variable Name and Description	Scale	Mean	SD	N	Alpha
2.b) **Refinement:** (Average of 2 items on a probability scale from no refinement (0) to most refinement (1).	0-1	0.53	0.30	508	.78
The refinement construct consists of : a) the number of different types of Project WILD activities that a teacher uses with student, and b) the number of reasons for the selection of the activities.					
The number of different types of Project WILD activities that a teacher uses with students was derived from					
1.2) I am using the following kind of Project WILD activities with my students (Number of different types of activities selected on an 8-point scale from no activities selected (0) to 7 activities selected (7): • a. Construction/arts and crafts projects. • b. Writing/reading/discussing activities. • c. Physical activities. • d. Student research projects. • e. Language Arts activities. • f. Science activities. • g. Social Studies activities.	0-7	2.70	1.89	508	n.a.
The number of reasons for the selection of the activities by a teacher was derived from the following item: (Number of different reasons given on a 6-point scale from no reason (0) to 5 reasons (5):					
1.3) I selected these particular activities because • a. Content of the activities fits my curriculum. • b. Learned them at a Project WILD workshop. • c. They help accomplish education standards or outcomes. • e. Thought students would enjoy them. • f. Easy to adapt to suit student learning.	0-5	2.99	1.70	511	n.a.

(continued)

Table 5.8

Scale Variable Construction: Criterion Variables (con't)

Variable Name and Description	Scale	Mean	SD	N	Alpha
2.c) **Integration:** (Number of high integration events on a 4-point scale from no integration (0) to high integration (3). 1.4) I use these activities primarily • a. In co-operation with my colleagues. • b. In a modified form to fit my students' needs. • c. In a set of lessons/activities on topics that I teach.	0-3	1.18	0.97	415	n.a.
2.d) **Renewal:** (Mean of 3 items on a 5-point Likert frequency scale from always (5) to never (1). • 4.2) I make plans with my colleagues to use Project WILD in our classroom. • 4.3) My colleagues and I compare how we each use Project WILD. • 4.4) My colleagues and I compare Project WILD with other wildlife education programs.	1-5	2.16	0.84	480	.86
2.e) **Institutionalization** of the innovation within the school organization. (Mean of 5 items on a 5-point Likert from always (5) to never (1) scale.) • 4.1) My colleagues at my school support Project WILD. • 5.6) Teachers at my school add Project WILD activities into teaching units. • 5.7) My principal supports requests to attend Project WILD workshops. • 5.8) My school district includes Project WILD activities in district-wide teaching units. • 5.9) My school district administration supports my involvement in Project WILD.	1-5	2.84	0.91	405	.82

(continued)

Table 5.8

Scale Variable Construction: Criterion Variables (con't)

Variable Name and Description	Scale	Mean	SD	N	Alpha
3) **Conceptual Use:** (Mean of 2 items on a 4-point Likert-type strongly agree (4)/ strongly disagree (1) scale. • 2.1) Project WILD has helped me a gain new understanding about topics it covers. • 2.2) I have gained new knowledge because of Project WILD. • 2.5) I have changed my thinking as a result of Project WILD (e.g., about wildlife, teaching).[3]	1-4	3.19	0.54	504	.83
4) **Process Use:** (Mean of 7 items on a 4-point Likert-type strongly agree (4)/strongly disagree (1) scale. • 2.3) I have learned new skills because of Project WILD (e.g., teaching in the out-of-doors). • 2.6) Project WILD has had an important influence on my work. • 2.7) Project WILD makes me feel positive about my work. • 2.8) Project WILD has increased my confidence in teaching about wildlife. • 2.9) The more I know about Project WILD, the more I feel committed to it. • 2.10) Being involved in Project WILD makes me feel like I have a say in something important. • 2.11) My involvement in Project WILD has furthered my career.	1-4	2.96	0.56	465	.88

[3] This item was dropped as it did not contribute substantially to reliability.

to a form of use along a continuum of use, starting with no use (1) through to the highest form of instrumental use (7). A reliability analysis was not conducted as only one item was used as the basis for this construct. The data suggest that teachers tend to use the innovation instrumentally (i.e., decided to use at least one activity from the activity guide for teaching purposes). There is, however, considerable variation.

5.2.2 Formation of a Scale Variable for Level of Implementation

The *level of implementation* scale variable is defined in this study as consisting of five scale variables: *routine use, refinement, integration, renewal* and *institutionalization* of the innovation. The intent was to use them to form a composite variable to represent *level of implementation*. Table 5.8 provides a list of the scales that were used for this purpose. First, a description will be provided as to how each scale variable was formed, followed by a description of how they were reduced the form *level of implementation*.

5.2.2.1 Scale Variable: Routine Use

A 5-point scale was created to represent *routine use* of the innovation during a regular school year, which ranged from no routine use (0) to high routine use (4). "No routine use" was derived from item 1.0. It was recoded such that items 1.0a, 1.0b, 1.0c and 1.0d were redefined as not making instrumental use. It was noted that some who said they were not using the innovation instrumentally (i.e., in item 1.0) completed Part 1 of the questionnaire as if they were doing so. The *routine use* variable, therefore, reflects (1) those who said they were not using the innovation in item 1.0 (i.e., indicated as "no use" on the table), and (2) those who completed item 1.1.

A descriptive analysis (not shown in Table 5.8) of this scale variable revealed that responses ($\underline{N}$ = 502) leaned toward the low end of the 5-point scale with a mean average score of 1.88. Slightly more than a quarter uses the innovation 1 to 3 times a year while 29% uses it 1 to 6 times. Another 13% uses it 7 to 9 times but 16% either never use it or use it 10 or more

times. There was fairly wide variability, however, with a standard deviation of 1.29. The data suggest that the majority of teachers use the innovation 1 to 6 times.

5.2.2.2 Scale Variable: Refinement

Refinement represents varied use of the innovation to increase its impact on students where variations are based on knowledge of short- and long-term consequences for students. It was constructed by averaging measures for each of two scales, after converting each to a probability metric. One scale was the number of activities selected by teachers to use with students (i.e., item 1.2); the other was the number of reasons for that selection. Each of these variables was on a different scale, as described more fully below. The reliability of *refinement* was fairly high at 0.78. A mean score of 0.53 suggests that teachers tended to vary their use of the innovation but there was fairly high variability.

5.2.2.3 Scale Variable: Selection/Reason for Selection of Activities

Given the rationale for selecting items 1.2 and 1.3 as indicators for refinement, and given that the researcher assumed that (1) teachers would be inclined to use a greater variety of activities to promote the innovation's impact on students, and (2) teachers would have a variety of reasons for selecting particular activities, the *amount* of choices for varieties of activities and reasons for their selection became the basis for developing a way to measure *refinement*. Two variables were developed to achieve this purpose, as shown in Table 5.9: one to reflect the amount of different types of activities selected by teacher during a regular school year; another to reflect the amount of reasons that were provided to justify the choices that were made.

First, an 8-point scale was created by summing the number of different types of activities that were selected by teachers. It ranged from no selection (0) through to seven selected (7). "No selection" was derived in the same way as for *routine use*. The mean score suggests that an average of about 3 different types of activities are selected, but there was wide variability. About a quarter selected 1 to 2 different activities, slightly less than a half chose 3 to

Table 5.9

Characteristics of Refinement: Number of Different Activities Selected by Teachers and Number of Reasons for Their Selection

Number of Activities and Reasons	Response Distribution	N	Mean	SD	95% C.I.[a] Lower	Upper
Number of Different Types of Activities Selected						
None Selected	16%	508	2.70	1.89	2.54	2.87
One	13%					
Two	18%					
Three	21%					
Four	13%					
Five	11%					
Six	5%					
Seven	3%					
TOTAL	100%					
Number of Reasons for Selection of Activities						
None Selected	16%	511	2.99	1.70	2.84	3.14
One	6%					
Two	11%					
Three	21%					
Four	24%					
Five	22%					
TOTAL	100%					

[a] C.I. = Confidence interval.

5 but less than10% selected 6 to 7. Second, a 6-point scale was created by summing the number reasons for the selections. It ranged from no reasons provided (0) through to five reasons (5). "No reasons" was derived in the same way as for *routine use*. The mean score suggests that an average of 3 reasons was provided but there was wide variability. Almost half of the teachers had 3 to 4 four reasons for making the choices that they did, with almost a quarter providing 5 reasons. These data suggest that many teachers give considerable thought to their choice of activities but and tend to vary the innovation's impact somewhat.

5.2.2.4 Scale Variable: Integration

Integration represents the amount of a teacher's effort to use the innovation to achieve an impact on students. It was constructed by summing the number events reported in three items that the researcher defined as "integration" and then recoding the data to form a scale that ranged from no integration (0) to high integration (3). "No integration" was derived in the same way as for *routine use*. The mean score suggests that the effort to achieve impact with students is fairly low.

5.2.2.5 Scale Variable: Renewal

Renewal was constructed by averaging responses to three items, all rated on a 5-point Likert frequency scale that ranged from never (1) to always (5). *Renewal* measures the extent to which users of the innovation evaluate their use of the innovation by comparing how they use it and to other related innovations. The reliability of *renewal* was very high. The mean score suggests that these evaluative efforts are moderate. There was a reasonable amount of variation. By slightly relaxing strict listwise deletion, the number of cases increased from 467 to 480.

5.2.2.6 Scale Variable: Institutionalization

The construct *institutionalization* was constructed by averaging responses to 5 items that were rated on a 5-point Likert frequency scale. It represents the extent to which the innovation has become part of the routine of doing things within the school organization. The

reliability of this scale variable was very high. The mean score suggests that the innovation tends toward being part of the routine of school organizations. A reasonably high amount of variation was noted. By slightly relaxing strict listwise deletion, the number of cases increased from 300 to 405.

5.2.2.7 Scale Variable: Level of Implementation

The *level of implementation* composite was constructed by converting each scale variable to a probability metric and taking the average. This procedure retained the integrity of original scales but enabled the creation of a scale variable for level of implementation. This variable represents the intensity of putting the innovation into practice. The reliability of the construct was fairly high at 0.76. The mean score suggests that the intensity of putting the innovation into practice tended toward the lower end of the scale but there was some variation. By slightly relaxing strict listwise deletion, the number of cases increased from 398 to 487.

5.2.3 Scale Variable: Conceptual Use

Conceptual use of the innovation was constructed by averaging responses to two items, all rated on a 4-point Likert-type of strongly agree/strongly disagree scale. This scale variable represented the educative use of the innovation: learning arising from the innovation that bears on one's thinking. The reliability of the conceptual use scale was very high (after dropping item 2.5 as it did not contribute to reliability). The mean score reveals that respondents tended to make relatively high conceptual use of the innovation. Some variability was noted, however. By slightly relaxing strict list wise deletion, the number of cases increased from 464 to 504.

5.2.4 Scale Variable: Process Use

Process use of the innovation was constructed by averaging responses to seven items that were all rated on a 4-point Likert-type of strongly agree/strongly disagree scale. This scale variable represents how users are affected because of their participation in, or proximity to, the innovation along cognitive, affective and political dimensions. The reliability of the process use

scale was very high. The mean score reveals that teachers were generally very positive about the effects of the innovation. Slightly relaxing listwise deletion increased cases from 399 to 465.

5.3 Conclusions about Characteristics of Use of Innovation

As the reader may recall, this chapter sought to present findings that would partially address the main research questions of this study with respect to use of the innovation: *Does program use vary as a function of the degree of sustained interactivity?* and *Does process use vary as a function of the degree of sustained interactivity?* In this segment of the chapter, conclusions are presented about the characteristics that emerged regarding the use of the program innovation and process use, given data analyses at item and scale variable levels. A summary of general and specific characteristics about use is displayed in Table 5.10 (see Appendix Q) to aid the reader. In general, it was found that the sample varies fairly widely along most of the dimensions of use that were considered in this study. There were, however, general patterns.

1. The level of program use of the innovation tends largely toward instrumental use. Given that the study tested Huberman's model within the implementation context of the innovation, it is encouraging that most teachers use it instrumentally, with almost a quarter doing so as it was intended. It is unknown if teachers who use the innovation were more inclined to respond.

2. Most teachers use well-developed innovation routinely during a regular school year. Over half of the teachers use the innovation 1 to 6 times a year. About a quarter is at the lower end (i.e., 1 to 3 times), slightly more than a quarter is in the middle range (i.e., 4 to 6 times) and at the higher end (i.e., 7 and more times). This finding supports that regular use of the innovation is made.

3. Refinement of the innovation tends to be moderate. Teachers tend to give considerable thought to curriculum needs and their students' interests in their choices but do not take advantage of full range of activities available to them to vary the impact of the innovation with

students. Of the seven different types offered, only an average of about three is chosen, which tends to the lower side. Most use physical activities and mostly for science subjects–an expected finding since the innovation is strong in these areas. This finding may, however, also indicate that these types of activities are emphasized more in workshops–about half of the teachers selected activities that they learned in workshops. This finding suggests that the initial workshop experience is an important source of influence on teachers' choices of activities.

4. Teachers tend to integrate the well-developed innovation into their own teaching in a modified form and as sets of lessons for the benefit of their own students. This trend suggests that teachers work in relative isolation and tend not to collaborate with other teachers to maximize the impact of innovation with students within their common sphere of influence. The findings, however, point to important individual efforts to enhance the innovation's impact by modifying it for perceived needs and using it as a coherent set of lessons.

5. Teachers' tendency to make plans and compare their use of the well-developed innovation is fairly low, with even less inclination to compare it with other similar programs. The fairly low collective effort to evaluate the innovation by comparing it with similar ones may indicate a lack of such discussions among colleagues or a lack of general interest (or awareness) in other programs like it. While collective planning to use it and compare its use among colleagues is more frequent, such collaborative activity is fairly low. This finding provides further support that teachers tend not to work collaboratively with respect to the innovation.

6. The well-developed innovation might tend toward being part of school organizations' routine but is not embedded as a part of it. This encouraging finding points to a potential of the innovation to become a part of school organizations' routine but needs to be viewed with caution. The source of data was solely based on teachers' perceptions where a fairly high proportion of users indicated that items that addressed these points were not applicable to them.

Moreover, the well-developed innovation appears to generate support among colleagues and administrators at school-building and school district levels but it is generally not included in teaching units within the school or district levels. The lack of its inclusion in teaching units was surprising as it suggests that references to it might not be wide-spread or integrated into other resources.

7. Overall intensity of putting the well-developed into practice is moderate. Although moderate, this finding is nonetheless very encouraging. Since the innovation not mandated, it relies on teachers' voluntary willingness to use this resource. Given this parameter, the moderate level of implementation serves as an important indicator that most teachers who have it may be using it instrumentally and regularly, with careful thought about serving students' interests and with apparent potential for becoming more part of school routine.

8. Learning about the innovation is high. The finding that the innovation generates optimism from teachers that they acquired high levels of learning suggests high conceptual use effects.

9. Participation in the well-developed innovation generates learning new skills, confidence in teaching about the innovation, positive feelings about work and commitment for the innovation but provides slightly less gains regarding voice, recognition and empowerment. One of the most surprising findings regarding process use was the innovation's capacity to stimulate the development of new skills, particularly new teaching practices. Almost half of the teachers reported this kind of learning. This finding suggests that participation was particularly important for personal professional development. Another exciting finding was the extent to which changes were made within schools that arose through deeper levels of social processing, according to respondents. Such deliberation seems to have prompted about 10% of the sample to carry out habitat projects as educational ventures for students and make greater use of the outdoors. Slightly fewer reported that they integrated the innovation into existing teaching units and curriculum topics and changed their attitudes about issues related to the innovation. This

finding implies change at organizational levels but whether they occurred was not verified by the researcher since this dimension was beyond the study scope.

5.4 Relationship among Scale Variables

This final segment of Chapter 4 presents the relationship among scale variables. Table 5.11 shows zero-order intercorrelations among the scale variables. A bivariate analysis was selected to generate a Pearson product-moment intercorrelation matrix to determine strengths of association among the variables. A one-tailed test was selected as the correlates were expected to be positive. As previously mentioned, Shavelson (1988) was used as a guide to judge the magnitude of a correlation coefficient (see page 136 in Chapter 4). All correlations were positive and significant, ranging in magnitude from .14 to .67. The low to moderately high sizes of correlations suggest that the scale variables are measuring different constructs.

The level of implementation scale variable was included in the analysis to examine its relationship among the components that comprise this composite variable. Generally, correlations between it and its components (i.e., routine use, refinement, integration, renewal and institutionalization) were positive, strong and highly significant, ranging from .62 to .80, as expected. The strongest correlations were between it and routine use and refinement. The weakest correlation was between it and institutionalization. Correlations among the variables that were used to form the level of implementation composite were generally of moderate size. The strongest correlation was between refinement and routine use (moderately high); the weakest was between integration and institutionalization (fairly low).

Table 5.11 reveals further insights about strengths of interrelationships among criterion variables. Correlations between level of program use and criterion variables ranged from fairly weak to fairly strong. Stronger associations were evident with integration, routine use and level of implementation, where the strongest was with refinement (moderately high). Weakest

Table 5.11

Zero-order intercoorelations Between Criterion Variables (Pairwise deletion of missing data, N = 370 - 515)

	1	2	3	4	5	6	7	8	9
CRITERION VARIABLES									
1. Level of Program Use	--								
2. Routine Use	.51***	–							
3. Refinement	.63***	.67***	–						
4. Integration	.45***	.42***	.49***	–					
5. Renewal	.22***	.36***	.35***	.30***	–				
6. Institutionalization	.17***	.27***	.31***	.24***	.59***	–			
7. Conceptual	.16***	.22***	.28***	.14**	.25***	.27***	–		
8. Process Use	.21***	.36***	.38***	.19***	.43***	.36***	.64***	—	
9. Level of Implementation	.55***	.79***	.80***	.72***	.66***	.62***	.30***	.46***	–

Note. * = *$p < .05$; ** $p < .01$; *** $p < .001$.

associations were with institutionalization and conceptual use, where the sizes of coefficients were fairly low. Correlations between conceptual use and the criterion variables were generally weak with the exception of a fairly strong relationship with process use (moderately high). With the exception of conceptual use, correlations between process use and most criterion variables ranged from weak to moderate. The correlations between process and conceptual use variables with the level of implementation composite tended to be fairly moderate.

5.6 Summary

This chapter partially addressed the study's main research questions regarding use: *Does program use vary as a function of the degree of sustained interactivity?* and *Does process use vary as a function of the degree of sustained interactivity?* The finding of reasonable amounts of variation along the dimensions of use is encouraging because the study seeks to examine use under varying conditions of sustained interactivity. All scale variables were also found to be positive and significant and measure different constructs. Relaxing listwise deletion limits the data.

Several patterns emerged through descriptive analyses that reveal important characteristics associated with use. In general the finding that most teachers were putting the innovation into practice, albeit moderately, surfaced as an important indicator that the non-mandated innovation is used instrumentally on a routine basis with considerable thought for students' interests and some individual effort to enhance its impact. It was also clear that teachers were optimistic about the learning gained about the innovation and that their participation in it stimulated confidence in teaching topics related to it, positive feelings about work and to a lesser extent facilitating voice, recognition and empowerment. These encouraging findings imply high conceptual and process use effects. The most exciting finding, however, was the impressive level of reported new skill development related to teaching practices, which suggest significant professional development benefits for teachers. While less

dramatic, effects of deeper levels of social processing surfaced as promising indicators of affecting change at the organizational level, the most striking being associated with initiating habitat projects and making more use of the out-of-doors. These findings beg answers to learn if use varies as a function of the degree of sustained interactivity–even in the face of other influences–to which we now turn in the next chapter.

CHAPTER 6

Characteristics of Covariate Variables

As the reader may recall, the conceptual framework that is guiding this study identified that, in addition to sustained interactivity, five categories of influences on the user may foster or negate the use of innovation by teachers in their workplace. These are the amount and depth of *collaboration* among teachers in their school settings, a user's *orientation to change*, level of *commitment to the innovation*, the *quality of the innovation*, and the user's *perception of disseminator characteristics*. These constructs are located within the school workplace in the conceptual framework (see Figure 2.5 on page 42). Items for these constructs were included within the questionnaire to enable an analysis of their influence on the use of innovation. In particular, these variables are considered to be covariates of sustained interactivity and can be used to obtain more precise estimates of the latter.

The first of the four parts of this chapter begins with a description of response patterns at the item level. Response patterns by item appear in Appendix D. How items for each variable were developed is described to justify the approach that the researcher took in creating them. In the second part of the chapter, the reader is presented with a description of how scale variables were formed, followed by an analysis of them to generate general ideas about their characteristics. In the third section, conclusions about characteristics are presented that emerged through these analyses. The last section shows the intercorrelations among the covariate variables.

6.1 Description of Response Patterns

The focus in this segment is on describing response patterns at the item level for each control variable. A description of how items for each variable were developed is also presented.

6.1.1 Collaboration

6.1.1.1 Formation of Items: Collaboration

As was discussed in the literature review in Chapter 2, empirical studies found that high but deep levels of collaborative activities between teachers–within contexts that facilitate shared understandings of their work–are fundamental to use of innovation (Cousins et al., 1994). Items for the variable *teacher collaboration*, therefore, were created to capture amount and depth of collaborative activities within teachers' school settings. Ideas for indicators for depth of collaboration drew largely from the work of Cousins et al. (1994) and Little (1982, 1990). These scholars cast collaboration along a continuum of teacher interaction that range from superficial forms (e.g., information exchange) through to highly involved (e.g., joint teaching). For both, the deepest form of collaborative activities includes notions of shared responsibility for teaching, collective conceptions of autonomy, and support for teachers' initiative and leadership regarding professional practice. Given that the study has an interest in exploring the presence of organizational learning conditions, the researcher was also interested in exploring if teachers tend to engage in deeper forms of collaborative inquiry about, for example, their practice. Items along this dimension (i.e., item 3.4 and 3.5) were adapted from the work of Cousins and Walker (2000). Part 3 of the questionnaire (see Appendix D, page 3) was devoted to teacher collaboration and invited respondents to describe their school context. The 6 items contained therein captured data along a 5-point Likert frequency scale that ranged from never (1) to always (5).

6.1.1.2 Description of Response Patterns: Collaboration

As displayed in Table 6.1, responses leaned, on average, toward the higher end of the scale. In general, there was considerable variability with standard deviations ranging from 0.86 to 1.02. The item in which the frequency was highest was 3.0: At my school, teachers get

Table 6.1

Characteristics of Collaboration Among Respondents

Questionnaire Item	Response Distribution[a] Ne	R	S	F	A	Mean	SD	N	Rank	95% C.I.[b] Lower	Upper
3.0) At my school, teachers get together to talk about teaching.	2%	9%	32%	44%	12%	3.55	0.90	503	1[c]	3.47	3.63
3.1) At my school, my colleagues and I compare the programs that we use in our classrooms.	4%	14%	38%	35%	9%	3.30	0.96	501	2	3.22	3.39
3.2) At my school, teachers co-operate together to teach a unit together.	7%	25%	38%	24%	7%	3.01	1.02	501	6	2.92	3.10
3.3) We look for and review new programs that might be exciting for our students	4%	17%	39%	30%	10%	3.24	0.98	500	3	3.16	3.33
3.4) My colleagues and I often question our beliefs about education (e.g., about teaching).	4%	21%	40%	28%	8%	3.15	0.96	495	5	3.06	3.23
3.5) We explore a topic that we teach to such an extent that sometimes we decide to make changes (e.g., about how we teach).	1%	17%	46%	29%	7%	3.23	0.86	499	4	3.16	3.31

[a] Ne = Never (1); R = Rarely (2); S = Somewhat (3); F = Frequently (4); A = Always (5).

[b] Confidence interval.

[c] 1 = highest level of collaboration; 6 = lowest level of collaboration.

together to talk about teaching. The item in which the frequency was the lowest was 3.2: At my school, teachers co-operate together to teach a unit together.

These data suggest that teachers tend to be fairly highly involved in collaborative activities. The most frequent forms of collaboration are at superficial levels where teachers get together to talk, compare their use of programs and review new programs. This finding confirms similar findings in the literature (Cousins et al., 1994; Little, 1990). Joint teaching–a deeper form of collaboration– occurs less often, which also confirms previous findings (Cousins et al., 1994). Interestingly, while teachers engage less frequently in deeper forms of dialogue about their practice (i.e., collective questioning their beliefs about education), they do tend to explore topics of interest to an extent that sometimes they make collective decisions to make changes (e.g., about how they teach). These findings suggest that respondents in general may be teaching within school settings that foster conditions for organizational learning.

The data, however, also suggest fairly wide variability in the study sample. Apart from general talk about teaching, it was noted that similar patterns of responses were evident for the remaining items: slightly more or less than a quarter of the sample never or rarely engages in collaborative activities; slightly more that a third engage in it somewhat while about a third to less than a half engage in collaboration more frequently.

6.1.2 Orientation to Change

6.1.2.1 Formation of Items: Orientation to Change

A user's orientation to change bears on use of innovation. Empirical studies suggest that users who are not inclined to change are often reluctant to engage in new programs (Feiman-Nemser & Floden, 1986; Hargreaves, 1990). In their study of 12 school sites, Huberman and Miles (1984) captured respondents' initial attitudes toward an innovation by asking the question: "Compared to the kinds of things that matter for you...how much did this one [innovation] really count, back then?" (p. 53). They also asked respondents whether they were

initially favourable to a new practice. They found that most users initially perceived the innovation as central to their classroom life and were favourable to it but many were neutral or had reservations. The researcher's item for orientation to change reflects the ideas behind the Huberman and Miles' (1984) questions. This item (see item 5.5 in Part 5 on page 3 in Appendix D) seeks to capture data about whether teachers were favourable to an innovation if it reflected something that mattered to them. The notion of what may "matter" to teachers regarding an innovation is the centrality of it to their classroom life. In the case of item 5.5, a teacher's belief that it will benefit students was selected as a central element to classroom life. As shown in Appendix D (see Part 5, page 3) it was developed to capture data on a teacher's attitude to change along a 5-point Likert frequency same which ranged from never (1) to always (5).

6.1.2.2 Description of Response Patterns: Orientation to Change

Of the 515 teachers who completed the questionnaire, 489 responded to item 5.5. With a mean of 3.66 on a 5-point frequency scale, responses leaned to the higher end of the frequency scale. Variability was somewhat wide, with a standard deviation of 0.98. These data suggest that most members of the study sample are open to change in the sense that they try out new programs if they believe that their students will benefit from them. There was, however, variation among the sample: a small segment never (4%) or rarely (5%) try out new programs but slightly more than half of the respondents do so frequently (37%) or always (21%).

6.1.3 Commitment to the Innovation

6.1.3.1 Formation of Item: Commitment to the Innovation

Empirical studies found that a user's commitment to an innovation was an important factor in the use of the innovation (e.g., Cousins et. al., 1994). The notion of commitment followed Huberman and Miles' (1984) definition as "commitment to the innovation" (p. 202), which they measured as a level of commitment. They found that commitment followed program

adoption and described it as a predictor of use in terms of "user commitment/acceptance" (p. 192) of an innovation. Two items (i.e., item C and 2.0) were created to gather data on teachers' level of commitment to the innovation (see Appendix D, page 1 and Part 2, page 2). The data for item 2.0 were collected along a 4-point agree/disagree Likert-type of scale that ranged from strongly disagree (1) to strongly agree (4). Item C was a dichotomous variable; teachers were asked teachers to indicate yes (1) or no (0) if they received training to become a facilitator of the innovation. It was included because it was assumed that teachers who were more committed to the innovation would be more likely to seek such training.

6.1.3.2 Description of Response Patterns: Commitment to the Innovation

Of the 515 teachers who completed the questionnaire, 485 responded to item 2.0. A mean score of 3.20 indicated that responses leaned to the agreement end of the scale. Variability was fairly low with a standard deviation at 0.65. These data suggest that most teachers agreed that they were committed to the innovation. There was, however, variation among the sample: a small segment disagreed (10%) while more than half were committed (59%), with almost a third in strong agreement (31%). Slightly more than a third (36.5%) of the teachers were also facilitators, which suggested a fairly strong commitment within that sector of the sample.

6.1.4 Quality of Innovation

6.1.4.1 Formation of Items: Quality of Innovation

Teachers were invited to rate the quality of the innovation (see Appendix D, Part 1, page 2). This item (i.e., item 1.5) was included in the questionnaire because empirical studies suggested that quality of the innovation was an important influence in the use of an innovation (e.g., Cousins & Leithwood, 1986; Falice & Muthard, 1982). Three dimensions of quality were selected: its educational quality, ease to connect it to the curriculum and ease of use. A 5-point scale was developed for each of these dimensions. Educational quality was rated along a low (1)

to high (5) scale. The remaining two dimensions were rated along a difficult (1) to easy (5) scale.

6.1.4.2 Description of Response Patterns: Quality of Innovation

As shown in Table 6.2, responses leaned toward the high end of the scale. In general, variability was somewhat stable with standard deviations ranging from 0.54 to 0.77. The item that received the highest rating was: 1.5: a. Educational quality of the activities. The item that received the lowest rating was 1.5b: Easy to connect to the curriculum.

The data suggest that most respondents viewed the innovation as a high quality product that was easy to use and connect to the curriculum. There was some variation: a small segment found the innovation difficult to connect to the curriculum, while about 10% rated ease of use and connection to the curriculum as average.

6.1.5 Characteristics of a Program Coordinator

6.1.5.1 Formation of Items: Characteristics of a Program Coordinator

A set of seven items (i.e., items 11.0a to 11.0g) was created to capture data about selected characteristics of a program coordinator that a user of an innovation might perceive as being important. The characteristics selected for these items were drawn from the work of several scholars who found that the following characteristics of a disseminator contributed toward the use of innovation (e.g., Cousins & Leithwood, 1986; Greene 1987, 1988a; Huberman & Cox, 1990; Marsh & Glassick, 1988; Muthard & Felice, 1982; Patton, 1994, 1997): strong technical skills, ability to invoke rapport, credibility, responsiveness, accessibility, listening and communication skills, and respect of diverse views. A 4-point not important/very important Likert-type of scale was created to capture data, ranging from no important (1) and very important (4).

Table 6.2

Characteristics of Quality of Innovation

Questionnaire Item	Response Distribution[a] 1	2	3	4	5	Mean	SD	N	Rank	95% C.I.[b] Lower	Upper
1.5) Overall, how would you rate Project WILD activities?											
a. Educational quality of the activities.	0%	0%	2%	40%	58%	4.56	0.54	430	1[c]	4.50	4.61
b. Easy to connect to curriculum.	1%	2%	10%	37%	50%	4.35	0.77	430	3	4.28	4.42
c. Easy to use.	0%	0%	9%	43%	48%	4.39	0.65	430	2	4.33	4.45

[a] 1 = Lower; 2 = Low; 3 = Average; 4 = High; 5 = Higher.

[b] C.I. = Confidence interval.

[c] 1 = highest quality; 3 = lowest quality.

6.1.5.2 Description of Response Patterns: Characteristics of Program Coordinator

As displayed in Table 6.3, responses leaned toward the very important end of the scale. Variability was somewhat stable, with standard deviations ranging from 0.67 to 0.73. The one item that was rated as the most important was 11.0a: Having technical expertise about wildlife topics. The items that were rated as the least important were: 11.0a: Being available when I with questions, and 11.0b: Delivering technical information when I need.

These data suggest that, in general, all selected characteristics were considered important as average mean scores were all above 2.5 for a 4-point scale. Bearing this in mind, the most important characteristic about a coordinator was having expertise about wildlife topics. The least important (although still important) were being sensitive to different views about an issue, being available when respondents call with questions and delivering technical information when needed. There was some variation. The most was associated with the coordinator's availability. Teachers were invited to complete item 11.0 which requested further information about important characteristics that were not listed under the prescribed list offered under items 11.0a through to 11.0g. They were also asked to identify the most and least important characteristics of a coordinator by completing items 11.1 and 11.2. An analysis of responses is located in Chapter 8 (see page 221) as the researcher elected to discuss these dimensions by comparing them with the responses of coordinators.

6.2 Scale Variable Construction and Description

The objective of this section is to provide the reader with a description of how scale variables for the control constructs were constructed to reduce the data for the regression analysis. The procedures that were used to create scaled variables and deal with missing data are the same as those described in the Chapter 4 (see page 119). All items for each construct were checked for reliability,

Table 6.3

Characteristics of a Program Coordinator

Questionnaire Item	Response Distribution[a] NI	SI	I	VI	Mean	SD	N	Rank	95% C.I.[b] Lower	Upper
11.0) Indicate how important the following characteristics are to you about a program coordinator:										
a. Being available when I call with questions.	1%	14%	45%	39%	3.23	0.73	479	5[c]	3.16	3.29
b. Delivering technical information when I need.	1%	12%	50%	37%	3.23	0.69	482	5	3.17	3.29
c. Being personable when talking with me.	1%	11%	39%	50%	3.38	0.70	484	2	3.32	3.44
d. Talking about things in ways that are easy to understand.	3%	6%	42%	49%	3.38	0.71	484	2	3.32	3.45
e. Being willing to hear what I have to say.	1%	10%	49%	41%	3.29	0.68	486	3	3.23	3.35
f. Being sensitive to different views about an issue.	1%	12%	51%	37%	3.24	0.67	484	4	3.18	3.30
g. Having technical expertise about wildlife topics.	1%	8%	38%	53%	3.43	0.68	483	1	3.37	3.49

[a]NI = Not Important (1); SI = Somewhat Important (2); I = Important (3); VI = Very Important (4).

[b] C.I. = Confidence interval.

[c] 1 = highest level of importance; 5 = lowest level of importance.

using Cronbach's alpha. As shown in Table 6.4, the reliability of all the scale variables is sufficiently high (i.e., over 0.70) for research purposes.

6.2.1 Scale Variable: Collaboration

As displayed in Table 6.4, *collaboration* was constructed by averaging responses to 6 items on a 5-point frequency scale. This scale variable represented the intensity of teacher collaboration in school settings. The reliability of the collaboration scale was very high. The mean score suggests that teachers were fairly involved in collaborating amongst themselves but there was some variability. By slightly relaxing strict listwise deletion, the number of cases increased from 478 to 500.

6.2.2 Scale Variable: Users' Perception of Disseminator Characteristics

Users' perception of disseminator characteristics was constructed by averaging responses to seven items, all rated on a 4-point Likert-type of not important/very important scale. This scale variable represents the views of respondents of what aspects of a coordinator of an innovation are important to them. It is not a measure of how they perceived the coordinator who is responsible for the dissemination of the innovation. The reliability of the users' perceptions of disseminator characteristics scale was very high. As suggested by the mean score, teachers considered most of the selected characteristics as important but there was some variation. By slightly relaxing strict listwise deletion, the number of cases increased from 478 to 500.

6.2.3 Scale Variable: Commitment to the Innovation

Commitment to the innovation was constructed by using one item that was rated on a 4-point agree-disagree Likert-type of scale. This scale represented a teacher's commitment to the innovation. The second item (a dichotomous variable) was taken directly from the raw data but was dropped as it did not contribute to the reliability of the scale. The average mean score

Table 6.4

Variable Construction: Control Variables

Variable Name and Description	Scale	Mean[1]	SD	N	Alpha
1) Amount, depth and quality of **Collaboration** among teachers at a school site. (Mean of 6 items on a 5-point Likert from always (5) to never (1) scale. Mean of same 6 items transformed to a probability scale from 0 to 1. Items are presented below.) • 3.0) At my school, teachers get together to talk about teaching. • 3.1) At my school, my colleagues and I compare the programs that we use in our classrooms. • 3.2) At my school, teachers co-operate together to teach a unit together. • 3.3) We look for and review new programs that might be exciting for our students. • 3.4) My colleagues and I often question our beliefs about education (e.g., about teaching). • 3.5) We explore a topic that we teach to such an extent that sometimes we decide to make changes (e.g., about how we teach).	1-5	3.25	0.74	500	.87
2) **Users' Perception of Disseminator Characteristics** (Mean of 7 items on a 4-point Likert very important (4)/not important (1) scale. Mean of same 7 items transformed to a probability scale from 0 to 1. Items are presented below.) 11.0.) Indicate how important the following characteristics are to you about a program coordinator: • a. Being available when I call with questions. • b. Delivering technical information when I need. • c. Being personable when talking with me. • d. Talking about things in ways that are easy to understand. • e. Being willing to hear what I have to say. • f. Being sensitive to different views about an issue. • g. Having technical expertise about wildlife topics.	1-4	3.31	0.48	483	.81

(continued)

[1] Statistics were rounded off to second decimal point.

Table 6.4

Variable Construction: Control Variables (con't)

Variable Name and Description	Scale	Mean	SD	N	Alpha
3) Level of **Commitment** to the innovation (1 item on a 4-point Likert-type strongly agree (4)/strongly disagree (1) scale. • 2.0) I am committed to Project WILD. • Have you received training to become a Project WILD Facilitator?[3]	1-4	3.20	0.65	485	n.a..[2]
4) Degree of **Orientation to Change** (1 item on a 5-point Likert frequency scale from always (5) to never (1) scale. • 5.5) I try out new programs if I believe that my students will benefit from them.	1-5	3.66	0.98	489	n.a.
5) **Users' Perception of Quality of Innovation** (Mean of 3 items on a 5-point Likert from high/easy (5) to low/difficult (1) scale. 1.5) Overall, how would you rate Project WILD activities? • a. Educational quality of the activities. • b. Easy to connect to curriculum. • c. Easy to use.	1-5	4.43	0.55	430	.77

[2] n.a. = Not applicable.

[3] This item was dropped because it did not contribute to reliability.

suggested that teachers were generally committed to the innovation but there was some variation.

6.2.4 Scale Variable: Orientation to Change

Teachers' *orientation to change* was constructed by using one item that was rated on a 5-point Likert frequency scale from never (1) to always (5). This scale variable represents the extent to which a teacher is oriented to change with respect to trying out new innovations. A reliability analysis was unnecessary. The mean score suggests that teachers were generally open to change (i.e., willing to try new innovations) but there was a fair amount of variability.

6.2.5 Scale Variable: Users' Perception of Quality of Innovation

Users' perception of quality of innovation was constructed by averaging responses to three items, each rated on a 5-point Likert frequency scale from high/easy (5) to low/difficult (1). This scale variable represents respondents' perceptions of the quality of the innovation along three dimensions: educational quality of the activities, ease in connecting the innovation to the curriculum and ease in using it. The reliability of this scale variable was at an acceptable level for research purposes. The mean score suggests that most teachers perceived the innovation's quality as very high. Variability was fairly low, which suggests that teachers do not vary widely on the innovation's quality By slightly relaxing strict listwise deletion, the number of cases increased from 478 to 500.

6.3 Conclusions about Characteristics of Control Variables

In this segment, conclusions are presented about the characteristics of control variables, given the analyses at item and scale variable levels. There was reasonable variation in the study sample along most of the dimensions of these influences on use of the innovation but it was less for others (i.e., users' perceptions of program coordinator characteristics and of the quality of the innovation). Nonetheless, several interesting patterns emerged.

1. The trend of mean scores for all control variables is toward the high end of scales. This finding was encouraging. The finding that covariates tend to be positive will help in achieving a better understanding of the effects of sustained interactivity on use despite the influence in the ensuing hierarchical linear regression.

2. Teacher collaboration at the level of exchange of information is fairly high but some deeper collaboration also occurs albeit less frequently. Conditions for organizational learning also appear evident. The trend of fairly high levels of collaborative activity between teachers along all the dimensions examined in this study was unexpected as the literature suggests that teachers tend to work in isolation. This finding may indicate that teachers who responded to the questionnaire tend to work in more collaborative work settings. While collaborative dialogue at the superficial level of information exchange was highest, deeper levels of dialogue were also apparent. This finding implies the presence of organizational learning capacity, which suggests an availability of forums for collegial interaction. The fairly high frequency of collective and deeper discussions about teaching and of efforts to compare use of existing programs, however, contrasts sharply with the relative lack of such activity regarding the innovation under study. It is unknown if these other programs were well-developed but the discrepant finding does raise questions, such as: Does "completeness" of an innovation inhibit collective dialogue about it? Does it reduce interest to compare its use with colleagues? Did more collective dialogue about the innovation occur more at earlier phases of putting it into practice but is now less during the implementation phase?

3. Teachers are relatively open to change. Since only one indicator was used to measure openness to change, the validity of the indicator for change may be somewhat limited. Responses to item 3.3, however, lend more evidence that teachers within the study were fairly open to change.

4. Commitment to the innovation is fairly high. Only one indicator was used to measure commitment and thus its validity may be limited. The finding of fairly high commitment for the innovation, however, tended to be confirmed regarding process use effects where teachers tended to indicate that the more the learned about the innovation the more they felt committed to it.

5. Users' perception of the quality of the innovation is high. There was fairly low variability along the dimension of quality, which suggests that most teachers perceived the innovation to be of high educational quality, easy to use and to connect to the curriculum.

6. Selected characteristics of a program coordinator are all important. Fairly low variability along this dimension implies that all were important to almost all teachers.

6.4 Relationship among Scale Variables

In this final segment of Chapter 6, the relationship among scale variables is presented. Table 6.5 shows zero-order intercorrelations among the scale variables. A bivariate analysis was selected to generate a Pearson product-moment intercorrelation matrix to determine the strengths of relationships between the scale variables. A one-tailed test was selected as correlations are expected to be positive. As previously mentioned, Shavelson (1988) was used as a guide to judge the magnitude of a correlation coefficient (see page 136 in Chapter 4).

Table 6.5 shows that the correlations were variably significant. Those that were significant were positive, and ranged in magnitude from .10 to .36. The low to moderately low size of significant correlations suggests that the scale variables are measuring different constructs and that assumptions about multicolinearity will not be violated for the ensuing hierarchical linear regression analysis.

Table 6.5 also shows the strength of interrelationships among the covariate variables. The strongest (but moderately low) association was between the level of teachers' commitment to the innovation and their perceptions of the quality of the innovation, followed by the level of

Table 6.5

Zero-order Intercoorelations with Control Variables (Pairwise deletion of missing data, N = 520 - 502)

	1	2	3	4	5
CONTROL VARIABLES					
1. Collaboration	–				
2. Change	.10*	–			
3. Commitment	-.01	.25***	–		
4. Quality	.05	.14**	.36***	–	
5. Characteristics	-.01	.14**	.11*	.03	–

Note. * = *$p < .05$; ** $p < .01$; *** $p < .001$.

teachers' commitment with teachers' orientation to change. The weakest association (and very low) was between teachers' orientation to change and collaboration among teachers as well as teachers' level of commitment to the innovation and their perceptions of coordinator characteristics.

6.5 Summary

Generally, there was a reasonable amount of variation among members of the study sample along most dimensions represented by the control variables. Relaxing listwise deletion slightly will limit the data. While several intriguing patterns emerged through the descriptive analyses, the one of most interest was the trend toward the positive end of scales because it suggests that control variables may be important sources of influence in the use of the innovation. As covariates, they will aid in attaining more precise estimates of sustained interactivity, despite their influence, in the ensuing hierarchical regression analysis, to which the next chapter is devoted.

CHAPTER 7

Relationships Between Use of the Well-developed Innovation and Sustained Interactivity

The focus of this chapter is to answer the main set of research questions:

Does program use vary as a function of the degree of sustained interactivity?

Does process use vary as a function of the degree of sustained interactivity?

To find answers to these questions, hierarchical linear regression was undertaken to examine the extent to which use of the program innovation and process use depends on the unique influences of sustained interactivity variables.

This chapter is divided into two parts. The first part begins with an examination of zero-order intercorrelations between criterion, predictor and covariate variables. The second segment addresses the results of hierarchical linear regressions, which were carried out in two phases. The first phase focuses on examining the extent to which the use of the program innovation and process use depends on the unique influence of sustained interactivity as *a global measure*, while controlling for other assumed influences on use of the well-developed innovation. The second phase addressed the extent to which the use of the program innovation and process use depends on the unique influence of *the nine measures of sustained interactivity*, while controlling for the same assumed influences on use of the innovation.

7.1 Intercorrelations among Criterion, Predictor and Covariate Variables

In this segment, the focus is on describing the zero-order intercorrelations associations among pairwise variables between criterion, predictor and covariate variables. These intercorrelations are displayed in Table 7.1. The reader will recall that zero-order intercoorelations within groups of individual criterion, predictor and covariate variables were discussed previously in Chapters 4, 5 and 6, respectively. Generally, it was found that correlations among criterion variables were positive, highly significant and ranged in magnitude

Table 7.1

Zero-order intercoorelations Between Criterion, Predictor and Covariate Variables (Pairwise deletion of missing data, N = 190 - 515)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
CRITERION VARIABLES																			
1. Program Level	--																		
2. Conceptual Use	.16***	--																	
3. Process Use	.21***	.64***	---																
4. Level of Implementation	.55***	.30***	.46***	--															
PREDICTOR VARIABLES																			
5. Social Processing	.15**	.30***	.46***	.53***	--														
6. Engagement/ Involvement	.18***	.32***	.54***	.53***	.47***	--													
7. Intensity of Indirect Contact	.16***	.34***	.48***	.42***	.35***	.64***	--												
8. Intensity of Direct Contact	.12*	.27***	.38***	.41***	.31***	.66***	.54***	--											
9. Ongoing Indirect	.21***	.22***	.32***	.42***	.24***	.48***	.69***	.44***	--										
10. Ongoing Direct	.07	.14**	.22***	.33***	.22***	.46***	.46***	.58***	.58***	--									
11. Perceptions of S.I.	.15*	.42***	.51***	.40***	.42***	.39***	.36***	.49***	.25***	.34***	--								
12. Benefits of S.I.	.09	.47***	.56***	.36***	.35***	.48***	.40***	.55***	.25***	.36***	.71***	--							
13. Follow Up	.14**	.26***	.42***	.35***	.28***	.62***	.69***	.52***	.52***	.32***	.31***	.41***	--						
14. S.I.	.19**	.43***	.57***	.58***	.48***	.75***	.75***	.80***	.67***	.75***	.62***	.68***	.71***	--					
COVARIATES																			
15. Collaboration	-.02	.03	.09*	.21***	.34***	.01	.02	.12*	.03	.04	.23***	.12*	-.00	.18**	--				
16. Change	.17***	.17***	.22***	.33***	.20***	.36***	.26***	.27***	.23***	.21***	.19**	.22***	.22***	.33***	.10*	--			
17. Commitment	.17***	.48***	.66***	.40***	.29**	.47***	.47***	.34***	.35***	.19***	.30***	.32***	.40***	.51***	-.01	.25***	--		
18. Quality	.02	.25***	.36***	.30***	.16**	.23***	.20***	.19**	.16**	.17**	.30***	.19**	.19***	.29***	.05	.14**	.36***	--	
19. Coordinator Characteristics	-.05	.11*	.15**	.11*	.10*	.12**	.09*	.22***	.08*	.22***	.31***	.45***	.06	.31***	-.01	.14**	.11*	.03	--

Note. S. I. = Sustained Interactivity; * = * $p < .05$; ** $p < .01$; *** $p < .001$.

from .14 to .67. Similarly, correlations among predictor variables were also positive and highly significant and ranged in magnitude from .22 to .71. Correlations among covariates were variably significant and positive and ranged in magnitude from .10 to .36. While some correlations within criterion, predictor and covariates variable groups were very low or moderately high, the size of most correlations was generally moderate. Moderately high correlations (i.e., over .60 but less than .80) were less than the benchmark (i.e., .80) set by the researcher (see page 136 in Chapter 4 for an explanation) as approaching the high range. These correlations within each group of criterion and predictor variables assured the researcher that scale variables were 1) measuring different constructs, and 2) that assumptions about multicolinearity would not be violated. Correlations between the overall indicator for sustained interactivity and its components were also positive and significant as were those between the overall indicator for the level of implementation of the innovation and its components, as expected.

There are five observations about Table 7.1 that are noteworthy. First, all statistically significant zero-order correlations are positive, which is entirely consistent with expectations. Second, one of the criterion variables, level of program use, correlates weakly with predictor variables and the five covariates. Third, predictor variables tend to correlate more strongly with level of implementation and process use variables than with the conceptual use variable. Most criterion variables appear to be more strongly correlated with engagement/involvement, social processing and the overall sustained interactivity indicator variables than with the other indicators of sustained interactivity (i.e., predictor variables). Fourth, while, as expected, most criterion variables are generally correlated with most of the covariates, the associations range from weak to fairly strong (moderately high). Covariates tend to be more strongly associated with the level of implementation and process use criterion variables. Variables associated with commitment, quality of innovation and orientation to change are generally more strongly

correlated with criterion variables than those associated with collaboration and coordinator characteristics. The strongest association between the covariates and the criterion variables is between commitment and process use; the weakest association is between coordinator characteristics and the criterion variables. Fifth, most covariates are generally correlated with predictors. The strongest correlation between covariates and predictor variables is associated with commitment and sustained interactivity; the weakest is generally associated with collaboration. These correlations imply the need to specify covariates in the regression equation.

7.2 Hierarchical Linear Regression with Sustained Interactivity

This segment of Chapter 7 presents the results of the first phase of hierarchical linear regression that was carried out. The purpose of this phase was to examine the extent to which program use and process use depends on the unique influence of sustained interactivity as a global measure, while controlling for five assumed influences on use of the innovation. Four models were run, corresponding to each of the four variables associated with the use of the innovation: level of program use, level of implementation, conceptual use and, finally, process use. As the overall indicator for the level of implementation of the innovation already reflected the components that formed it, they were not individually included in the analysis.

Hierarchical linear regression is suitable for this analysis because it allows the researcher to test the significance of predictors as a set and then to determine where each predictor contributes uniquely to the explanation of variability in an outcome measure (Abrami, Cholmsky & Gordon, 2001; Draper & Smith, 1998; Pedhazur & Schmelkin, 1991). The advantage of this approach is that it allows for shared variability to be assigned to a predictor variable according to theoretical or some other criterion. In the case of this study, five covariates were assumed to be influences to use of innovation: the degree of commitment to the innovation by the user of it; the users' orientation to change; the amount and depth of

collaboration among teachers in school settings; the users' perception of the quality of the innovation; and selected characteristics of the program coordinator. These five influences were derived from prior theory and are considered covariates of sustained interactivity. The primary purpose for their inclusion is to obtain more precise estimates of the effects of sustained interactivity. Hierarchical linear regression is a procedure that allows the researcher to examine the unique contribution of sustained interactivity to the explanation of variability in outcome (i.e., use) variables, given other theoretical influences that may bear on the use of the innovation. Decisions rules for establishing the order of entry of variables into the regression equations are presented below, followed by an examination of the regression models.

7.2.1 Order of Entry of Variables

Hierarchical linear regression allows the researcher to decide on the order of entry of predictors based on theoretical guidelines or other criterion (Abrami et al., 2001; Draper & Smith, 1998; Pedhazur & Schmelkin, 1991). Given that the objective is to use covariates to obtain more precise estimates of the effects of sustained interactivity, the researcher decided to enter covariates first into each regression equation, followed by the sustained interactivity predictor. Two problems, however, surfaced. First, in what order should covariates be entered? The researcher had no theoretical basis to say that one covariate was more or less influential on use than another covariate. Second, should all covariates be used for all models?

The first issue (i.e., which covariate might be more influential) was resolved by relying on information provided by the zero-order intercorrelations matrix about the strength of relationships among covariates and criterion variables as a basis upon which to standardize an entry order. It was noted that commitment to the innovation generally tended to be more strongly correlated with criterion variables, followed by users' perception of quality of the innovation and users' orientation to change. This observation was used as the basis to establish order of entry for these three covariates (i.e., commitment first, users' perceptions of quality

second and users' orientation to change third). With regard to the collaboration among teachers and coordinator characteristics variables, the researcher examined their correlations with level of program use, level of implementation, conceptual and process use variables. It was noted that correlations between collaboration and these criterion variables were generally weaker. Based on this observation, coordinator characteristics became the fourth candidate in the order for entry, with collaboration as the last. The second issue was resolved by entering covariates, in the order as was specified above, only if the zero-order correlation between covariates and criterion variables was statistically significant (i.e., that there was a relationship). Using these decision rules for the ordering and selection of covariates and the sustained interactivity predictor, four models were run. Each model is described in the next segments of this section.

7.2.2 Impact of Sustained Interactivity on Use of the Innovation

Table 7.2 reports the results of the four models that were run to examine the extent to which use of the innovation depends on the unique influence of sustained interactivity, while controlling for the effects of the covariates. The overall measure of sustained interactivity was used for this purpose. It should be noted that this decision had a significant effort on the number of cases included in the analysis since listwise deletion of missing cases was used. This limitation is reflected in the degrees of freedom shown in Table 7.2.

In every case, the regression model was statistically significant. Across the four models, the number of covariates along with the predictors entered in the linear regression equation ranged from three to six, accounting for 8% to 47% of the variability in respective criterion variables. With the exception of the level of program use model, sustained interactivity surfaced as a statistically significant predictor of use of the innovation. This finding is particularly encouraging. The criterion variables most readily explained by sustained interactivity, after accounting for variation attributable to the covariates, were process use, level of implementation, and conceptual use.

Table 7.2

Hierarchical Linear Regression: Impact of Sustained Interactivity on Use of Innovation

Criterion Variable	R^2	df	F	Predictor Variables[a]	B	t
1. Level of Program Use	.08	(3, 165)	4.82**	Commitment	.23	2.64**
				Orientation to Change	.03	0.28
				Sustained Interactivity	.07	0.75
2. Level of Implementation	.43	(6, 161)	19.81***	Commitment	.11	1.55
				Quality of Innovation	.19	2.90**
				Orientation to Change	.14	2.12*
				Coordinator Characteristics	.06	0.93
				Collaboration	.16	2.63**
				Sustained Interactivity	.37	4.83***
3. Conceptual Use	.24	(5, 165)	10.46***	Commitment	.23	2.76**
				Quality of Innovation	.11	1.40
				Orientation to Change	-.07	-0.94
				Coordinator Characteristics	.06	0.85
				Sustained Interactivity	.28	3.28**
4. Process Use	.47	(6, 156)	22.67***	Commitment	.39	5.48***
				Quality of Innovation	.12	1.91
				Orientation to Change	-.11	-1.75
				Coordinator Characteristics	.01	0.18
				Collaboration	.13	2.24*
				Sustained Interactivity	.33	4.45***

[a] In order of entry.

Note. * = *$p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.

These findings suggest that the innovation may likely be more fully implemented (i.e., put into practice more) as the amount of sustained interactivity increases, despite perceptions about the quality of the innovation, collaboration among teachers, and users openness to change. Since the level of implementation variable also contains within it specific instrumental uses of the innovation, these findings also suggest that the innovation will be more fully used as sustained interactivity increases. The results also suggest learning about the innovation (i.e., conceptual use) and effects of participating in it (i.e., process use) will likely increase when amounts of sustained interactivity also increase. While these results are highly encouraging with respect to the effectiveness of sustained interactivity as a unique predictor of use of the innovation, the test was limited because, due to listwise deletion of missing cases, it reflects slightly less than 40% of the study sample. Nevertheless, the significance of the regression models and the amount of explained variation in the criterion variables are very promising indeed.

7.2.3 Impact of Specific Components of Sustained Interactivity on Use

Sustained interactivity is a multidimensional complex construct as reflected by the nine indicators used to measure it in the present study. In this next segment, the extent to which the criterion variables depend on the unique influences of specific component indicators of sustained interactivity is examined. The interest is to explore which of the nine components of sustained interactivity would surface as being the most important in explaining variation in the criterion variables. In total, 3 models were run: one for each of the three criterion variables, where sustained interactivity emerged as being statistically significant. As shown in Table 7.3 in all models, the order of entry of covariates was held constant; covariates were entered first while predictors were entered last. In every case, the regression model was statistically significant. Across the three models, the number of covariates along with the predictors entered in the linear regression equation ranged from 13 to 14 and accounted for 34% to an impressive

Table 7.3

Hierarchical Linear Regression: Impact of Components of Sustained Interactivity on Criterion Variables

Criterion Variable	R^2	df	F	Predictor Variables[a]	B	t
1. Conceptual Use	.34	(13, 157)	6.12***	Commitment	.26	3.25***
				Quality of Innovation	.06	0.81
				Orientation to Change	-.05	-0.69
				Coordinator Characteristics	-.06	-0.77
				Social Processing	.14	1.76
				Engagement/Involvement	.03	0.27
				Intensity of Indirect Contact	.07	0.76
				Intensity of Direct Contact	-.15	-1.33
				Ongoing Indirect Contact	-.05	0.46
				Ongoing Direct Contact	.04	0.50
				Users' Perception of S.I.	.15	1.55
				Benefits of Sustained Interactivity	.31	2.98**
				Follow Up	-.04	-0.46
2. Level of Implementation	.54	(14,153)	12.81***	Commitment	.12	1.74
				Quality of Innovation	.16	2.48*
				Orientation to Change	.11	1.75
				Coordinator Characteristics	.05	0.81
				Collaboration	.11	1.75
				Social Processing	.32	4.55***
				Engagement/Involvement	.31	3.68***
				Intensity of Indirect Contact	-.01	-0.16
				Intensity of Direct Contact	-.01	-0.08
				Ongoing Indirect Contact	.05	0.67
				Ongoing Direct Contact	.04	0.57
				Users' Perception of S.I.	.01	0.07
				Benefits of Sustained Interactivity	.01	0.14
				Follow Up	-.08	-1.10

[a] In order of entry.

Note. * = * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.

(continued)

Table 7.3

Hierarchical Linear Regression: Impact of Components of Sustained Interactivity on Criterion Variables (con't)

Criterion Variable	R^2	df	F	Predictor Variables[a]	B	t
3. Process Use	.58	(14, 148)	14.31***	Commitment	.40	5.77***
				Quality of Innovation	.11	1.67
				Orientation to Change	-.11	-1.78
				Coordinator Characteristics	-.11	-1.69
				Collaboration	.07	1.08
				Social Processing	.15	2.24*
				Engagement/Involvement	.15	1.86
				Intensity of Indirect Contact	.07	0.84
				Intensity of Direct Contact	-.07	-0.80
				Ongoing Indirect Contact	-.06	-0.89
				Ongoing Direct Contact	.01	0.07
				Users' Perception of S.I.	.06	0.80
				Benefits of Sustained Interactivity	.36	4.40***
				Follow Up	-.06	-0.86

[a] In order of entry.

Note. * = * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.

58% of the variability in respective criterion variables. In all cases, one or more component of sustained interactivity surfaced as a statistically significant predictor of use of the innovation, despite the influence of covariates. Once again, these results are very encouraging regarding the effectiveness of components of sustained interactivity as unique predictors of use of the innovation but the tests were limited. Listwise deletion of missing cases and the inclusion of numerous covariates reduced the analyses to include less than 40% of the study sample. The significance of the regression models and the amount of explained variation in the criterion variables, nevertheless, are very promising.

7.2.3.1 Impact of Components of Sustained Interactivity on Conceptual Use

Table 7.3 also presents the results of a model that was run to examine the extent to which conceptual use of the innovation depends on the unique influence of each of the nine indicators of sustained interactivity. The results show that the benefits of sustained interactivity surfaced as significant, despite the influence of teachers' commitment to the innovation. In this case, less variation was explained in the criterion than that for level of implementation–only 34%–but the amount of explained variation was nonetheless quite impressive. This finding suggests that learning about the innovation will likely be more enhanced the more that teachers receive benefits that are perceived by them as being important from their interactions with coordinators. Conceptual use of the innovation (i.e., learning, enlightenment) was not found to depend on the remaining eight indicators of sustained interactivity.

7.2.3.2 Impact of Components of Sustained Interactivity on Level of Implementation

Table 7.3 also displays that a model was run to investigate the extent to which the level of implementation depends on the unique influence of each of the nine indicators of sustained interactivity. The results show that social processing about the innovation among teachers and their engagement and involvement in it emerged as highly significant, despite the influence of teachers' perceptions of the quality of the innovation. An impressive 54% of the variability was

explained in the criterion. This finding suggests that increases in levels of social processing and engagement andinvolvement will more likely enhance putting the innovation into practice by teachers. Level of implementation was not found to depend on the remaining seven indicators of sustained interactivity.

7.2.3.3 Impact of Components of Sustained Interactivity on Process Use

Finally, Table 7.3 also presents the results of a model that was run to examine the extent to which process use depends on the unique influence of the nine indicators of sustained interactivity. Benefits of sustained interactivity and social processing emerged as significant, despite the influence of teachers' commitment to the innovation. A very impressive 58% of the variation was explained in the criterion variable. This finding suggests that effects from participating in the innovation will likely increase the more that teachers receive benefits that are perceived by them as being important from their interactions with coordinators and the more that social processing occurs about the innovation among teachers. Process use was not found to depend on the remaining seven indicators of sustained interactivity.

7.3 Conclusions aout the Effects of Sustained Interactivity on Use

Table 7.4 (see Appendix R) presents a summary of the findings of the hierarchical linear regression analyses for the reader's convenience. On the basis of these findings, the researcher made the following conclusions:

1. Sustained interactivity is a potent predictor of process use. The finding that sustained interactivity emerged as an especially powerful predictor of process use is very encouraging. It suggests that the effects of participating in a well-developed innovation may be expected to increase with increased levels of sustained interactivity. That is, increases in sustained interactivity may enhance new skill development associated with the innovation, stimulate greater commitment to the innovation, inspire greater confidence in teaching about the topics within it, generate feeling of making a difference about dimensions covered by it, help

empower teachers in their career aspirations and make them feel more positive about their work.

2. The more that social processing occurs about the innovation among teachers, and the more that teachers receive benefits that they perceive as being important to them from their sustained interactions with coordinators, the more likely that effects of process use (i.e., effects that occur because of participating in the innovation) will increase. This finding is exciting because it reveals that social processing and that benefits of interaction that are perceived as important by teachers are of particular significance in enhancing process use effects. This finding has positive implications for theory and practice. For theory, it enlarges understanding about potential process use effects related to these specific kinds of interactions (i.e., those that promote social processing and benefits that are perceived as important by users of innovation). For practice, it points to important indicators upon which one may build to maximize process use effects.

3. Sustained interactivity is a potent predictor of level of implementation. Higher levels of implementing the innovation may be expected with increases in sustained interactivity. This finding implies that increases in sustained interactivity contribute toward putting an innovation into practice more fully. It may enhance the instrumental use of the innovation by teachers and its potential of becoming more entrenched as part of the routine of school organizations.

4. The more that social processing occurs about the innovation among teachers and the more that engagement and involvement in it increase, the more likely the innovation will be more fully implemented. Social processing and engagement and involvement emerged as being particularly

significant dimensions of sustained interactivity in putting the innovation into practice. This finding was expected but was nonetheless exciting it confirmed similar findings in prior research.

5. Sustained interactivity is an important predictor of conceptual use. The findings of this study imply that teachers will likely learn more about the well-developed innovation with increases in levels of sustained interactivity.

6. The more that teachers receive benefits that they perceive as being important to them from their sustained interactions with coordinators, the more likely that their learning about the innovation (i.e., conceptual use of the innovation) will increase. This finding is very encouraging because it suggests that benefits of interaction that are perceived as important by teachers is especially significant in enhancing learning about the innovation. It is noted that this indicator of sustained interactivity explained somewhat less of the variation in the criterion (i.e., conceptual use) than in the case of process use. Nonetheless, the finding advances theoretical understanding about potential conceptual use effects associated with benefits of interaction. For practice, it helps to unravel which dimension of sustained interactivity may help to maximize learning about the innovation.

7. Sustained interactivity as a global measure is not a predictor of the level at which teachers make use of the program innovation. The researcher was surprised that sustained interactivity did not explain variation with respect to the level of program use. This scale variable was developed to situate teachers at the level of their current use of the innovation. The correlation matrix showed that its association with predictors (and covariates) was either very weak or non-existent. It is possible that the use of this measure to examine if sustained interactivity could explain variation in it might have been inadequate or irrelevant. Alternatively, the weak performance of this variable may be an indicator that factors that play a role in explaining the level at which a teacher might use a well-developed innovation were not included in this study.

8. Sustained interactivity tended to explain more of the variation in cognitive-related aspects of use than it did in behaviour-related aspects of use (i.e., instrumental use and

level of implementation). Of the four regression models that were run, sustained interactivity tended to explain more of the variation in conceptual use and process use (these two variables tended to be cognitive-related) than the variation in instrumental use (through the level of program use measure) and level of implementation (these two variables were behaviour-related). This difference might be an indicator that learning about the innovation or learning new skills (because of participation in it) may be easier for teachers than doing (applying) the innovation in a local setting. For example, teachers may encounter constraints in their setting that could intrude on their ability to implement the innovation. This study, however, was limited to a consideration of a limited number of factors that may inhibit or enhance use. While there are other sources of influences, they were beyond the scope of the study.

7.3.1 General Conclusions to Answer the Main Research Questions

In this chapter, the researcher sought to find answers to the two main research questions. The first question was:

Does program use vary as a function of the degree of sustained interactivity?

As the reader may recall, *program use* referred to the use of the program innovation in terms of a continuum where *instrumental use* was located at one end and *conceptual use* at the other end. The *level of implementation* was defined as a special case of instrumental use. These constructs were identified within the conceptual framework that is guiding this study (see Figure 2.5 on page 42). One measure was also created to reflect how teachers were currently using the innovation by situating their use along the continuum. In answer to the main research question, it was found and concluded that

- the level of implementation and conceptual use vary as a direct function of the degree of sustained interactivity, as a global measure, and
- how teachers are currently using the innovation does not vary as a function of sustained interactivity as a global measure.

The study also investigated which of the nine indicators of sustained interactivity were more important in explaining variation in criterion variables. It was found and concluded that

- conceptual use varies as a direct function of the degree of benefits of sustained interactivity, and
- level of implementation varies as a direct function of social processing about the innovation among teachers and of engagement and involvement in it.

The second main research question of this study was

Does process use vary as a function of the degree of sustained interactivity?

Process use refers to how users are affected because of their participation in, or proximity to, the innovation along three dimensions: cognitive, affective and political, as shown within the conceptual framework. It was found and concluded that

- process use varies as a direct function of the degree of sustained interactivity.

The study also examined which of the indicators of sustained interactivity were more important in explaining variation in the process use variable. It found and concluded that

- process use varies as a direct function of the degree of benefits of sustained interactivity and social processing about the innovation among teachers.

7.3.2 Conclusions Respecting the Researcher's Hypotheses

As the reader may recall, the researcher presented two hypotheses in Chapter 2 regarding the relationship between use and sustained interactivity. The first hypothesis was that *greater degrees of sustained interactivity leads to higher levels of use and implementation of the innovation.* It was found that greater degrees of sustained interactivity lead to

- higher levels of implementation and higher levels of conceptual use, and
- no explanation in the criterion related to the level of use of the innovation.

Greater degrees of specific components of sustained interactivity also indicated that

- social processing about the innovation and engagement and involvement in it lead to higher levels of implementation, and
- benefits of sustained interactivity leads to higher levels of conceptual use.

These findings generally provide strong support for the researcher's hypothesis.

The second hypothesis was that *greater degrees of sustained interactivity leads to higher levels of process use.* It was found that greater degrees of sustained interactivity lead to

- higher levels of process use.

Greater degrees of specific components of sustained interactivity also indicate that

- benefits of sustained interactivity and social processing about the innovation leads to higher levels of process use.

These findings also provide strong support for the researcher's hypothesis.

The overall conclusion is that sustained interactivity is an important predictor of process use and the level of implementation and conceptual use of a well-developed program innovation.

7.4 Summary

Zero-order intercorrelations between criterion, predictor and covariate variables were positive, highly significant and generally of moderate size, which was entirely consistent with what was expected. The generally moderate sizes of correlations for criterion and predictor variables provided assurance that scale variables were 1) measuring different constructs, and 2) that assumptions about multicolinearity would not be violated. This finding enabled hierarchical linear regression analyses to examine unique influences of sustained interactivity and the components of it, on use. Five covariates aided in estimates of the unique influence of sustained interactivity on utilization. Although the results were limited because of listwise

deletion of missing data, the significance of regression models and the amount of explained variation in criterion variables are promising.

The results of the analyses are encouraging. They indicated that sustained interactivity is a potent predictor of process use, the level of implementation and, to a lesser extent, the conceptual use of a well-developed program innovation. These findings provide support for the researcher's hypothesis that increases in sustained interactivity lead to higher levels of use and implementation of the innovation and process use. Moreover, specific aspects of sustained interactivity–that is, benefits of sustained interactivity, social processing and engagement and involvement–also surfaced as important predictors. These findings have positive implications for theory and practice. For theory, they enlarge an understanding about the potential effects of sustained interactivity in enhancing utilization. For practice, they point to important indicators upon which practitioners (i.e., coordinators) may build to maximize positive effects on use. Finally, the findings also provide support for a premise of Huberman's model–that users are affected by their interactions with disseminators. But disseminators are also, in turn, affected by their interactions with users. This next chapter explores this latter dimension.

CHAPTER 8

Convergence of Teachers' and Program Coordinators' Perceptions about Sustained Interactivity

As the reader will recall, a set of research questions was presented in Chapter 3 with respect to users' and disseminators' perceptions of sustained interactivity. These questions were

What are the users' perceptions of sustained interactivity?

What are the disseminators' perceptions of sustained interactivity?

Do the perceptions of users and disseminators of sustained interactivity converge?

The terms *users* and *disseminators* are defined in the conceptual framework (see Figure 2.5 on page 42) that is guiding this study. They refer to *teachers* and *program coordinators* respectively.

Since Chapter 4 was devoted to an examination of the characteristics of sustained interactivity and since *users' perceptions of sustained interactivity* is a dimension of the sustained interactivity construct, the first research question was already addressed in that earlier chapter (see page 107). The focus of this chapter, therefore, is to answer the two remaining research questions within this set. These answers were sought by conducting two analyses. First, a descriptive analysis was undertaken of program coordinators' perceptions of selected dimensions that formed the sustained interactivity construct. Second, independent samples t tests were carried out along these selected dimensions as tests for convergence.

The methods used to find answers to these two questions of interest were outlined in a general way in Chapter 3 (i.e., the Methods chapter). They will, however, be more fully described here. Coordinators' perceptions of sustained interactivity were captured by administering a version of the questionnaire that was sent to teachers that mirrored parts of it (see Appendix E). The advantage of using this approach is that it enables a direct comparison between teachers' and coordinators' perceptions along dimensions of sustained interactivity. In

this case, 4 of the 9 dimensions of sustained interactivity were selected for comparative purposes. They are *follow up, intensity of direct contact, users' perceptions of sustained interactivity* and *benefits of sustained interactivity*. The dimensions that were excluded include

- *social processing* among teachers about the innovation and their *engagement and involvement* because coordinators have limited access to that kind of information;
- *indirect contact* because they were irrelevant to interactions with coordinators, and
- *ongoing direct contact* because that data are available through the teachers' instrument.

The dimension of *characteristics of a program coordinator*, however, was included even though it is not part of the sustained interactivity construct. The researcher's personal interest governed the reason for its inclusion. She thought the data would help coordinators gain insight into which characteristics of program coordinators are of importance to teachers. Finally, since Huberman's model specifies reciprocal effects on disseminators, an open-ended question was also included to explore what kinds of influences arise among coordinators through their interactions with teachers.

This chapter is divided into three parts. The first part begins with a descriptive analysis of coordinators' responses patterns of their perceptions of interactions with teachers. In the second part, a description is provided of comparisons between teachers' and coordinators' perceptions of sustained interactivity as well as characteristics of a program coordinator. This second segment includes a description of reciprocal influences of sustained interactivity arising from their interactions with teachers. The third and final part of the chapter presents results of the t tests.

8.1 Description of Program Coordinators' Perceptions about Sustained Interactivity

As the reader may recall, Part 9 of the teachers' questionnaire (see page 5 of Appendix D) was designed to gather data about *users' perceptions of sustained interactivity*. The items for it drew on Huberman's (1990, 1994) emergent sustained interactivity model (see page 19).

By mirroring Part 2 of the coordinators' questionnaire to reflect Part 9 of the teachers' questionnaire, the researcher was able to generate data regarding the *coordinators' perceptions of sustained interactivity* along the same dimensions as those for teachers (see page 1 in Appendix E). This procedure also enabled a comparison between the perceptions of teachers and coordinators of sustained interactivity. This section of the chapter begins with an examination of the *coordinators' perceptions of sustained interactivity* and then a comparison of them with teachers' perceptions. Most coordinators completed Part 2 of the coordinators' questionnaire. A 4-point agree-disagree Likert-type of scale was used to capture data.

Table 8.1 displays descriptive statistics for each of the 9 items in Part 2. Responses leaned, in general, toward the agreement end of the 4-point scale. Variability was reasonably stable across items, with standard deviations ranging from 0.59 to 0.93. The three items with which coordinators agreed the most were

2.6. I helped Project WILD teachers gain a new understanding about wildlife topics.

2.4. I added to Project WILD teachers' knowledge about topics covered in Project WILD.

2.5. Project WILD teachers added to my understanding about how Project WILD fits with what they teach.

The three items with which coordinators tended to disagree were

2.8. My contact with Project WILD teachers led them to more involvement in other wildlife/ environmental education programs.

2.7. Project WILD teachers seem to change their views about wildlife-related topics as a result of this new understanding.

2.1. Compared with other programs, I spend a lot of time with Project WILD teachers.

These data suggest that, in general, coordinators were positive and optimistic about their interactions with teachers. Coordinators generally agreed quite strongly that they helped teachers gain new understandings and added to their knowledge about topics related to the

Table 8.1

Characteristics of Coordinators' Perceptions of Sustained Interactivity

Questionnaire Item	Response Distribution[a]								95% C.I.[b]	
	SD	D	A	SA	Mean	SD	N	Rank	Lower	Upper
2.0) My first contact with Project WILD teachers increased their interest in Project WILD.	0%	0%	70%	30%	3.30	0.47	23	3[c]	3.10	3.51
2.1) Compared with other programs, I spend a lot of time with Project WILD teachers.	26%	26%	42%	5%	2.26	0.93	19	8	1.81	2.71
2.2) I helped Project WILD teachers determine how Project WILD was relevant to their teaching.	4%	0%	74%	22%	3.13	0.63	23	5	2.86	3.40
2.3) I helped Project WILD teachers determine how Project WILD fits with what they teach.	4%	0%	61%	35%	3.26	0.69	23	4	2.96	3.56
2.4) I added to Project WILD teachers' knowledge about topics covered in Project WILD.	0%	9%	43%	48%	3.39	0.66	23	2	3.11	3.68
2.5) Project WILD teachers added to my understanding about how Project WILD fits with what they teach.	0%	4%	52%	44%	3.39	0.58	23	2	3.14	3.64
2.6) I helped Project WILD teachers gain a new understanding about wildlife topics.	0%	9%	39%	52%	3.43	0.66	23	1	3.15	3.72
2.7) Project WILD teachers seem to change their views about wildlife-related topics as a result of this new understanding.	0%	27%	64%	9%	2.82	0.59	22	7	2.56	3.08
2.8) My contact with Project WILD teachers led them to more involvement in other wildlife/ environmental education programs.	5%	14%	64%	18%	2.95	0.72	22	6	2.63	3.27

[a] SD = Strongly Disagree (1); D = Disagree (2); A = Agree (3); SA = Strongly Agree (4).

[b] C.I. = Confidence interval.

[c] 1 = highest agreement; 8 = lowest agreement.

innovation. There was less agreement, however, that such understanding changed teachers' thinking about those topics. Coordinators also agreed quite strongly that teachers added to their understanding about how well the innovation fits in their context. There was less agreement, however, that teachers' contacts with them led teachers to more involvement in other future projects or that they spent a lot of time with teachers as compared with other programs.

What are the similarities and differences between the coordinators' perceptions of their interactions with those of teachers? Table 8.2 helps to unravel this dimension in the next segment.

8.2 Comparison of Teachers' and Coordinators' Perceptions of Sustained Interactivity

This segment compares teachers' and coordinators' perceptions of sustained interactivity at the level of individual items with respect to Huberman's model. The purpose of this comparison is to gain a better insight about the distinguishing similarities and differences between their respective perceptions of sustained interactivity. Table 8.2 was created to guide the comparative analysis. The researcher opted to use a mean of 3.0 along the 4-point scale, as an indicator that agreement occurred, assuming a small spread of responses. A mean of 8.0 was selected as an extra assurance of agreement, even though a mean of 2.50 is the mid-point of the scale.

Table 8.2 displays descriptive statistics for each of the 9 items for *teachers'* and *coordinators' perceptions of sustained interactivity*. The four items with which both teachers and coordinators tended to agreed were

9.0. My first contact with the Project WILD Coordinator increased my interest in Project WILD. /2.0. My first contact with teachers increased their interest in Project WILD.

9.2. The Project WILD Coordinator helped me determine how Project WILD was relevant to my teaching. / 2.2. I helped Project WILD teachers determine how Project WILD was relevant to their teaching.

Table 8.2

Comparison of Teachers' and Coordinators' Perceptions Based on Outcomes Arising from Huberman's (1990) Sustained Interactivity Model

Outcomes	Associated Items	Teachers		Coordinators	
		Mean	SD	Mean	SD
Interest Generation Disseminator generated interest in the innovation.	9.0) My first contact with the Project WILD Coordinator increased my interest in Project WILD. / 2.0) My first contact with Project WILD teachers increased their interest in Project WILD.	3.35	0.74	3.30	0.47
Time Commitment Amount of time spent with user from users' and coordinators' perspectives.	9.1) Compared with other programs, the Project WILD Coordinator has spent a lot of time with me. / 2.1) Compared with other programs, I spend a lot of time with Project WILD teachers.	2.77	0.74	2.26	0.93
Relevance Coordinator helped user see relevance of innovation.	9.2) The Project WILD Coordinator helped me determine how Project WILD was relevant to my teaching./ 2.2) I helped Project WILD teachers determine how Project WILD was relevant to their teaching.	3.03	0.69	3.13	0.63
Assimilation Coordinator helped user see how innovation fits with what the user is teaching.	9.3) The Project WILD Coordinator helped me determine how the program fits with what I teach. / 2.3) I helped Project WILD teachers determine how Project WILD fits with what they teach.	2.97	0.65	3.26	0.69

(continued)

Table 8.2

Comparison of Teachers' and Coordinators' Perceptions Based on Outcomes Arising from Huberman's (1990) Sustained Interactivity Model (con't)

Outcomes	Associated Items	Teachers Mean	Teachers SD	Coordinators Mean	Coordinators SD
Creating Meaning User learning the meaning of the program.	9.4) The Project WILD Coordinator added to my learning about topics covered in Project WILD. / 2.4) I added to Project WILD teachers' knowledge about topics covered in Project WILD.	3.16	0.65	3.39	0.66
Mutual Correction User was able to point out if innovation fits in his or her context.	9.5) I added to the Project WILD Coordinator's understanding about how Project WILD fits with what I teach. / 2.5) Project WILD teachers added to my understanding about how Project WILD fits with what they teach.	2.82	0.71	3.39	0.58
Reciprocal Influences User changed her or his thinking because of exposure to the coordinator.	9.6) The Project WILD Coordinator has helped me gain a new understanding about wildlife-related topics. / 2.6) I helped Project WILD teachers gain a new understanding about wildlife topics.	3.12	0.64	3.43	0.66
	9.7) My views about wildlife-related topics have changed as a result of this new understanding. / 2.7) Project WILD teachers seem to change their views about wildlife-related topics as a result of this new understanding.	2.85	0.76	2.82	0.59
Involvement in Future Projects Extent to which involvement in innovation led to involvement in related programs.	9.8) My contact with the Project WILD Coordinator led to more become involvement in other wildlife/ environmental education programs. / 2.8) My contact with Project WILD teachers led them to more involvement in other wildlife/ environmental education programs.	2.90	0.81	2.95	0.72
	9.9) An example of a related program is _____ (Please specify).	127 cited		17 cited	

9.4. The Project WILD Coordinator added to my learning about topics covered in Project WILD. / 2.4. I added to Project WILD teachers' knowledge about topics covered in Project WILD.

9.6. The Project WILD Coordinator has helped me gain a new understanding about wildlife-related topics. / 2.6. I helped Project WILD teachers gain a new understanding about wildlife topics.

These data suggest that teachers and coordinators found their mutual interactions positive and rewarding upon their first contact with each other, in determining the relevancy of the innovation to what teachers were teaching and about learning gained about topics related to the innovation. Coordinators, however, tended to estimate higher, relative to teachers.

The one item with which both teachers and coordinators tended toward agreement, but less than the previous three items, was

9.8. My contact with the Project WILD Coordinator led to more involvement in other wildlife/ environmental education programs. / 2.8. My contact with Project WILD teachers led them to more involvement in other wildlife/environmental education programs.

These data suggest the trend of some agreement among teachers and coordinators that contacts between them led to more involvement in other related programs. While coordinators estimated slightly higher, relative to teachers, the extend to which their contact with teachers led to more involvement in such programs, they identified far less than teachers the number of programs concerned. Teachers cited over 120 compared with less than 20 by coordinators.

The two items with which both teachers and coordinators tended to disagree were

9.1. Compared with other programs, the Project WILD Coordinator has spent a lot of time with me. / 2.1. Compared with other programs, I spend a lot of time with Project WILD teachers.

9.7. My views about wildlife-related topics have changed as a result of this new understanding. / 2.7. Project WILD teachers seem to change their views about wildlife-related topics as a result of this new understanding.

These data suggest that coordinators and teachers shared fairly mutual perceptions that the amount of time coordinators spent with Project WILD teachers is less compared with other programs. Teachers, however, estimated higher, relative to coordinators, the amount of time–although they may be experiencing more time directed at them from other programs, time spent by Project WILD coordinators is also more than was estimated by coordinators. Both coordinators and teachers also shared mutual perceptions that teachers' views tended not to change as a result of new understandings that they may have gained.

The two items in which agreement was discrepant, however, were

9.3. The Project WILD Coordinator helped me determine how the program fits with what I teach. / 2.3. I helped Project WILD teachers determine how Project WILD fits with what they teach.

9.5. I added to the Project WILD Coordinator's understanding about how Project WILD fits with what I teach. / 2.5. Project WILD teachers added to my understanding about how Project WILD fits with what they teach.

These data suggest that teachers generally tended to disagree that coordinators helped them determine how the innovation fits with what they teach but coordinators tended to agree that they did provide such assistance. This finding implies that coordinators' success in providing assistance to teachers in determining the "fit" of the innovation with what is being taught may be less than they perceive. Teachers also tended to disagree that they added to coordinators' understanding about how the innovation fits with what they teach but coordinators tended to agree that they gained such understanding through their interactions with teachers. This finding implies that teachers might not be aware that they have influenced coordinators' understanding

about how the innovation fits with what they teach. Alternatively, this finding may be an indicator that they might tend not to see evidence of such understandings.

In general, these data suggest that along the dimensions of first contact, determining the relevancy of the innovation to what was being taught and of teachers' learning about topics related to the innovation, sustained interactions were mutually rewarding and positive. They also suggest that although coordinators tended to estimate higher across most items, their perceptions were generally consistent with those of teachers. This finding implies fairly reasonable insight on the part of coordinators of sustained interactivity, with the exception of the coordinators' role and understanding regarding how the innovation fits with what was being taught.

While Part 2 of the coordinators' questionnaire offered insight regarding coordinators' perceptions about their interactions with teachers, it did not probe deeply into reciprocal effects on them that arose from such interactions. An open-ended question was included within their questionnaire to explore this dimension, the results of which are described in the next segment.

8.3 Reciprocal Effects of Interaction with Teachers on Program Coordinators

Although this study's focus is to investigate effects of sustained interactivity on the use of innovation, an opportunity was available to ask coordinators how their interactions with teachers affected them in their role as disseminators of the innovation. This segment identifies emerging reciprocal influences on coordinators as a result of such interactions. Data were collected by requesting written responses of their views (see page 3 of Appendix E). Of the 23 coordinators who returned the coordinators' questionnaire, 22 offered comments. The data enrich an understanding of coordinators' perceptions of sustained interactivity and contribute toward an answer for the question *What are the disseminators' perceptions of sustained interactivity?*

Figure 8.1 presents an overview of reciprocal effects that were reported by coordinators. Four points are remarkable about the data. First, all coordinators reported that they were enriched by their interactions with teachers, often leading them to make changes in how they disseminated the innovation. Second, coordinators were able to better appreciate teachers' professional knowledge, the constraints and the context in which they work and learned from them. Such understanding often stimulated coordinators to develop new dimensions to the innovation that were in line with recommendations from teachers. Third, coordinators gained more awareness about what teachers need and what their constraints are, thus enabling them to create more useful materials. Developing materials that would aid in linking the innovation to educational standards, showing how the innovation supports those standards and designing workshops based on an understanding of teachers' time and material constraints were among the strategies cited to meet such challenges. Fourth, such awareness also changed perceptions of teachers for some coordinators and led them to alter their approach about the kind of workshops that they deliver.

The next segment reports on general observations regarding three additional dimensions sustained interactivity to help further an understanding of similarities and differences between teachers' and coordinators' perceptions of it. Perceptions of the importance of characteristics of program coordinators were also included.

8.4 Comparison of Teachers and Coordinators Perceptions of Intensity of Direct Contact, Follow Up and Benefits of Sustained Interactivity

A total of 23 coordinators provided their perspectives along the following three additional dimensions of sustained interactivity in which they had direct contact with users of the innovation (see Appendix E, pages 1 and 2): intensity of direct contact with the coordinator, follow up initiated by coordinators and by teachers and perceptions of benefits of sustained

Fitting Innovation to State/Provincial Standards

Worked more on getting standards into education materials. (rec 01)
Listening to teachers explain the curriculum materials guideline they must follow prompted me to correlate Project WILD to the state subject standards. This correlation has assisted teachers in demonstrating that Project WILD aids them in teaching the state standards. (rec 06)
Realized teachers needed Project WILD material correlated to state standards so they can justify using this "supplemental" curriculum in their classroom. (rec 07)

- Standards correlation
- Standardized Testing
-Certification requirements
-Resource needs
-topical workshops
-info on current issues (rec 11)

Developed WILD correlations to state educational standards. Provided additional training for teachers and facilitators on assessments to help improve scores on state assessment tests. (rec 18)
Through teacher interaction we have adapted to target key areas and learning goals specific to what the teachers are teaching. We also try to accommodate state learning outcomes/tests. (rec 22)

Appreciating Teacher Time Constraints

Gained lots of insight on conflicting demands of teachers' time and huge work load. And importance of offering educators what they need. (rec 01)
I think being a classroom teacher myself made me more aware of the opportunities and challenges facing other teachers with regards to Project WILD. This allowed me to work alongside teachers to encourage the use of supplementary education programs into their daily teaching. This meant working more closely with few teachers to help them incorporate WILD and more. Almost a "mentoring" role. This allowed for a greater "return" on "investment" so to speak as those teachers seem to then take on more than just a one off meeting at a workshop and often would then go on their own way without requiring much more time from me other than the occasional consultation. The warm body approach in assisting educators use the WILD program is far superior but is limited by your own time and available resources ($). Quality vs. quantity as far as changing attitudes and behaviors. (rec 10)

Changing Perceptions

Viewpoint changed. It is indeed much more difficult than I realized for teachers to take part in all day workshops and to integrate wildlife education into classrooms. (rec 01)

Changing Approach in Dealing with Teachers

I have changed my approach in talking with teachers about Project WILD as a result of having frequent conversations with teachers who want to get trained in our programs and only half-way through the conversation realize that it's free. That concept seems to be a big breakthrough for many people, and at some point I start making sure that people knew that it was free up front instead of assuming that they knew this. (rec 02)
My interactions with teachers provided me with the knowledge of what teachers needs are. Changed format of workshop to offer combination WILD/Aquatic workshops to met time constraints of teachers. Continue to work on correlating WILD with the state curriculum frameworks. Try to provide wildlife related support materials and resource contacts to participants. (rec 12)
I have designed advanced workshops based on requests from teachers. (rec 16)

(continued)

Figure 8.1: Reciprocal influences on program coordinators arising from contact with teachers.

Improving Listening Skills

I changed my approach to be a more attentive listener. When I hear a crackle of renewed enthusiasm in someone's voice as a result of having been given some relatively small bit of valuable information, it tells me that I need to listen for what the caller needs more closely. It doesn't happen very often, but often enough to make a difference, that a caller will be in an emotional "dump" when he or she calls; usually it's a classroom teacher who is worn out from the day or feeling unappreciated and overwhelmed with paperwork and minutiae. All of a sudden, this person has more energy and warmth in her voice and sounds as if she has opened a secret door that will lead to an adventure in learning. I've learned to listen for this as I listen for the wood thrush. (rec 02)

Learning from Teachers

The teachers who come to our workshops always teach me something. Sometimes it's that they are afraid of going outdoors, or that they have principals who won't allow their students to get near water. Sometimes it's that their students have been doing beach cleanups for years or that they know how to set up a saltwater aquarium. Most of the things I consciously try to learn from them is how to be a better teacher, but most of them have been at if far longer than I have. (rec 02)

We listen to teachers needs so that we can provide product that are useful to them. That is the only way we can stay in the classroom. (rec 11)

Appreciating Teachers' Professional Knowledge

Teachers are more diverse than most people give them credit for. They may have a vast knowledge of vascular plants, electricity, fossils, a talent for quilting or oil painting. Everyone has a passion for something. I have begun to look for ways to weave their individual experiences into whatever we are engaged in collectively so that they can see just how much they add to the community. (rec 02)

My interactions with Project WILD classroom teachers are always inspiring, because WILD teachers are enthusiastic and exemplary educators. They often have the good ideas and adaptations to activities, how WILD fits in to broader curriculum goals, and which activities most appeal to certain age groups. They also give me feedback on our activities, and what other programs we could be offering or developing. (rec 05)

When you work with teachers in a workshop setting or just thorough emails or phone calls it helps both you and the agency. Teachers have on the job experience in adapting activities, developing handouts, etc. I always pass on ideas to other teachers in workshops. (rec 13)

Perhaps most significantly my contact with teachers over the 17 years of coordinating Project WILD have kept me motivated. I have friends whom I look forward to seeing each year at conferences. The creativity and enthusiasm of teachers is contagious. (rec 16)

Developing New Materials / Modifying Old Materials

Interactions with teachers enabled me to consider how a workshop or activity might be better delivered based on the geographic or cultural setting. (rec 19)

I have modified activities as a result of feedback. (rec 20)

Through talking with and surveying teachers, I have been able to provide them with useful supplemental material. In most cases, this information is state specific. The other think I have done is implemented specific content training that builds their knowledge level by hearing it from the experts. The whole area of feelings about knowing content is one area where teachers feel they need to know things before they can teach a unity to their students. Very few teachers are interested in using a unity to learn about things at the same time their students are. (rec 20)

I have also found the teachers perceive things that are barriers that are not really barriers, that through guidance and patience and working with them, perceived barriers can be removed. (rec 21)

Teachers loved it in spite of some of our early clumsy attempts to workshop it. We refined our technique and selection of activities. (rec 00)

Figure 8.1: Reciprocal influences on program coordinators arising from contact with teachers.

interactivity. Descriptive statistics for each of these dimensions that were completed by teachers are located in Appendix D (see pages 4, 5 and 6).

Statistics along these three dimensions reveal that coordinators tended to estimate consistently higher than teachers the intensity of sustained interactivity. Their mean scores and proportions are generally higher than those for teachers except in the case of one item (i.e.,10.0f). In this instance, coordinators estimated lower the importance that teacher place on the benefit of inviting personnel to speak at their school. Regarding follow up: coordinators' estimates were considerably higher than those of teachers, especially with respect to teacher-generated follow up. This finding suggests that teachers may not have reported (or remembered) how much follow up they initiated. Further, as the reader may recall, the researcher used Klein and Gwaltney's (1991) dissemination framework to create categories for types of follow up (see page 103 in Chapter 4). While the proportions along the dimension of follow up show a similar pattern of higher estimation, they do confirm that coordinator-generated follow up emphasizes spread and implementation functions but diverge slightly regarding teacher-initiated follow up: coordinators reported that teacher-generated follow up with them tended more toward spread functions.

Coordinators were also asked to supply additional data that was covered under "Other" options within these three parts of the questionnaire as well as under the "most important" option of teachers' contacts with coordinators. How teachers responded to these sections was previously described in Chapter 4. In this segment, the reader is provided with a summary of coordinators' responses and how their responses compared with those of teachers.

8.4.1 Responses to "Other" Option for Intensity of Direct Contact

Two coordinators added two additional suggestions under the "Other" option for intensity of direct contact (i.e., see item 1.0g in Appendix E): that they frequently engaged in direct contact with Project WILD teachers at environmental or science education conferences.

These suggested additions are similar to the researcher's category reflected in item 1.0f (i.e., "Direct contact at conferences or workshops"). Additions by teachers to this same option were previously discussed in Chapter 4 (see page 99). It was found that of the 7 teachers who provided comments, only 4 provided new additions. The researcher interpreted the relatively low number of "other" occurrences of direct contacts as an indicator that her list was fairly representative of the types of direct contacts in which most respondents might engage.

8.4.2 Responses to "Other" Option for Follow Up

Regarding teacher- and coordinator-generated follow up: Most coordinators did not complete the "Other" option for coordinator-generated follow up. Four of the 5 responses by coordinators were categorized by the researcher as being associated with "spread" functions: mailing workshop certificates, newsletters, confirmations of mailing addresses and information about other programs and related organizations. The fifth response was categorized as an "implementation" function, namely the mailing of a 6-month reminder of a self-addressed postcard about Project WILD that teachers prepared as part of their participation in an introductory workshop about the innovation.

With respect to teacher-generated follow up, 13 coordinators completed the "Other" option. Most reported that teachers tended to request classroom resources or other similar forms of information. The researcher categorized these comments as associated with "spread" functions. Two coordinators said they also receive requests for guest speakers and assistance to develop outdoor classrooms; these were associated with "implementation" functions. Overall, these findings deviate somewhat from reports by teachers about follow up. Teachers generally indicated that they engaged in more implementation-type of follow up with coordinators (see page 105 in Chapter 4). Coordinators, alternatively, might be more engaged in spread-related functions.

8.4.3 Responses to "Other" Options for Benefits of Sustained Interactivity

Coordinators were invited to identify and rate the importance of other benefits that they provided to teachers. Eight of the 23 coordinators completed the "Other" option in Part 4 of the coordinators' questionnaire (see page 2 of Appendix E), all of which were rated as very important. Of these, 5 were variations of different forms of information provided for teachers. The researcher categorized these as "spread" type of activities because they were similar to her first item in this section (i.e., "Helping teachers get information"): information and pictures for classroom distribution and information about other programs, related workshops and research projects. The remaining 3 benefits involved networking functions: putting teachers in touch with persons, organizations, related programs and making contacts on their behalf with resource professionals. In contrast, 17 of the 515 teachers participating in this study (see page 118 in Chapter 4) identified 12 other benefits that were not included in the researcher's list. These findings suggest that the researcher's list of 10 benefits of sustained interactivity, while adequate for the purpose for which it was intended, is not exhaustive. Teachers offered more examples of benefits, and in greater variety, than coordinators.

Both teachers and coordinators were invited to identify the most important benefits of sustained interactivity. The following segment of this section is a content analysis of responses to this item.

8.4.4 Content Analysis of Most Important Aspects of Contact with the Coordinator

Part 10 of the teachers' questionnaire (see Appendix D, page 6) and Part 4 of the coordinators' questionnaire (see Appendix E, page 2) invited coordinators and teachers to identify the most important aspect of contacts with the program coordinator. A content analysis was conducted of responses from 17 of the 23 coordinators participating in this study and from 183 of the 297 teachers who had direct contact with the coordinator and completed this section of the questionnaire.

The researcher used her framework of definitions for various levels of intensity (see page 113 in Chapter 4) to categorize responses for this analysis. In doing so, she noticed that similar themes kept emerging that corresponded to Huberman's sustained interactivity model. An attempt was therefore made to capture these themes and connect them with dimensions reflected in Huberman's model (e.g., reports by teachers of reciprocal influences arising from their interaction with the coordinator).

As displayed in Table 8.3, the content analysis revealed that about half of the teachers and coordinators selected high intensity activities associated with implementation functions as being the most important benefits of direct contacts. There was slightly more divergence regarding the level of importance of low intensity activity associated with the spread function of dissemination: half of the coordinators said that providing personal assistance to get information about the innovation was the most important benefit in contrast to a third of the teachers who identified the same. Less than 10% indicated that opportunities for exchanges with the coordinator were most important. The analysis also revealed that teachers were far more inclined to offer varieties of benefits as being most the important: teachers suggested over 50 benefits in contrast with less than 10 benefits that were cited by coordinators. In spite of the broad range of benefits that were suggested, however, most teachers and coordinators tended to select their choices from the researcher's list of 10 benefits. The item that generated the single most responses among teachers and coordinators was the researcher's first item "Helping me (teachers) get information", followed by "Helped me (teachers) gain a new understanding about topics covered in Project WILD". The latter corresponds to "Reciprocal Influences" dimension within Huberman's model. Training opportunities were rated as the third most important activity for teachers.

These data suggest that while there is notable variation in the study sample with respect to the importance of benefits that arise from their contact with coordinators, most see spread

Table 8.3

Comparison of Most Important Aspects of Contact with Program Coordinator

Summary of Benefit (Teachers' Perspective)	% of Teacher Response/Benefit N = 183	Intensity Level	% of Coordinator Response/Benefit N = 17	Summary of Benefit (Coordinators' Perspective)
1. ACTIVITIES RELATED TO SPREAD	**38%**		**50%**	
Benefits Not Involving Contact		**No INTENSITY[a]**		
Getting newsletter				
Never thought about contacting coordinator until I received this survey				
Newsletters				
Provision of materials in Spanish				
Involvement available if I chose				
Knowing I have a state resource				
Personal Assistance with Supplying Information		**LOW INTENSITY[b]**		
Helped me get information.	*(27.7%)*		*(40%)*	Providing positive impressions of wildlife staff.
Keeping me up to date about what's new with program				Providing information about workshops and resource materials at our agency.
Receiving new lessons at my grade level, to teach				Providing access to information.
Helped me get supplies for activities				
Providing educational videos				
Access to agency biologists				
2. ACTIVITIES RELATED TO EXCHANGE	**8%**		**5%**	
Exchanges Between Teachers and Coordinators		**MEDIUM INTENSITY[c]**		
Encouraged me to talk with the Coordinator and share my point of view about topics of interest.	*(1.6%)*			
Networking opportunities				Serving as contact for natural resources and environmental education network for teachers
Someone to turn to with questions about activities				
Contacts with other teachers				
Contacts with other programs				
Encouraged me to use PW guide				
Capacity-building for environmental education				

(continued)

Table 8.3

Comparison of Most Important Aspects of Contact with Program Coordinator (con't)

Summary of Benefit (Teachers' Perspective)	% of Teacher Response/Benefit N = 183	Intensity Level	% of Coordinator Response/Benefit N = 23	Summary of Benefit (Coordinators' Perspective)
3. ACTIVITIES RELATED TO IMPLEMENTATION	**54%**		**45%**	
Engagement/Generating interest		**HIGH INTENSITY**[d]		Generating awareness about wildlife and habitat.
Sparking interest				
Encouraging me to be more involved				
Funding for projects				
Leadership/coordination of activities by coordinator				
Seeing the enthusiasm and interest of the coordinator				
His teaching and interest in each person and their situation				
Engagement/Assimilating the program /Creating Meaning		**HIGH INTENSITY**		Connection to science learning through wildlife and action (conservation) – teachers who are science-phobic lose that fear because of Project WILD.
Led me to learn more about technical things.	*(1.6%)*			
Content enrichment.				
Helped me with curriculum planning				
How to make activities work for me				
Helped me make connections between wildlife topics and other content areas				
Helped me to combine Project WILD with other programs to achieve set goals				
Helped to add variety to curriculum				
Engagement/Mutual Correction		**HIGH INTENSITY**		
Led me to share my professional knowledge about teaching with the Coordinator.	*(3.8%)*			

(continued)

Table 8.3

Comparison of Most Important Aspects of Contact with Program Coordinator (con't)

Summary of Benefit (Teachers' Perspective)	% of Teacher Response/Benefit N = 183	Intensity Level	% of Coordinator Response/Benefit N = 23	Summary of Benefit (Coordinators' Perspective)
Involvement/Inviting Coordinator to Events		**HIGH INTENSITY**		
Led me to invite the Coordinator to help organize an event.	*(1.6%)*			
Led me to invite wildlife personnel to speak at my school.	*(1.6%)*			
Coordinator visits classroom to share knowledge				
Setting up workshops				
Involvement/Inviting Teachers to Attend Training and Other Events		**HIGH INTENSITY**		
Led me to gain more training.	*(11.4%)*			
Allowed me to participate as a facilitator without training for it				Created opportunities to be more involved.
[STATE'S] PW advanced classes (enjoyed them)				
Provided me with opportunities to participate in events.				Awareness that professional development exists and they would be supported.
Reciprocal Influences: Affective		**VERY HIGH INTENSITY**[e]		
Encouraged me to make suggestions to enhance Project WILD .	*(1.6%)*			
Made me feel appreciated				
Made me feel strongly supported				
Friendship				
Gave me self confidence with subject area				
Making me feel that what I do matters				
Making me feel a part of a great wildlife educators team with common goal				
Furthering my commitment to conservation/environmental stewardship				
Furthered my commitment to teach about environmental stewardship				

(continued)

Table 8.3

Comparison of Most Important Aspects of Contact with Program Coordinator (con't)

Summary of Benefit (Teachers' Perspective)	% of Teacher Response/Benefit N = 183	Intensity Level	% of Coordinator Response/Benefit N = 23	Summary of Benefit (Coordinators' Perspective)
Reciprocal Influences: New Understanding/ New Way of Seeing Things		**VERY HIGH INTENSITY**		
Helped me gain a new understanding about topics covered in Project WILD.	*(12%)*		*(20%)*	
Learned better teaching methods				
Helped me get new teaching ideas and curriculum to adapt to my classroom				
Stimulating new ideas from presentations at annual Project WILD Facilitators Conferences				
Resource for ideas				
Led me to become better teacher				
Contributed to thinking about wildlife-related topics in a new way .	*(3.3%)*			
Helped me to think about environmental education and wildlife education in a new way				
Led me to involve children in their world				
Involvement in Future Projects		**VERY HIGH INTENSITY**		
Work on curriculum projects				
Creating [STATE'S] Early Childhood PW program				

[a] **No INTENSITY**: one-way, passive contact to spread awareness (e.g., contact through a publication such as a newsletter).
[b] **LOW INTENSITY**: one-way, active contact to spread information (e.g., contacting the disseminating organization/program coordinator to request information).
[c] **MEDIUM INTENSITY**: an interactive contact, such as exchanging information or sharing of perspectives where the contact is direct with the coordinator.
[d] **HIGH INTENSITY**: ongoing interactive contact where some form of action is evident (e.g., technical assistance provided; participation in training has occurred; engagement and involvement in the innovation) because of interaction with the coordinator is evident.
[e] **VERY HIGH INTENSITY**: an ongoing interactive exchange where the coordinator or the user have identified that some kind of change has occurred because of their exchanges, (e.g., a new understanding of topics covered by the innovation by the user or changes in some aspect of the innovation because of a coordinator's insight into what a user needs).

and implementation activities as being the most important benefits of contacts. Of the implementation-related activities, help in gaining new understanding about topics covered by the innovation was the most important for both, followed by training opportunities for teachers. These findings suggest that, in general, the set of 10 items provided by the researcher was adequate (although not exhaustive) and somewhat limited in capturing a wider range of benefits associated with exchange functions.

8.5 Comparison of Teachers' and Coordinators' Perceptions of Characteristics of a Program Coordinator

A total of 22 coordinators provided their perspectives along the dimension of the importance of selected characteristics of a program coordinator (see page 2 in Appendix E). Descriptive statistics for this dimension for teachers are located on page 6 in Appendix D. The data reveal that coordinators tended to estimate consistently higher than teachers the importance of the characteristics of a program coordinator with the exception of items 11.b and 11.g. In these cases, coordinators estimated lower the importance of delivering technical information when they (i.e., teachers) need it and the importance of possessing technical expertise about topics contained in the innovation.

8.5.1 Content Analysis of Coordinator Characteristics under the "Other" Option

Part 11 of the teachers' questionnaire and Part 5 of the coordinators' questionnaire invited respondents to complete the "Other" option regarding characteristics of the program coordinator that were not listed under the prescribed list offered by the researcher. Less than 10% of the 515 teachers in the study sample and slightly less than half of the 23 coordinators participating in the study completed this section of the questionnaire. Together they identified 42 other important characteristics. Table 8.4 lists these characteristics; the top two characteristics that teachers reported most often were associated with "getting back to me when

Table 8.4

Characteristics of Program Coordinator Listed under "Other" Option

Program Coordinator Characteristic	% of Teachers N = 45	% of Coordinators N = 10
Getting back to me when he/she said.	6.7%	
Directing me to other appropriate resources.	6.7%	
Available to help with activities/ give suggestions.	4.4%	
Getting materials.	4.4%	
Having tools to teach with materials.	4.4%	
Being supportive/ caring/ friendly.	4.4%	
Enthusiasm & generating enthusiasm/ motivational.	4.4%	
Humour/ fun to be around.	4.4%	
Keeping me up to date about program.	4.4%	
Knows state standards.	4.4%	
Setting up workshops.	2.2%	
Ability to access information.	2.2%	
Networking/ knowing who to contact.	2.2%	
Coming to school to demonstrate an activity.	2.2%	
Loans me equipment.	2.2%	
Being reactive in finding answers.	2.2%	
Being able to provide classroom material.	2.2%	
Provide French-language support/ contact.	2.2%	
Treating me as an equal.	2.2%	
Inspiring others to learn more.	2.2%	
Inspiring others to teach more.	2.2%	
Great with kids.	2.2%	
Be willing to learn.	2.2%	
E-mail communication.	2.2%	
Contacting me about other related EE opportunities.	2.2%	
Understanding of teaching.	2.2%	
Knowledgeable about program.	2.2%	
Linking info with content standards.	2.2%	
Time to organize learning opportunities and activities.	2.2%	
Serves as a model for leadership.	2.2%	
Coordinating creation of new topically relevant curriculum.	2.2%	
Passionate about wildlife education.	2.2%	
Knowing who can help if I can't.		1%
Applying activities to aspects of teacher's curriculum.		1%
Being innovative and creative.		1%
Being a contact for other events, conferences, etc.		1%
Understanding teachers' needs and constraints.		1%
Being enthusiastic.		1%
Being knowledgeable about educational reform.		1%
Being responsive and following up phone calls, emails, etc.		1%
Answering administrative questions.		1%
Being flexible.		1%

he/she said" and "directing me to other appropriate resources". All others tended to be offerings by one or two respondents.

8.5.2 Analysis of "Most Important" and "Least Important" Characteristics

Teachers and coordinators were also invited to identify the most and least important characteristics of a program coordinator. A content analysis of responses was conducted with respect to those characteristics. Table 8.5 displays the proportions of respondents who identified the characteristics that were the most important to them. Most respondents selected one of the characteristics provided in the researcher's prescribed list. The top two characteristics identified by most of the teachers as being the most important were:

1) being available when I call with questions, and

2) having technical expertise about wildlife topics.

While coordinators also selected the first item as important, their views diverged from teachers regarding the importance of technical expertise. They also placed more emphasis than teachers on listening skills but their emphasis was less on the importance of delivering technical information when teachers need it. Coordinators also added only 3 "other" characteristics as being important (but not on the researcher's list) in contrast with the over 50 that were identified by teachers (see Figure 8.2 for teachers' data in Appendix S). Although this number sounds impressive, the proportions in support of the additions were relatively low. Given that the majority of respondents drew from the researcher's prescribed list, she concluded that her list was an adequate representation of selected characteristics.

Teachers and coordinators were also invited to identify characteristics that were the least important; 70% of the teachers and over 80% of the coordinators in the study completed this part of the questionnaire. Table 8.6 shows the proportion of respondents who identified such characteristics. Most made selections from the researcher's list of characteristics. The top two characteristics that were identified by teachers as being of least importance were

Table 8.5

Most Important Characteristics of a Program Disseminator

Program Coordinator Characteristic	% of Teachers N = 445	% of Coordinators N = 20
Being available when I call with questions.	28%	20%
Having technical expertise about wildlife topics.	16%	5%
Talking about things in ways that are easy to understand.	13%	20%
Being personable when talking with me.	12%	20%
Delivering technical information when I need it.	10%	0%
Being sensitive to different views about an issue.	4%	5%
Being willing to hear what I have to say.	3%	15%
Networking/ knowing who to contact.	1%	
Getting back to me with information.	1%	
Quick response.	1%	
Being supportive/ caring/ friendly.	1%	
Inspiring others to teach more.	1%	
Communication.	1%	
Providing program updates.	1%	
Being organized.	1%	
Being able to relate how to use wildlife in classrooms.		5%
Having knowledge of educational reform.		5%
Applying activities to teachers' curriculum.		5%
Other.	6%	
TOTAL	100%	100%

Table 8.6

Least Important Characteristics of a Program Coordinator

Program Coordinator Characteristic	% of Teachers N = 363	% of Coordinators N = 19
Having technical expertise about wildlife topics.	25.9%	80%
Being sensitive to different views about an issue.	19.3%	
Being available when I call with questions.	12.4%	5%
Being personable when talking with me.	12.4%	
Talking about things in ways that are easy to understand.	11.6%	
Delivering technical information when I need it.	9.9%	10%
Being willing to hear what I have to say.	6.9%	
Proximity	0.3%	
Information about content.	0.3%	
Getting back to me in reasonable time.	0.3%	
Telling me what to do.	0.3%	
Why is the coordinator there?	0.6%	
Expertise in education.		5%
TOTAL	100%	100%

1) having technical expertise about wildlife topics;

2) being sensitive to different views about wildlife;

For most coordinators "Having technical expertise about wildlife topics" was the least important.

Based on these data, teachers appear somewhat divided regarding the importance of coordinators possessing technical expertise about wildlife topics. Expertise was first on their least important characteristic list but second on the most important one. Teachers may be more varied along this dimension than was evident in their responses for item 11.0.

8.6 Summary of Findings

As the reader may recall, this chapter sought to answer the two of the research questions: *What are the disseminators'* (i.e., coordinators) *perceptions of sustained interactivity?* and *Do the perceptions of users* (i.e., teachers) *and disseminators of sustained interactivity converge?* The second question will be answered in the last and final part of this chapter. In this segment, a summary of findings is provided that is related to the first question. It summarizes coordinators' perceptions of sustained interactivity largely in terms of findings of comparisons between teachers and coordinators with respect to four dimensions of sustained interactivity considered in this chapter as well as the selected characteristics of a program coordinator. This approach also serves to enrich answers for a related research question–*What are the users' perceptions of sustained interactivity?*–which was already addressed in Chapter 4.

1. Teachers' and coordinators' perceptions of sustained interactivity were generally consistent with each other. This encouraging finding suggests that teachers and coordinators share in general a common view of sustained interactivity. Along the dimensions of first contact, coordinators help in determining the relevancy of the innovation and of teachers' learning about topics related to the innovation were mutually rewarding and positive albeit

slightly less regarding more involvement in other related programs. Both teachers and coordinators also tended to disagree that coordinators spent a lot of time with teachers compared with other programs or that interactions changed teachers' views about wildlife-related topics as a result of new understandings.

2. Coordinators, relative to teachers, tend to estimate higher the intensity of their interactions with teachers, their perceptions of sustained interactivity, the amount of follow up, benefits of sustained interactivity and intensity of direct contact. This finding was expected. It was assumed that coordinators would be more concerned about sustained interactivity than teachers because they are promoting the innovation.

3. Teachers, relative to coordinators, estimate lower the extent to which coordinators helped them determine how the innovation fits with what they teach and the extent to which they (i.e., teachers) influence coordinators' understanding about how the innovation fits with their context. This finding suggests that teachers tend not to share the same view as coordinators with regard to the extent to which coordinators help them determine how the innovation fits with what they teach. It also indicates that teachers might not be aware of, or see evidence of, their influence on coordinators' understanding about how the innovation fits with what they teach.

4. Interactions with teachers influence coordinators' thinking and actions. This emergent finding suggests the presence of reciprocal influences arising through interactions with teachers. Such influences tend to alter coordinators' perceptions of teachers and aspects of their practice.

5. Teachers, relative to coordinators, tend to estimate lower that they gained new understandings about topics covered by the innovation. This intriguing finding might be an important indicator that the level of teachers' understandings about the topics covered in the innovation may be higher than is assumed by coordinators. What the teachers' level of

understanding might be is, however, not known since it was not measured. Considering that almost 80% of teachers in the study sample reported that they teach science, however, their understanding might be reasonably high.

6. Coordinators, relative to teachers, tend to estimate lower the amount of time they spend with teachers. In general, this finding implies that teachers' perceptions about how much time coordinators spend with them is fairly high.

7. Coordinators, relative to teachers, tend to estimate lower the number of programs in which teachers became involved because of contacts with them. Coordinators' estimates of the number of programs were substantially lower than those of teachers. This surprising finding suggests that coordinators may be generally unaware of the extent to which teachers become involved in different programs because of their contacts with them.

8. In general, coordinators and teachers cite spread and implementation functions as the most important benefits of sustained interactivity. Coordinators, relative to teachers, however estimate higher that the most important aspect of teachers' contact with them were benefits related to spread and they estimate lower benefits associated with implementation. For both, helping teachers get information and gain new understandings of topics in the innovation were the most important benefits of sustained interactivity. Coordinators may be unaware, however, that benefits of interactions that go beyond information sharing tend to be the most important to teachers.

9. Coordinators' and teachers' views about the most important characteristics of a program coordinator converge regarding the availability of coordinators. Coordinators, however, relative to teachers estimate lower the importance of coordinators possessing technical expertise and delivering technical information; they estimate higher listening to what teachers have to say. This finding suggests fairly prominent differences between

coordinators and teachers about the importance of technical expertise, delivery of technical information and listening.

10. Whether teachers' and coordinators' views about the least important characteristic of a program coordinator converged is not clear. Teachers were divided about this dimension but most coordinators identified it as the least important. The results suggest that coordinators, relative to teachers, might be estimating lower the importance of technical expertise.

8.7 Test of Convergence

Scale variables for all the dimensions of sustained interactivity were used and were previously described on page 117 in Chapter 4 of this study, except for amount of follow up. While in Chapter 4 a scale variable was created for the overall amount of follow up, in this segment the researcher made a distinction between amount of follow up associated with coordinator-generated and teacher-generated follow up. The reason was to gain a more precise understanding of differences along this dimension. The two groups used for the analysis were teachers as one group and coordinators as the other group.

Independent samples t tests were carried out in order to test for differences between teachers and program coordinators along the following dimensions of sustained interactivity: intensity of direct contact; amount of follow up with coordinators; amount of follow up with teachers; perceptions of sustained interactivity; benefits of sustained interactivity, and characteristics of a program coordinator. Table 8.7 reports on observed differences. The F statistic for the Levene test is reported. It tests if the spread of the two groups (i.e., teachers and coordinators) differs. The null hypothesis is that the two population variances are equal. If the observed significance level for this test is low (i.e., $p < .02$), statistical sources (SPSS, 1997) recommend the use of separate-variance t tests for means; if high, then the use of pooled-variance tests is suggested. The t is reported to reveal where the mean differences between the two groups.

Table 8.7

Independent Samples t-tests Results

ITEM CATEGORY / Differentiating Items	Teachers Mean	SD	n	Coordinators Mean	SD	n	F	Probability	t	df	Probability
Type of Direct Contact (5-point frequency scale)	2.54	0.76	274	3.05	0.72	23	0.03	NS	-3.12	295	**
Amount of Follow Up with Coordinator (4-point frequency scale)	1.41	1.11	515	2.04	0.98	23	4.75	*	-2.72	536	**
Amount of Follow Up with Teachers (4-point frequency scale)	0.82	1.01	515	1.91	1.04	23	0.05	*	-5.11	536	***
Perceptions of Sustained Interactivity (4-point strongly disagree/ strongly agree scale)	3.00	0.52	251	3.12	0.41	23	0.46	NS	-1.08	282	NS
Intensity of Sustained Interactivity (4-point not important/ very important scale)	2.65	0.67	223	2.86	0.34	22	10.11	**	-1.33	258	NS[a]
Characteristics of Program Coordinator (4-point not important/ very important scale)	3.31	0.48	483	3.58	0.36	22	2.95	NS	-2.58	503	**

[a] Mann-Whitney U test of z = -1.45, $p = .146$, confirmed no statistical difference. Mann-Whitney U tests were consistent with those of the independent samples t tests for all measures.

Note. NS = No statistical difference; * = * $p < .05$; ** $p < .01$; *** $p < .001$.

For groups where one sample is much smaller than the other (as is the case in this study), the researcher also had the option of conducting the Mann-Whitney U Test as a nonparametric alternative to the independent samples t tests. Like the t test, it also tests the null hypothesis that two independent samples come from the same population but rather than being based on parameters of the normal distribution, the Mann-Whitney statistic is based on ranks and it used when assumptions of the t test are seriously violated (Abrami, 2001). The researcher opted to run this test as a confirmation of results of t tests (see Table 8.8 in Appendix T).

As displayed in Table 8.7, the mean scores for coordinators were consistently higher than those for teachers. With the exception of the perceptions of sustained interactivity and benefits of sustained interactivity variables, all t tests results for all other variables were statistically significant (i.e., $p < .05$). These findings suggest, first, that coordinators and teachers converged along the dimensions of perceptions of sustained interactivity and benefits of sustained interactivity (i.e., no significant differences). Coordinators' and teachers' opinions about their interactions with each other and their views about the benefits of sustained interactivity were not significantly different. Second, teachers and coordinators diverged on the dimensions of intensity of direct contact, follow up from teachers and coordinators, and with respect to coordinator characteristics (i.e., $p < .05$). Coordinators' and teachers' views along these four dimensions were significantly different. Coordinators consistently estimated higher than teachers the intensity of direct contact and follow up and the level of importance of characteristics of coordinators.

8.7.1 Conclusions

The independent samples t tests were conducted to answer the last of the set of three research questions posed in this study regarding teachers and users perceptions of sustained interactivity. This question is: *Do the perceptions of sustained interactivity of users and disseminators of sustained interactivity converge?*

The results of the tests of convergence suggest that teachers' and coordinators' perceptions converge along the dimension of perceptions of sustained interactivity and benefits of sustained interactivity but they do not converge along the dimensions of follow up and intensity of direct contact. The researcher hypothesized that disseminators would estimate higher than users the intensity of sustained interactivity but the results suggest only partial support for this hypothesis. Based on these results, the researcher concluded that teachers and coordinators share a similar view of sustained interactivity and benefits.

8.8 Summary

This chapter's focus was to answer two research questions: *What are the disseminators' perceptions of sustained interactivity?* and *Do the perceptions of users and disseminators of sustained interactivity converge?* Descriptive analyses and independent samples t tests revealed two main findings: in general, teachers and coordinators found their mutual interactions positive and rewarding and they share a similar view of sustained interactivity and benefits of sustained interactivity. These findings are encouraging for two main reasons. First, they suggest that both parties acknowledge that they are enriched through their sustained interactions with each other. Coordinators come to better understandings of the practitioner's world through their interactions with teachers and are able to make accommodations to an innovation so it can fit into their world. Through their interactions with coordinators, teachers are able to access and gain benefits related to the innovation that are important to them from the disseminator's world. Second, the finding that both share similar views of sustained interactivity and benefits indicates that both parties are "in tune" with each other. Coordinators possess reasonable insight into their influence on teachers and the importance of benefits that they offer and they are responsive to influences of teachers. These attributes imply the presence of dissemination efforts that focus on encouraging use. This study's findings will aid practitioners to maximize those efforts to promote use for local change.

CHAPTER 9

Discussion and Conclusions

This final chapter summarizes the motivation for this study, specifies its limitations, highlights the study's findings, and discusses implications for research and theory and practice.

9.1 Motivation for Study

This study was motivated on the researcher's belief that sustained interactivity has important implications for enhanced use of innovations to result in lasting change within school settings. Her premise was based on findings from current empirical studies, within the general domain of academic inquiry called knowledge utilization, that suggest the emerging significance of sustained interactivity as a predictor of use. There was also a call to test it (Huberman, 1990, 1994) with well-developed innovations (Cousins & Leithwood, 1993) because sustained interactivity effects on their use is unknown. Addressing this important gap in knowledge further motivated the study. Huberman's (1990) model made it possible to do so.

Huberman (1990) coined the term *sustained interactivity* and developed a very promising model of it. It has, however, two major limitations. First, it is emergent. Its development is largely confined to Huberman's (1990) empirical investigation of a national research program in vocational education although he (1999) recently extended it to examine its effects on researchers. Huberman found that frequent and intense interpersonal contacts must occur before, during and after a study for research results to exert a strong influence on practitioners. The model needs refinement and testing, as Huberman (1990, 1999) acknowledged, but its development fills an important gap in the literature by providing a comprehensive framework that aids in understanding (1) the linkages between disseminators and users of knowledge, and (2) the effects of those linkages on use of knowledge. Second, the model is not enriched by related scholarly work within the research and evaluation use domains. Other researchers (e.g., Cousins & Leithwood, 1986, 1993; Greene, 1987, 1988a,

1988b; Louis & Dentler, 1988; Marsh & Glassick, 1988; Yin & Moore, 1985) also observed potent effects arising from strengthened linkages between disseminators and users over the life of a study.

9.1.2 Overview of How Study Was Conducted

The researcher elected to enrich Huberman's model by including related scholarly work in a test of it. She incorporated interactive processes, which were drawn from prior research (Cousins & Leithwood, 1993), into the model to define better the characteristics of sustained interactivity. The enriched model was applied across North America within the implementation context of a well-developed educational program called Project WILD. Hierarchical linear regression analysis was conducted to examine the extent to which use of the innovation and process use depends on the unique influence of sustained interactivity. An examination of the effects of sustained interactivity was enabled by generating a sample of teachers that reflected a range of contacts with disseminators, which ranged from high to low to an absence of contact. Program coordinators who administer the innovation at state, provincial and territorial levels in Canada and the US volunteered to participate in the study, provide contributions for the sample of teachers and serve as the disseminator sample for the study. Their voluntary participation enabled the development of the study sample and an exploratory investigation of reciprocal effects of sustained interactivity on them, as Huberman's model implied such effects. The next segment draws attention to limitations of this research, followed by an overview of the study's findings.

9.2 Limitations

9.2.1 Generalizability of the Sample

There are at least five limitations regarding the generalizability of the study but great care was taken to minimize threats to its external validity wherever possible. First, random sampling strategies were not possible for this study–a serious limitation–but the researcher was

very careful to construct a purposive sample of 2,000 teachers teaching in school settings and 23 coordinators that would well represent the target population of users that were of interest and of disseminators of the program innovation across North America.

Second, the response rate of almost 32% from teachers was low–a serious limitation–but it did result in an achieved study sample of 515 eligible teachers who were fairly well spread across four dimensions of directness of contact with coordinators and who were selected from four strata that are typically found among jurisdictions offering the innovation. The spread ranged from low to high to an absence of contact but was skewed somewhat toward the high side.

Third, an almost equal balance across rural, urban and suburban settings was achieved but types of teachers were skewed toward elementary (i.e., K-grade 8) school female teachers with many years of experience. This skewness was expected since the innovation's design was more suited for elementary levels.

Fourth, although only 40% of all available coordinators voluntarily participated across North America to form the disseminator sample and contribute sample members for the study from their jurisdictions, this sample is typical of the general population of coordinators across North America. It was a mix of female and male government employees who work at state or provincial (or territorial) levels and perform very similar roles associated with the innovation but was slightly skewed in favour of males.

Fifth, the members of both samples were from a wide mix of sizes of jurisdictions (from very large to quite small) and a broad geographical spread across 17 US states and 5 Canadian provinces or territories (i.e., northern, southern, central, eastern and western parts of the continent). They adequately reflected North American dimensions but were slightly skewed toward larger jurisdictions.

Although limited, by and large the achieved samples were fairly good representations of the general population associated with the innovation. Moreover, they may be viewed as being reasonably representative of user and disseminator populations of other, similar well-developed innovations like Project WILD that use the same kind of implementation model. Indeed, given that Project WILD offers bundled knowledge in the form of a pre-packaged activity guide, it is not unlike other resources offered to teachers. Generalizing this study to this latter dimension may be more limiting, but it is reasonable to view it as pointing to indicators of potential trends.

9.2.2 Listwise Deletion of Missing Data and Reduction of Degrees of Freedom

The study is also limited because strict listwise deletion of missing data was slightly relaxed with some measures to maximize the number of valid cases. That is, in cases where complete data were not available, the calculation of the mean was based only on the items from which valid data was provided. That was not the case in the formation of an overall measure for sustained interactivity. Adhering to strict listwise deletion of missing data regarding the overall sustained interactivity measure, however, had a significant effect in reducing the number cases included in the analysis. Similarly, running hierarchical linear regression models with five covariates and all nine indicators of sustained interactivity significantly reduced the number of degrees of freedom. Nonetheless, the significance of the regression models and the amount of explained variation in criterion variables were promising.

9.2.3 Limited Number of Covariates to Estimate the Effect of Sustained Interactivity

This study tested the potency of sustained interactivity with respect to only five covariates that were drawn from prior theory and were assumed to be influences on use of innovation. Descriptive analyses revealed a trend to the positive end of scales for these covariates. Teacher collaboration tended to be fairly high. Teachers were relatively open to change. Commitment to the innovation and their perception of the quality of it, was high and perceptions of selected characteristics of disseminators were rated as important. It was

concluded that these covariates of sustained interactivity helped in obtaining more precise estimates of the effects of sustained interactivity but they might not be the only sources of influences.

9.2.4 Observer Bias: Dual Role as Researcher and as Director of Innovation

Given that the researcher is also the Canadian Director of Project WILD, she took four important precautions to reduce observer bias. First, the study was driven by a well-justified conceptual framework that was rooted in the literature. Second, great care was taken to develop items that were solidly grounded in prior research. These items were systematically corresponded with all factors within the conceptual framework in the design of the instrument. Third, a well-structured pilot study was conducted prior to the study proper to test the reliability of the research instrument and collect evidence of its content validity. The validity study included a high number of independent experts about the innovation who were distributed across North America. Refinements to the instrument were based on pilot findings. Fourth, teachers for the study proper sample were supplied by a broad mix of coordinators. The researcher was confident that coordinator observer bias was reduced because of the high number participating. Fifth, coordinators were not selected for the disseminator sample. Rather, they volunteered. It is possible that they were more interested in research but a number who did not volunteer indicated that factors such as lack of time or job changes inhibited their participation.

It is also noteworthy that the researcher is not involved in local dissemination; she is not part of the US program nor does she have reporting relationships with Canadian coordinators. Indeed, one benefit of her position is the availability of her experience and knowledge about the innovation as a resource for the reader. She could draw attention to findings that, given the data, struck her as particularly interesting. She recognizes that her position as a known entity within the community of disseminators may have made it easier for her to carry out the research but

she had no reason to believe that members of this community became involved because of her. Rather, coordinators indicated that their interest was rooted in the study's potential to provide useful data of effects of linkages upon which they could draw to enhance their delivery to promote more use.

9.2.5 Validity and Reliability of Scale Variables

The researcher was careful to provide a high degree of confidence that the instrument for the study proper was measuring what it was supposed to be measuring but there were limits. The content validity of the instrument was deemed to be high, as discussed in the next segment of this section. Scale variables that were constructed to reduce data into more manageable forms were based on sets of items that (1) reflected constructs within a well-justified conceptual framework and (2) were rooted in prior research, where a number were drawn directly from related research and adapted for this study. These efforts imply that the validity of the constructs was reasonable. Moreover, the use of multiple indicators to capture various dimensions of constructs within most item sets further strengthened their validity. The validity of scale variables for commitment to the innovation and teachers' orientation to change was more limited since they were based solely on one indicator. Institutionalization may also be suspect; some dimensions of it did not apply to a fair number of respondents.

The reliability of scales was adequate for research purposes in all cases where they applied but four indicators–one each for social processing, benefits of sustained interactivity, conceptual use and commitment–were dropped as their deletion improved reliability. Except for commitment, the reliability of these scale variables prior to the removal of items were within acceptable ranges.

9.2.6 Limits of Survey Instrument

The data that were generated for this research were self-reported and limited to teachers' and disseminators' recollections. While some interviews were conducted to collect data

regarding some aspects of the pilot study, there were no follow up interviews to explore more deeply any issues that may require further exploration to clarify or probe data. Nonetheless, data that were collected were sufficient for the purposes of this study.

9.3 Summary of Findings and Conclusions

Having laid out the limitations of this study, it is fair to say that the study produced some very interesting trends and findings. The framework used for discussing them has been outlined in Chapter 2 and embodied in the research questions that were posed for investigation. This segment summarizes the main findings of the research and the researcher's conclusions.

9.3.1 Sustained Interactivity as a Predictor of Use of Well-developed Innovation

The general finding that use varies as a function of the degree of sustained interactivity was expected. It provides important empirical support that sustained interactivity is a very promising predictor of use of well-developed program innovation and demonstrated that it can be expected that use will likely increase with increases of sustained interactivity. The main variables that were associated with use were process use, level of implementation of the program innovation–as a special case of instrumental use–and the conceptual use of it. The finding that sustained interactivity is a particularly potent predictor of level of implementation, process use and, to a lesser extent, the conceptual use of the well-developed innovation breaks new ground in the theoretical understanding of the importance of this construct in the domain of program utilization. It also adds to mounting empirical (e.g., Cousins & Earl, 1995; Greene, 1987; Kennedy, 1984) support for the premise embodied in Huberman's (1990) model that sustained interactivity is an important predictor of use. For practice, this general finding is gratifying and useful. It provides support that multiple exchanges between disseminators of the well-developed innovation and users of it enhance utilization. Indeed, coordinators associated with the innovation may celebrate that their sustained interactions with teachers enhance the use of Project WILD.

Finally, the general finding of this study will aid disseminators in maximizing dissemination strategies to promote use. It provides strong evidence in support of the notion that dissemination that takes place through sustained interactions between users and disseminators promote use. More generally, it supports current thinking about dissemination: namely that the intent ought not to be to simply distribute information but rather to do it in a way that promotes its use (Louis & Jones, 2001) and that the most hopeful new avenue of inquiry in the D & U literature emerges when dissemination takes place...through...sustained interactions between..." (Huberman & Broderick, 1994, p. 3-4) disseminators and practitioners.

9.3.1.1 Enhanced Process Use Effects

Based on the general findings, the researcher concluded that one may expect that increases in sustained interactivity will likely enhance, fairly powerfully, process use effects. These effects relate to how teachers are affected because of their participation in the innovation. That is, the more that sustained interactivity increases, the higher are the effects of their participation in the innovation. This finding adds important new knowledge with respect to well-developed innovation to the growing scholarly work (e.g., Cousins, 1995c; Cousins & Earl, 1995) of the consequences of participation. Such effects were found to bear on the following areas: enhanced learning in developing new skills associated with the innovation, feelings of more commitment to it and greater confidence in teaching about topics within it, feelings of making a difference about the dimensions covered by it or being more positive about work, and becoming more empowered regarding career advancement. Descriptive analyses at item levels suggest that such effects are probably more highly associated with the first three areas, especially learning new skills, than with the latter three. Nonetheless, enhancing these kinds of effects have important implications for enhanced utilization: learning new skills suggests professional development that will help in how to better teach the innovation, as does gaining greater confidence in teaching its topics; feelings of more commitment to it suggest

greater ownership and care for it that may stimulate more involvement in it. Having more voice in something perceived as important may be a significant justification for using it or simply feeling good about work.

9.3.1.2 Enhanced Implementation and Conceptual Use

The researcher also found, and concluded, that increases in sustained interactivity will likely substantially contribute toward putting the innovation more fully into practice and may enhance its potential of becoming more entrenched as part of the routine of the school organization. Since the level of implementation variable also included measures associated with instrumental use of the innovation (i.e., the decision to use it by teachers), she concluded that increases in sustained interactivity will also likely enhance the use of it by teachers. Finally, it was concluded that learning about the innovation by teachers may also be enhanced with increases in sustained interactivity. These findings have important implications for implementors of school programs of the potential of sustained interactivity in enhancing utilization of programs for the realization of sustained change (e.g., Fullan, 1991, 1993).

9.3.2 Components of Sustained Interactivity that Are Important Predictors of Use

Sustained interactivity was cast as a multidimensional, complex construct that was reflected by nine indicators to measure it. Hierarchical linear regression analyses revealed which of these nine indicators surfaced as the most important in explaining variation in criterion variables. While only three emerged, they were impressive in their effectiveness as predictors. First, as was expected and based on prior research (Cousins & Leithwood, 1993; Louis & Dentler, 1988), *social processing* about the innovation among teachers and their *engagement and involvement* in it emerged as potent predictors of putting the innovation into practice. This study found, and concluded, that the more that such activities increased, the more likely the well-developed innovation would be more fully implemented. Second, as expected, the intensity of sustained interactions between users and disseminators surfaced as an important

influence in enhancing, in particular, the conceptual use of innovation, given Huberman's (1990) findings. The variable *benefits of sustained interactivity* was used as a measure of intensity of such interactions. It was found, and concluded, that intensity of sustained interactivity enhances learning about the innovation, which further supports Huberman's findings. Third, Huberman's (1990) model did not include dimensions about effects arising because of participation in, or proximity to, the innovation. This study found, and concluded, that increases in social processing about the innovation among teachers and the intensity of sustained interactivity will likely increase substantially process use effects. These findings also help to unravel and point to the kind of specific interactions (i.e., components of sustained interactivity) that are more likely to support the dissemination of the innovation in ways that promote use.

These findings shed light on what is known about the characteristics of sustained interactivity. In this respect, Cousins and Leithwood's (1993) research is particularly relevant. This study used their idea of interactive processes to characterize sustained interactivity and enrich the overall test of Huberman's model of sustained interactivity. Cousins and Leithwood (1993) found that the following predictors were particularly potent (in order of their frequency), especially with respect to the conceptual use of pieces of information (they did not examine "complete pieces of information" in the form of well-developed innovation): *social processing, engagement, involvement* and *ongoing contact*. A similar pattern was found in this study among these processes as significant, unique predictors of use of a well-developed innovation, with the exception of ongoing contact. *Ongoing contact* (*direct* or *indirect ongoing contact*) did not surface as a significant, unique predictor of use of a well-developed innovation. *Social processing* and *engagement and involvement* were also found to be significant, unique predictors of *level of implementation*–a special case of instrumental use. This finding suggests that these activities may also be particularly potent with respect to putting "complete or pre-

packaged" well-developed program innovations into practice more fully. Cousins and Leithwood (1993) did not include *follow up* as an interactive process. It was included in the test of interactive processes in this study because Huberman (1989, 1990) identified it as being potentially important as a predicator of use. This study did not find *follow up* to be a significant, unique predictor of use of well-developed innovation.

Given Cousins and Leithwood's (1993) and Huberman's (1990) findings regarding the potency of ongoing contacts, it was surprising that neither direct contact (with coordinators) nor indirect contact (with the innovation) emerged as significant, unique predictors of use in this study. This observation was apparent regardless of whether contacts were measured as frequencies of contact (i.e., number of contacts) or as more intense contacts (e.g., types of contact such as through newsletters, telephone). Rather, *intensity of sustained interactivity* emerged as an important predictor. These findings suggest, and it was concluded, that *intensity* of *interaction* as opposed to its *frequency* may bear more on the use of well-developed innovation. This finding generally supports Huberman's (1990) conclusion of the potency of the intensity of linkage for utilization.

9.3.3 Characteristics of Sustained Interactivity

Since understanding about sustained interactivity has emerged from the research and evaluation utilization domains of inquiry, the new knowledge revealed in this study helps to further understandings of it as it relates to well-developed program innovation. Keeping in mind that this study examined sustained interactivity during the implementation phase of the innovation, three particularly interesting findings surfaced.

First, data drawn from the full study sample revealed that *social processing* about the innovation among teachers, their *engagement/involvement* in it, follow up between teachers and disseminators (especially from teachers), the *intensity of indirect contact* tend to be low as is *ongoing indirect contact*, which is also declining. In contrast, data from sample members who

were also in direct contact with the coordinator showed that the *intensity of direct contact* is moderate and *intensity of sustained interactivity* tends to be fairly high, *benefits of sustained interactivity* are generally perceived as important and *users' perceptions of sustained interactivity* tends to be reasonably similar and relatively positive and optimistic. *Ongoing direct contact*, however, is somewhat low, and, like *ongoing indirect contact*, is declining. These findings indicate, and it was concluded, that sustained interactivity is generally higher among teachers who are in direct contact with the coordinator, which was expected, but the overall rates of contact are declining (which may be pointing to less interest in the innovation). Why contact is declining is not known and needs further investigation. An important benchmark was found, however, to judge future trends of contact: teachers tend to have about two direct and two indirect contacts a year with the coordinator or the innovation.

Second, the finding that the innovation generally is not discussed collectively nor are teachers highly engaged or involved in it points to an important area that might need to be enhanced during the implementation phase of a well-developed innovation. These factors surfaced as important dimensions of sustained interactivity for putting the innovation into practice more fully. When they do talk deeply about the innovation, collective discussion appears to stimulate change, as will be discussed shortly. Reported changes, however, were not verified as this dimension was beyond the scope of the study. Most talk about the innovation, however, is at the information-sharing level by individual teachers, which is consistent with findings in the literature (e.g., Cousins et al, 1994; Little, 1990). Involvement in implementing the innovation within schools also tends to be at individual levels (i.e., trying out new activities) as opposed to presentations to groups of teachers.

Third, the findings that teachers view their interactions with coordinators with some optimism and that they gain benefits that are important to them from such interaction were expected and suggest that their experience of sustained interactivity is generally rewarding and

beneficial. Three key benefits emerged through interactions that were especially important to teachers–they led to receiving help to get information, gaining new understanding about the innovation and contributed to thinking about wildlife-related topics in a new way.

9.3.4 Characteristics of Use of the Innovation

Examining the characteristics of use also revealed important knowledge about how teachers use well-developed innovation during the implementation phase of it and the effects of their participation in it. Bearing in mind that the innovation under study is not a mandated program but rather relies on voluntary willingness to use it, the finding that most teachers make instrumental use of it is promising.

This study, however, was particularly interested in investigating how well the innovation was implemented into school systems. In this respect, it found that the overall intensity of putting the innovation into practice was moderate. Most teachers use it regularly but such use tends to be six times or less during a school year. There is also some effort to vary the innovation's impact on students but teachers seem not to take advantage of the range of different activities available within it. Their choice of activities, however, is based on careful thought to their curriculum needs and their students' interests. Moreover, for about half of the teachers such choices are limited to those activities learned in workshops. This finding suggests that the workshop experience may be an important source of influence of which activities are selected. Teachers also tend to integrate activities into their teaching in a modified form and as sets of lessons for the benefit of their own students as opposed to working in collaboration with colleagues for collective impact. It is unknown, however, what kinds of modifications are made to activities since this element was beyond the scope of the study. Nor is there much evidence of collective efforts to re-evaluate the use of the innovation amongst themselves or to compare it with other similar program innovations. This finding raised questions as to why such activity is fairly low since it was also found that members of the study sample tend to be fairly active in

engaging in such activities regarding other programs. Finally, the well-developed innovation appears to generate support among colleagues and administrators but it is generally not included in teaching units within schools or district levels.

Overall, these findings suggest, and it was concluded, that teachers are using the innovation instrumentally routinely and that positive albeit moderate efforts are made to put it into practice and there may be good potential for the innovation to become more part of the school routine.

The finding that teachers reported that the innovation enhances their learning about it is encouraging as it suggests that they are gaining the kind of knowledge that may be needed to teach its subject matter. Even more exciting are the very positive findings associated with how teachers are affected because of their participation in the innovation. Teachers participating in it appear to derive considerable gratification from their experience. The specific benefits of participation were discussed earlier in this chapter and support similar findings of other scholars (e.g., Cousins, 1995a, 1996; Greene, 1998a): new skill development, confidence in teaching about the innovation and commitment for it and positive feelings about work because of it were particularly prominent with slightly less gains regarding having voice in something important or becoming more empowered or recognized. In this study, the most spectacular finding is in the area of developing new skills related to the innovation, especially those associated with teaching practices. This finding is promising as it indicates that teachers are learning the kinds of skills that may help them teach the innovation better.

Another less dramatic but nevertheless impressive finding was the effect of deeper levels of social processing about the innovation. The inclusion of indicators for deeper levels of it in this study helped in probing into the presence of organizational learning capacity. These indicators did not measure organizational learning (this dimension was beyond the scope of the study) but they may be regarded as exploratory. The exploration revealed that deeper levels of

social processing may be a promising indicator of affecting change at the organizational level. As such, the data help to provide support for similar findings of other scholars (e.g., Marks & Louis, 1999). The most striking evidence surfacing in this regard was decisions arising from collective discussion to create habitat improvement projects as learning experiences for students–complex projects that require considerable effort and in-school cooperation–and making more use of the out-of-doors. As mentioned previously, however, reported changes were not verified since this dimension was outside the study's scope.

In general, it was found, and concluded, that conceptual use and process use of well-developed innovation is high. Teachers' participation is gratifying and the most impressive benefit of participating in the innovation is associated with new skill development.

9.3.5 Convergence of Teachers' and Coordinators' Perceptions of Sustained Interactivity

The examination of the extent to which users' perceptions of sustained interactivity, and those of the disseminators, converged revealed important new knowledge about teachers' and coordinators' view of their mutual interactions. It was found, and concluded, that both parties share similar perceptions of their mutual interactions along many dimensions of Huberman's model that were considered in this study. Although coordinators consistently estimated higher than teachers the influence of sustained interactivity, which was expected, a test of convergence revealed that only along the dimensions of *intensity of direct contact* and *follow up* between teachers and coordinators was there a statistical difference. This finding suggested, and it was concluded, that teachers and coordinators share a similar view of sustained interactivity and the benefits of it. Descriptive analyses, however, revealed a key area of divergence, namely the extent to which teachers receive assistance in determining the fit of the innovation to what is being taught.

While the study's focus was on users, reciprocal effects of sustained interactivity were also explored. It was found, and concluded, that there are reciprocal effects on coordinators

through their interactions with teachers. Such effects include adding, changing or modifying aspects of the innovation to improve its overall usefulness to teachers, greater appreciation for the needs of teachers and their professional knowledge and changes in perceptions of teachers. These findings support similar effects reported in Huberman's (1999) recent study but they are very preliminary and warrant further examination.

These findings provide important empirical support for a premise of Huberman's (1990) model that strengthening linkage promotes reciprocal effects and mutual accommodation that enhance use. Coordinators better understand the teachers' world and can make accommodations to make the innovation more relevant for it; teachers are enabled to access and draw benefits that are important to them. These effects imply that each party is generally in tune with the other. By being more in tune, coordinators are enabled 1) to gain better insight into their influence on teachers and the importance to teachers of benefits that they offer, and 2) to respond to influences of teachers. It draws attention to the potential power of sustained interactivity in enhancing coordinators' learning about the world of teachers, which may make their dissemination effort more effective to promote use.

9.3.6 Other

The test of convergence was also applied to users' and disseminators' views of the importance of selected characteristics of a program coordinator. These were found to be statistically different: coordinators, relative to teachers, tend to estimate higher than teachers the importance of the selected characteristics of a program coordinator. This finding was expected. Descriptive analyses also revealed fairly prominent differences about their views as to which characteristics were the most and least important. These findings suggest, and it was concluded, that coordinators and teachers do not share similar views along this dimension.

9.4 Implications for Practice and Theory

9.4.1 Practice

What is the meaning of this study for practice? In asking this question, the researcher hopes that this study's findings will serve as a valuable resource for disseminators at national and North American levels of well-developed program innovations. Given the findings, seven key implications for practice emerged:

1. Dissemination practices that use sustained interactions between coordinators of well-developed program innovation and teachers of it as their strategy will likely have the effect of enhancing (a) teachers' learning about the innovation, (b) teachers' use of the innovation in practice, (c) the implementation of the innovation, and (d) how teachers are affected because of their participation in the innovation.

2. When coordinators use a sustained interactivity approach in their practice with users and provide benefits to teachers that teachers perceive as being important to them, coordinators may expect that learning about the innovation will increase and that the effects of how teachers are affected because of their participation in the innovation will be enhanced.

3. Strategies that encourage teachers to engage in collective discussion among themselves about the well-developed innovation at their school will likely enhance the effects of how teachers are affected because of their participation in the innovation.

4. Increasing teachers' engagement and involvement in the innovation will likely enhance teachers' use of the innovation in their practice and the extent to which the innovation is implemented within school systems.

5. Strategies that encourage teachers to engage in collective discussion about the well-developed innovation among themselves at their school will likely increase teachers' use of the innovation in their practice and more full implementation of the innovation may be expected.

When teachers engage in deeper levels of such collective discussion, the potential for change associated with the innovation at the school level is more likely.

6. When teachers participate in the innovation, they are highly likely to develop new skills associated with the innovation. Most skill development identified in this study was in learning new teaching practices associated with the innovation. Teachers also learned new skills associated with wildlife (e.g., tracking, wildlife identification).

7. Teachers participating in well-developed program innovation may derive considerable gratification from these experiences. Among the benefits of participation are new skill development, feelings of more commitment for the innovation and greater confidence in teaching about topics in it, feelings of making a difference about the dimensions covered by it or being more positive about work, and becoming more empowered regarding career advancement.

8. Frequency of contact alone does not appear to enhance use of well-developed program innovation. Rather, it is the intensity of interaction that enhances use.

9.4.2 Theory

This study, within its limits, extended theoretical knowledge of sustained interactivity in five important ways:

1. It provided important empirical support that sustained interactivity is a promising predictor of use. As such, it makes an important contribution to the growing empirical support for the power of linkages between disseminators and users as a significant but emerging factor in explaining use.

2. It breaks new ground in advancing understandings of the importance of this construct in the domain of program utilization. Prior research applied largely to the evaluation and research utilization domains and focused on "pieces" of knowledge as opposed to "pre-packaged" bundled knowledge. The finding that sustained interactivity is an especially potent predictor of

process use, level of implementation and, to a lesser extent, conceptual use adds new knowledge about the significance of this construct for the use of well-developed program innovation.

3. It revealed new knowledge about the importance of sustained interactivity as a predictor of process use. Indeed, the intensity of sustained interactivity appears to be particularly potent in predicting this kind of use. This finding points to the type of linkage that may to be especially important for enhancing process use: those that provide benefits that users perceive as important.

4. It extended understandings of the potency of interactive processes regarding well-developed innovation–prior research had focused on "pieces" of information.

5. It enriched understandings of sustained interactivity as a promising predictor of use of well-developed program innovation in school settings–a very important dimension for encouraging use of innovation sufficiently long for the realization of lasting change.

This study's contribution to theory furthers understandings about sustained interactivity but there were limits. It used a survey strategy to answer the research questions posed but without the benefit of exploring, probing or clarifying areas that surfaced as especially rich areas for further investigation. Among these, two areas emerged as worthy of deeper, qualitative investigation, with the most interesting dimension being "benefits of sustained interactivity".

First, this study showed quite clearly that benefits of sustained interactivity was especially potent in enhancing use but more questions emerged than answers. Benefits ranged from simply receiving requested information through to gaining new understandings about the innovation and thinking about its content in a new way. What types of sustained interactions between users and disseminators contribute to users' new understandings and thinking of an innovation? What do users mean by "new understandings and ways of thinking" that arise from

their interactions with disseminators? How do disseminators perceive the meaning of those terms?

Second, social processing and engagement and involvement emerged as important predictors for putting an innovation into practice more fully yet both were found to be low in this study. Keeping in mind that the sample was fairly higher on the collaboration scale and that social processing is a collaborative activity, questions surfaced: Are teachers less inclined to engage in collective discussion about a well-developed innovation? Does its completeness inhibit or reduce a need for collaborative discussion? Regarding engagement and involvement: Does completeness of an innovation reduce or inhibit engagement or involvement in it? A qualitative research strategy would help to unravel underlying reasons for less activity along these dimensions.

9.5 Conclusion

This study concluded that sustained interactivity is a very promising predictor of the use of well-developed program innovation. The study, within its limitations, has advanced theoretical knowledge about the potential of sustained interactivity as a potent predictor of use of a well-developed innovation in school settings. It also helped to unravel what the characteristics of sustained interactivity and use may be regarding a well-developed program innovation. It enriched the test of Huberman's model by including findings of related empirical research, most notably interactive processes. In doing so, it extended further insights about these processes by testing them with encouraging results. It also provided research that will help advance the efforts of disseminators promote utilization of well-developed program innovation.

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APPENDICES

DISSEMINATION EFFORT

Intensity of Effort

Time Invested

In 4 out of 10 cases of strong conceptual outcomes, time invested was associated directly with one or more predictors and/or associated with high conceptual outcomes.

Dissemination and Utilization Competence

Targeted Products

In 8 out of 10 cases of strong conceptual outcomes, use of disseminated products tailored specifically to target public was associated directly with one or more of the predictors and/or associated with high conceptual outcomes.

Interpersonal Modes of Dissemination

In 6 out of 10 cases of strong conceptual outcomes, interpersonal modes of dissemination were associated with one or more of the predictors and/or associated with high conceptual outcomes.

Follow up

In 6 out of 10 cases of strong conceptual outcomes, follow up was associated with one or more predictors and/or associated with high conceptual outcomes.

Multiple Channels of Communication (print, visual, in-person)

In 6 out of 10 cases of strong conceptual outcomes, multiple channels of communication was associated with one or more predictors and/or associated with high conceptual outcomes.

Reinforcement of Users

In 4 out of 10 cases of strong conceptual outcomes, reinforcement of users was associated with one or more of the predictors and/or associated with high conceptual effects.

Quality of Dissemination Products

Focus on Malleable Factors

In 6 out of 10 cases of strong conceptual effects, use of a focus on malleable factors was associated directly with one or more of the predictors and/or associated with high conceptual effects.

Contextualization of Findings

In 7 of 10 cases of strong conceptual effects, contextualization of findings was associated directly with one or more of the predictors and/or associated with high conceptual outcomes.

Operationalization of Key Findings

In 3 out of 10 cases of strong conceptual outcomes, operationalization of key findings were associated with one or more of the predictors and/or associated with high conceptual outcomes.

PREDICTORS OF LOCAL USE

Time Invested

In 5 out of 10 cases of strong conceptual outcomes, time invested was associated with one or more of the predictors and/or associated with high conceptual outcomes.

Resources Invested

In 5 out of 10 cases of strong conceptual outcomes, resources invested was associated with one or more of the predictors and/or associated with high conceptual outcomes.

Number of Persons Involved

In 5 out of 10 cases of strong conceptual outcomes, the number of persons involved was associated with one or more of the predictors and/or associated with high conceptual outcomes.

Compatibility of results with Users' Opinions

In 3 out of 10 cases of strong conceptual outcomes, compatibility of results with users' opinions was associated with one or more of the predictors and/or associated with high conceptual outcomes.

Perceived Quality / Validity of Study Findings

In 7 out of 10 cases of strong conceptual outcomes, perceived quality/ validity of study findings was associated directly with one or more of the predictors and/or associated with high conceptual outcomes.

Comprehension of Study Findings

In 6 out of 10 cases of strong conceptual outcomes, comprehension of study findings was associated directly with high conceptual outcomes.

Organizational Permeability to Discrepant Data

In 6 out of 10 cases of strong conceptual outcomes, organizational permeability to discrepant data was associated directly with one or more of the predictors and/or associated with high conceptual outcomes.

Level of Problem Awareness

In 4 out of 10 cases of strong conceptual outcomes, level of problem awareness was associated directly with one or more predictors.

Figure 2.2: Huberman's (1990) list of variables that exert a directional influence on the outcome variable (i.e., conceptual use).

APPENDIX B

EFFECTS OF LINKAGE LITERATURE REVIEW

Effects of Linkage: Evaluation Utilization Perspective

Alkin and Stecher (1983) interviewed 66 decision makers from 22 elementary schools to examine patterns of evaluation use. They found that the "clearest instance of evaluation use point up the importance of local involvement and familiarity in the evaluation utilization process" (p. 30) and that more attention was given to data that were generated locally. They also found that personnel have a personal investment in needs assessment information because they were actively involved in its collection.

Dawson and D'Amico (1985) used a single case study approach in their examination of user participation in the evaluation of school development programs that spanned two and a half years. Program staff were extensively involved in a number of interactive activities associated with the study by helping design and modify the programs, providing training for teachers and administrators, conducting interviews, assisting in data collection and feedback activities and helping to implement the programs. Dawson and D'Amico found that staff participation accelerated the utilization of evaluation information and increased staff learning about program needs. Staff participation increased staff's knowledge of effects of the program, led them to make strategic changes in the program and build provisions to offer technical assistance to administrators and advice to schools. Their participation also contributed increased relevancy of the program because their involvement influenced types of data sought. Participation also resulted in improved communication, which, the authors suggested "is perhaps the major reason that utilization has increased" (p. 181). It was observed that communication was direct, informal, interactive, frequent and timely. Involvement gave staff a better understanding of the programs' actual use than through a report. Credibility of the study was enhanced by program staff familiarity with it, by frequent interactions among evaluators and staff and by feedback from participants with others about the study. User commitment to the study and advocacy for it was enhanced by involving staff. Commitment was seen to increase because staff saw that the study produced useful information. Shared understandings of the program developed and helped staff become more receptive to the findings.

Green (1987, 1988a, 1988b) examined participation in design, planning, communication and interpretation phases of evaluations spread over three years and reported that higher levels of involvement were associated with greater cognitive, affective, and political consequences. Multiple opportunities for discussion and user engagement, as well as personal contacts (via meetings and interim progress reports), were associated with ongoing processing and assimilation of information, which were linked to conceptual uses. Ongoing contacts, combined with decision roles for users, stimulated feelings of worth and value, gave users voice and generated interest. Greene reported conditions for use: greater understanding of results, greater acceptance and ownership of results, and perceptions of evaluation quality. Listening skills, technical competence, respectiveness to diverse views, and responsiveness of evaluators on the part of the disseminator, along with user commitment, enhanced use.

Using a case study approach of four evaluations conducted by a large school district, Marsh and Glassick (1988) examined the role of recommendations in school evaluation efforts by interviewing evaluators, project directors and program decision makers (usually the principal). The recommendations were developed in three overlapping phases, each of which involved frequent collaboration with program staff. They found that interaction of the evaluator and the program staff or district decision makers was a prominent factor in enhancing use of the recommendations – "our findings point to the central importance of verbal interaction about the creation and refinement of the findings and recommendations themselves" (p. 337). Verbal interaction between evaluator and program staff was found to be dominant in formulating the recommendations and also important in its utilization and was very influential in substantive revisions of the program. The more significant finding, they claimed, was the role that recommendations played in the general utilization of evaluations: They found that the

formulation and revision of the recommendations provided a vehicle for the negotiation of the interpretation of the findings; this included resolving misconceptions about the meaning of the findings. Recommendations were also seen to provide a vehicle for implications of findings to be explored and then revealed to several audiences. Finally, they found that recommendations represented a major dimension of the way in which key role groups construed the transformation of the findings to interpretations and then to decision implications and then to decisions. Interaction and negotiation was seen by both evaluators and decision makers as a vital part of this transformational process. Marsh and Glassick concluded that use of recommendations was an information transformation strategy used by these groups.

In their review of 65 empirical studies, Cousins and Leithwood (1986) concluded that evaluation use seemed strongly evident when evaluations were appropriate in approach and intensity, where users were involved in the process, had a prior commitment to the evaluation, saw data as relevant, and where decisions to be made were significant to users and consistent with their beliefs and expectations. In his doctoral dissertation, Cousins (1988) found that principals' use of performance appraisal data for personal professional development was enhanced with participation in data-gathering and the processing aspects of the appraisal process.

Geva-May and Peretz (1991) used a single case study approach in which four sets of stakeholders (adult students, teachers, the curriculum team, and the administration) participated of an instructional evaluation. They examined the use of information from a multi-purpose diagnostic test. The test could be used to screen learners' ability, check study progress during a course and for student achievement and summative evaluation of curriculum and thus providing information regarding the worth of the program. They found that "the closer a stakeholder is to the results of a diagnostic test, the stronger the chances for implementation" (p. 146). Personal involvement of individual students led to an effort to understand and utilize the results; impersonal involvement, conversely, deterred implementation on the part of the administration. Students reported that face-to-face communications made all the difference in their acceptance of a diagnosis and in their following though in their remedial work. Although teachers were also partners in the evaluation, limited use was made of evaluation information due to time constraints, the amount of extra work and effort involved (without compensation) to engage in the evaluation's approach and the lack of support for the evaluation's approach to from their administration.

Keiny and Dreyfus (1993) conducted a case study of the intervention of external researchers in a process of school self-evaluation. The self-evaluation was performed by means of a partnership between researchers and practitioners. The researchers used a reflective dialogue technique. This technique is a type of interaction that enables practitioners to modify their perception of situations and reframe their knowledge (Schon, 1983). The researcher helps practitioners reflect on their actions, and better understand the link between their behaviour and their assumptions. Prior to the study, a decision was made to try Mixed-Ability Teaching (MAT) as means of enhancing social integration between academic and vocational students. The study examined a third phase of the process, which was to help school personnel evaluate the process of implementation of MAT and to reach operational decisions. Keiny and Dreyfus (1993) found that by involving practitioners in an analysis of their own findings, practitioners were able to reframe their initially discouraging conclusions about the MAT experiment to seeing that it was successful. They also found that in the attempt to obtain a deeper understanding into the implications of the results, a new approach was adopted. Further, they found that as a result of the dialogue, management became ready to accept, appreciate and find useful for further decision making the type of answer that emerged from the evaluation. They concluded that dialogue that starts from the needs of school staff and involves them in the implementation and the evaluation of their actions ends with staff being able to make its own decisions and may be considered a process of self-evaluation.

Strang and Pearson (1995) examined factors that influenced utilization of evaluation results in their case study of a day-care program for frail or disabled elderly adults. The program was operated in collaboration with the Victorian Order of Nurses. Their research process included 65 interviews with all

a broad spectrum of interested stakeholders, including program staff and administrative staff, program volunteers and care givers. Noting the importance of staff attitudes and their relationship with researchers as an important influence on utilization, the researchers spent time in the program as observers and volunteers before beginning their data collection, made efforts to listen to the agency and convey attitudes of respect:

> If the researcher has the confidence of the staff, if the staff see the researcher as credible in terms of practice, as having an understanding of program operations, there seems to be a much greater chance that the results of the study will be applied to their practice. Additionally, if the researcher demonstrates respect for the skill and knowledge of the staff, actively listens to the various organizational perspectives, and indeed identifies with the agency, there is the possibility of a more active recognition within the agency that the research might provide useful information for program enhancement. (p. 84).

They found that collaborative involvement of administrators and practitioners in the evaluation project enhanced its utilization and led to changes where the agency enhanced care giver outreach, educative, and counseling components of their program. In addition to wide circulation of the evaluation report, face-to-face discussion of findings and their implications for program enhancement facilitated use. Organizational valuing of research was also found to be clearly reflected at the local program level and an eagerness to learn from the study on the part of the administration and program staff. They suggested that an overall facilitating agency atmosphere can encourage use of findings by creating opportunities for informal exchange of scientific information in which new ideas can be generated and where researchers and staff come together for mutual exchange of information and learning concerning program enhancement.

Alvik (1995) conducted a case study of a secondary school which chose school-based evaluation as a project. The agreement with the school was that the researcher would obtain information about what happens in the school which evaluates its own practice, and teachers could use the researcher as a consultant. The consultant role was dominant at the beginning of the project. The research role included gathering information about the development of the project and participants' experiences and attitudes. Alvik found that some changes of practice could be ascribed to the initial phase of the evaluation and that staff held a favourable attitude toward school-based evaluation. He also found that "information and advance discussions have their limitations. One must be prepared for renegotiations of agreements and for a continuous exchange of experience gained" (p. 335). He concluded that lack of time "was insufficient for maximum use of what was allocated. This problem was noticeable even in the year when school-based evaluation was appointed as the main educational project, but it seemed to become insurmountable in the following year, when the school-based evaluation had to compete on a more equal basis with other routine and development tasks" (p. 335).

Effects of Direct Linkage: Research Utilization Perspective

Muthard and Felice (1982) examined 78 projects, with follow up questionnaires, to develop and test rating scales for measures of activities that were thought to be valuable in promoting use of research. Their objective was to evaluate predictive indicators of research use that could be applied to rehabilitation research projects during planning and conduct phases of the research and development process. They hypothesized that dissemination through personal contact between researchers and users will result in greater user impact that publication alone. They found that use of research was more closely associated with personal presentations than with technical journal use and with reports designed for specific groups. The most important single variables were the development of an overall research and development strategy and staff commitment to promoting research utilization.

Kennedy's (1984) study of information-processing characteristics (which was discussed briefly earlier in this literature review with respect to conceptions of knowledge) also sheds light on effects of linkage. She suggested that instances of high interaction enable participants to "meld disparate bodies of working knowledge into a body of shared knowledge...perhaps groups develop shared views through

negotiation or informal conversation" (p. 218). She concluded that it is interpretations that become integrated into working knowledge, not facts. She also suggested that disparity among groups of parents and educators in their lack of shared experiences, beliefs, and interests may inhibit the development of a shared meaning of evidence.

In the field of natural hazards innovations, Yin and Moore (1985) used a case study approach to analyze the utilization experience of nine applied research projects and compared these experiences with three of seven knowledge utilization theories for explaining use that had been summarized by Weiss' (1979). Included among them was the social interaction theory, which stipulates that researchers and users communicate interactively prior to, during and after the research; utilization occurs because of these interactions and does not follow a linear sequence. What Yin and Moore (1985) found was the persistent role of social interactions between the investigators doing the research and the potential users of research results. Such interactions led to continued exchanges of ideas where investigators learned more about users' conditions and users learned more about research. The most persistent pattern leading to utilization was the prevalence of direct, ongoing communication between knowledge producers and users throughout the design and conduct of the projects. Organizations were found to play a role as settings for vigorous and informal communications between researchers and potential users of knowledge. Principal investigators also created strong, direct and non-imposing communications with users that reflected interactive two-way communications, where users became aware of ongoing research and were also able to influence it so it was more targeted to their needs. This mutual adaptation took time and required investigators to be adaptable and in refining research plans to meet users' needs. Overall, communications continued beyond the end of a project. They suggested that

> An investigator who a) has close ties with users, b) is sensitive to their needs, and c) is able to modify an original research design without compromising its quality or integrity, may be promoting utilization far more than one who simply tries to disseminate information to user groups. (p. 72)

Furthermore, Yin and Moore found that the presence of a user-dominated advisory panel fostered the desired type of communication. When panels had opportunities to meet frequently over the life of a project and users could influence the design of the research, the research was more relevant to users' needs and hence utilization. They also found lack of a linear sequence between knowledge production and use: initial use could occur before research was completed. They observed that good and bad ideas need to be exchanged between knowledge producers and users on a continuing basis. Each bring different vantage points; the exchange of ideas allows those ideas that have most merit–from both communities–to emerge through a sifting process. They concluded that their findings call attention to the social interaction theory as an explanation for utilization. In doing so, they suggested that although their findings were consistent with earlier studies (e.g., Dunn, 1980; Glaser & Taylor, 1973; Yin & Gwaltney, 1981), such studies only pointed toward social interactions between producers and users of knowledge as one of several conditions important to utilization. Their findings, in contrast, raised the possibility that "social interactions may be the most important ingredient for utilization to occur" (p. 74).

In his study that examined organizational actions that were influenced by research and by other sources of knowledge in the area of criminal justice, Johnson (1985) found that two variables emerged as important facilitators of research use: extent of exposure to research information and the presence of information brokers. In an earlier study, Johnson (1980) found that information brokers and linking roles were important determinants of evaluation use among government officials. Information brokers created conditions that resulted in stimulating contact, involvement, and the transfer of evaluative knowledge.

Cohen, Sargent and Sechrest (1986) interviewed 20 subjects in their study of research use by psychologist service providers. Their interest was focused on the use of external research produced by researchers and published in formal scientific outlets. They found that discussions with colleagues was more important than research articles and books. They also found that written material was not sufficient

for treatment adoption. They concluded that it is unlikely that a clinician will adopt a positively evaluated treatment unless she or he has received some training in the treatment, that training seemed to require interpersonal communication (e.g., workshops) and a coordinated effort to interpersonally disseminate the findings of applied research to practitioners.

More recently, Landry, Amara and Lamari's (2001) conducted a survey of 1229 Canadian social science scholars to examine the extent to which social science research lends to use by practitioners, professional and decision makers. They found that the most important determinants of utilization the mechanisms "linking researchers to users, the dissemination efforts, the adaptation of research outputs undertaken by the researchers, the users' context and the publication assets of the researcher" (p. 333). They concluded that the most important finding was that knowledge use depended more heavily on the users' context and the behaviour of researchers' and users' context than on the attributes of the research products. What is of particular interest with respect to the focus of this thesis is that Landry et al. drew their independent study variables directly from Huberman's model of sustained interactivity as the basis for items. They dubbed the model as an "interaction model". Their study, therefore, can be viewed as a test of those factors that, according to Huberman's model, are potent predictors of utilization. The specific predictors they selected included: types of products, researchers' context (defined as publication assets, focus on advancement of knowledge and users' needs, and importance of funding for projects), users' context (perceptions of users' context by researchers), dissemination (adaptation of products to users) and dissemination efforts of researchers, and finally, linkage mechanisms (intensity of linkage with users). Utilization was an index derived from Knott and Wildavaky's (1980) scale which includes six cumulative stages of knowledge utilization: transmission, cognition, reference, effort, influence and application. They found that

> "the determinants associated to the interaction model provide the best predictors of knowledge utilization in social sciences" (p. 345).

Effects of Direct Linkage: Knowledge Utilization within a School Improvement Context

Through the use of survey and field interview techniques, Louis and Dentler (1988) examined use of knowledge from 12 dissemination events, which were instances where educational agencies disseminated information (such as resource guides) for school improvement purposes. Their sample was designed to maximize variation on (1) the degree to which information was provided *directly* to school personnel who were expected to use it, versus *indirectly*, where personnel was reached through an intermediary and (2) the emphasis in the change effort on tailoring information to local contexts. "Social processing" of information was found to be a key factor with respect to use of knowledge by teachers. It was defined as collegial interaction and dialogue involved in considering "how and whether information is relevant to the work context" (p. 48). Louis and Dentler found that many respondents engaged in social processing activities and, when asked if meetings or discussions were influential in encouraging others to use the information, most said they were. They also found that social processing was more likely to occur when dissemination was characterized by some intensity. That is, information accompanied by some personal assistance who interpreted its utility and applicability to the recipient's context motivated discussion with colleagues. Alternatively, information given to single individuals inhibited social processing; complex, abstract information, or information perceived as not immediately relevant or applicable tended not to be used or shared with colleagues. They concluded that interacting with colleagues about information is a critical determinant of whether new information is used; social processing helps educators test

> "the value of the information, in terms of 'fit' to the local setting...engages local educators in whatever adaptation or development activities are required...Perhaps the most important function...is that it helps to build or affirm commitment to information use" (p. 52).

Noting that dissemination of information in school contexts tend to take a top-down approach, the need to understand "who talks to whom" (p. 54) matters: reaching teachers with indirect knowledge exchange

strategies may be difficult. They concluded that if "teachers do not regularly receive information with positive pressures to use and discuss it, the opportunities for school-focused strategies for improvement are clearly limited" (p. 54). They also examined the intensity of the dissemination process. Impacts of knowledge were found to be highest when the content has been "shaped to fit the reality constructs and concerns of practitioners, and that when strong reality features are augmented with high intensity of interaction, impacts are further reinforced" (p. 57). (Reality features included such dimensions as compatibility of the knowledge product to the social context of users, accessibility of the product, adaptability of it, its inspirational thrust and its legitimacy). They also found that lack of (1) attention to matching content with users' frame of reference, or (2) reliance on nonintensive means of communication, were likely to result in little use and improvement.

Using a comparative case study approach of two schools where 164 teachers, students and administrators were interviewed, Hart (1990) focused on the dynamics of work design. Her work was premised on the view that information exchanged and interpreted at each school should be influenced by the "value people place on its source and the consensual interpretations that develop among members of a group" (p. 507). She found that "an important mechanism for the evolution of work values was on information exchange and processing among teachers" (p. 526).

In their study of the implementation of a mathematics knowledge dissemination project, Leinhart and Grover (1990) found that when they designed researcher-teacher interaction to be more informal and more accommodating of teachers' practical knowledge, all parties increased their engagement with substantive information and the final product was superior to its predecessor. Tamir (1991, cited in Cousins & Earl, 1992) found that student teachers' perceptions of students and views about instructional techniques were favorably affected by their implementation of action research in their student training activities" (p. 408).

In their examination of a curriculum development, implementation and review process in high schools, Earl and West (1991) used a participatory approach. School and central office administrators worked with researchers. They participated in preparing instruments, conducting interviews, interpreting results, writing recommendations, providing feedback and implementing to identify issues and prepare instruments. They found that participants became users of findings, implemented changes in their schools, felt responsible for the data and the conclusions.

Cousins and Leithwood (1993) examined the use of information by principals and district staff from various sources of help (e.g., report summaries, local inservice, conferences). They found that processes, which they defined as "interactive processes", enhanced conceptual and instrumental uses of information. These interactive processes were identified as social processing, engagement, involvement and ongoing contact and were found to have potent effects on use of knowledge. These processes will be discussed in the next segment of this review. Finally, in their study of three exemplary schools, Cousins, Ross and Maynes (1994) examined effects of collaboration among peers. "Exemplary schools" were defined as schools where teachers felt unrestricted in engaging in discourse about school matters and decisions that affects the school. They found that collaborative participation heightened understanding of innovations, improved technical performance, and enhanced insights into the behaviours and motives of students.

Table 1

Characteristics of Engagement/Involvement: Users Who Had No Contact at All with the Coordinator or with the Innovation.

Questionnaire Item	Response Distribution[a]					Mean	SD	N (N = 64)	Rank	95% C.I.	
	Ne	R	S	F	A					Lower	Upper
5.0. I try out new activities because of information provided by the Project WILD Coordinator.	61%	19%	18%	2%	0%	1.60	0.84	57	1[b]	1.37	1.82
5.1. I present Project WILD at my school site (e.g., at meetings).	77%	18%	3%	2%	0%	1.30	0.62	60	2	1.14	1.46
5.2. I contact the government wildlife department because of Project WILD.	78%	13%	8%	0%	0%	1.30	0.62	60	2	1.14	1.46
5.3. I share ideas about Project WILD with the Project WILD Coordinator.	93%	7%	0%	0%	0%	1.07	0.25	60	3	1.00	1.13
5.4. I help host Project WILD workshops at my school.	97%	3%	0%	0%	0%	1.03	0.18	60	4	0.99	1.08

[a]Ne = Never (1); R = Rarely (2); S = Somewhat (3); F = Frequently (4); A = Always (5).

[b]1 = highest level of engagement/involvement in the innovation; 4 = lowest level of engagement/involvement in the innovation.

Table 2

Characteristics of Engagement/Involvement: Users Who Have Had Indirect Contact Only in the Innovation

Questionnaire Item	Response Distribution[a]					Mean	SD	N (N=152)	Rank	95% C.I.	
	Ne	R	S	F	A					Lower	Upper
5.0. I try out new activities because of information provided by the Project WILD Coordinator.	34%	16%	42%	7%	7%	2.26	1.05	142	1[b]	2.09	2.43
5.1. I present Project WILD at my school site (e.g., at meetings).	56%	28%	14%	2%	7%	1.63	0.83	142	3	1.49	1.76
5.2. I contact the government wildlife department because of Project WILD.	50%	26%	15%	8%	5%	1.85	1.04	142	2	1.68	2.03
5.3. I share ideas about Project WILD with the Project WILD Coordinator.	80%	16%	5%	0%	7%	1.25	0.54	142	4	1.16	1.34
5.4. I help host Project WILD workshops at my school.	83%	11%	4%	1%	6%	1.24	0.59	143	5	1.14	1.34

[a]Ne = Never (1); R = Rarely (2); S = Somewhat (3); F = Frequently (4); A = Always (5).

[b]1 = highest level of engagement/involvement in the innovation; 4 = lowest level of engagement/involvement in the innovation.

Table 3

Characteristics of Engagement/Involvement: Users Who Had Contact with the Coordinator but Are Not Facilitators

Questionnaire Item	Response Distribution[a]					Mean	SD	N (N = 136)	Rank	95% C.I.	
	Ne	R	S	F	A					Lower	Upper
5.0. I try out new activities because of information provided by the Project WILD Coordinator.	13%	20%	48%	18%	1%	2.74	0.93	126	1[b]	2.57	2.90
5.1. I present Project WILD at my school site (e.g., at meetings).	55%	27%	14%	5%	0%	1.68	0.88	126	3	1.53	1.84
5.2. I contact the government wildlife department because of Project WILD.	42%	26%	26%	5%	0%	1.95	0.95	129	2	1.79	2.12
5.3. I share ideas about Project WILD with the Project WILD Coordinator.	54%	30%	14%	1%	1%	1.64	0.81	126	4	1.50	1.79
5.4. I help host Project WILD workshops at my school.	82%	12%	3%	2%	1%	1.28	0.71	129	5	1.16	1.40

[a]Ne = Never (1); R = Rarely (2); S = Somewhat (3); F = Frequently (4); A = Always (5).

[b]1 = highest level of engagement/involvement in the innovation; 5 = lowest level of engagement/involvement in the innovation.

Table 4

Characteristics of Engagement/Involvement: Users Who Had Contact with the Coordinator and Are Facilitators

Questionnaire Item	Response Distribution[a]					Mean	SD	N (N = 159)	Rank	95% C.I. Lower	95% C.I. Upper
	Ne	R	S	F	A						
5.0. I try out new activities because of information provided by the Project WILD Coordinator.	8%	25%	45%	15%	7%	2.87	0.99	150	1[b]	2.71	3.03
5.1. I present Project WILD at my school site (e.g., at meetings).	21%	27%	32%	13%	7%	2.58	1.16	149	2	2.40	2.77
5.2. I contact the government wildlife department because of Project WILD.	31%	20%	34%	12%	3%	2.35	1.12	151	3	2.17	2.53
5.3. I share ideas about Project WILD with the Project WILD Coordinator.	34%	28%	26%	8%	5%	2.21	1.13	154	4	2.03	2.39
5.4. I help host Project WILD workshops at my school.	25%	21%	33%	14%	7%	2.58	1.21	153	2	2.39	2.78

[a]Ne = Never (1); R = Rarely (2); S = Somewhat (3); F = Frequently (4); A = Always (5).

[b]1 = highest level of engagement/involvement in the innovation; 4 = lowest level of engagement/involvement in the innovation.

APPENDIX D

(Instrument for Teachers for Study Proper and Data Summary)

SURVEY ON THE USEFULNESS OF PROJECT WILD

Dear Project WILD Teacher: October 2001

I am a doctoral candidate in education at the University of Ottawa in Canada. As part of the requirement for the degree, I am conducting a research study on Project WILD in North America. I am also an employee of the Canadian Wildlife Federation, where I serve as the Head of Education and Director of Project WILD in Canada.

As a doctoral candidate, I am inviting teachers across the United States and Canada who have attended Project WILD workshops to participate in my study.

I know that you are busy with your teaching duties. I would be very grateful, however, if you would find time to participate **voluntarily** in this survey.

In appreciation for your time, I will send you a WILDLIFE POSTER for your classroom and offer you a chance to receive a tote bag of **CLASSROOM RESOURCES** when you complete and return this questionnaire. I will also send a summary of the FINDINGS OF THE STUDY to teachers who send me an e-mail or indicate their interest on the white form. See the white form enclosed.

The purpose of the study is to investigate how Project WILD is being used by teachers and other professionals in school settings and how direct and indirect contacts between teaching professionals and Project WILD Coordinators contribute toward teachers' use of the program. As an academic research effort, it seeks to improve an understanding of innovation dissemination.

Your state, provincial or territorial Project WILD Coordinator is identified on the attached violet form. The Coordinator is the person responsible for administering Project WILD in your state, province or territory.

This study is not an evaluation. The results of the study will help to provide insights on the use of Project WILD by teaching professionals and dissemination practices that contribute toward teachers' use of the program.

Your co-operation by contributing **20-25 minutes** of time to complete and return the enclosed questionnaire will be appreciated. Your co-operation will be a valuable contribution to this research study even if you have had no contact with the Project WILD Coordinator or no longer use Project WILD. All responses to this questionnaire will be treated **confidentially**. They will be used only by the researcher and only for the study.

If you agree to participate (and I really hope that you do), please complete and return the enclosed questionnaire in the self-addressed and postage-paid envelope **within one week of receipt** to:

Luba Mycio-Mommers, Doctoral Candidate
Faculty of Education, University of Ottawa
c/o 36 Carlotta Avenue
Vanier, Ontario, Canada
K1L 6S6

The Council for Environmental Education, which administers Project WILD in the United States, and the Canadian Wildlife Federation, which sponsors it in Canada, support this research. Your state, provincial or territorial Project WILD Coordinator is also a participant in the study. Your Coordinator provided me with your name and address and permission to invite you to participate in this research. I hope you will welcome this opportunity to offer **important information** for this study.

I look forward to your **quick** response.

Sincerely,

Luba Mycio-Mommers,
Doctoral Candidate.

Contact Luba Mycio-Mommers (613) 599-9594 ext. 224 (telephone), (800) 563-9453 (toll-free in Canada), (613) 744-6493 (fax) or lubamm@cwf-fcf.org if you require further information or have any questions. If you have questions about your rights as a participant in this research, you may contact Catherine Lesage, Protocol Officer for Ethics in Research, University of Ottawa, 30 Stewart St., Room 301, (613) 562-5387, clesage@uottawa.ca. A contact list is also enclosed for your convenience if you require information from your state, provincial or territorial Project WILD Coordinator regarding this study.

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SURVEY ON THE USEFULNESS OF PROJECT WILD

A. Indicate if you are *(Check ALL options that apply.)*

% N = 515

a.____ Classroom Teacher b. ____ Resource Teacher/Librarian c. ____ Other *(specify):*_____ 84.1 7 18.1

B. Approximately when did you attend a Project WILD Introductory Workshop? *(Check only ONE option.)*
(An Introductory Workshop is 4-6 hours in length and introduces teachers to Project WILD. Some refer to it by a different name, such as a Basic or Educator Workshop.)

% N = 496

a.____ Before 1994 b.____ Between 1995-97 c. ____ In 1998 33.5 20 12.5

d.____ In 1999 e. ____ In 2000 f. ____ In 2001 g.____ Do not recall 13.7 11.7 3.2 5.4

C. Have you received training to become a Project WILD Facilitator?
(A Project WILD Facilitator is authorized to conduct Project WILD workshops in local areas.)

% Yes No N

____No ----> *(SKIP to Question 1.0)*

____Yes 36.5 63.5 515

D. Have you given a Project WILD Introductory Workshop to teachers?

____No
____Yes 95.3 4.7 188

PART 1: This section asks you to describe how you use Project WILD.

% N = 473

1.0. Indicate which option **BEST** describes your current use of Project WILD. *(Check only ONE option.)*

a. ____ I decided **not** to use the program. ----> *(SKIP to Question 2.0)* 7.6

b. ____ I am not using Project WILD but I am involved in the program in other ways. ----> *(SKIP to Question 2.0)* 4.4

c. ____ I am thinking about using Project WILD as a teaching resource. ----> *(SKIP to Question 2.0)* 6.1

d. ____ I am making specific plans to use Project WILD in my classroom. ----> *(SKIP to Question 2.0)* 2.5

e. ____ I am using selected activities from Project WILD that fit my day-to-day needs. 56.0

f. ____ I am using at least one activity from each section of Project WILD during a school year in the form that the activities were presented in the Activity Guide. 7.4

g. ____ I am using at least one activity from each section of Project WILD during a school year in a form **modified** to fit my needs. 15.9

1.1. During a regular school year, I typically use Project WILD activities *(Check only ONE option.)*

% N = 423

a.____ 1-3 times b.____ 4-6 times c. ____ 7-9 times d.____ 10+ times 31.2 34.3 15.1 19.4

1.2. I am using the following kind of Project WILD activities with my students: *(Check ALL options that apply.)*

% N = 430

a. ____ Construction/arts and crafts projects 38.4
b. ____ Writing/reading/discussing activities 52.6
c. ____ Physical activities 69.1
d. ____ Student research projects 21.9
e. _____ Language Arts activities 33.0
f. _____ Science activities 83.3
g. _____ Social Studies activities 20.9
h. _____ Other *(specify):* _____ 5.8

1.3. I selected these particular activities because *(Check ALL options that apply.)*

% N = 430

a. ____ Content of the activities fits my curriculum. 88.4
b. ____ Learned them at a Project WILD workshop. 49.8
c. ____ They help accomplish education standards or outcomes. 69.5
d. Other *(specify):* _____ 6.3
e. ____ Thought students would enjoy them. 82.6
f. ____ Easy to adapt to suit student learning. 65.3

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1.4. I use these activities primarily *(Check ONE from each pair below.)*

				% Either / OR	N
a. ____ On my own	OR	____ In co-operation with my colleagues		79.8 / 20.2	352
b. ____ As they are presented in the Activity Guide	OR	____ In a modified form to fit my students' needs		26.8 / 73.2	365
c. ____ As an individual lesson	OR	____ In a set of lessons/activities on topics that I teach		26.8 / 73.2	369

1.5. Overall, how would you rate Project WILD activities Project WILD activities? *(Circle ONE number for each question.)*

		X	SD	N
a. Educational quality of the activities	Low 1 2 3 4 5 High	4.56	0..54	430
b. Easy to connect to curriculum	Difficult 1 2 3 4 5 Easy	4.35	0.77	430
c. Easy to use	Difficult 1 2 3 4 5 Easy	4.39	0.65	430

1.6. Do you use other wildlife education programs? _____ No
_____ Yes –> 1.7. An example is *(specify)* ______________________

% Yes	No	N
40.9	59.1	425

1.8. Compared with other wildlife education programs, rate the overall quality of Project WILD. *(Check only ONE option.)*

a. _______ Project WILD is superior b. _______ Project WILD is the same c. _______ Project WILD is inferior

% N = 375: 54.3 35.5 0.3

1.9. During the past year, what, if anything, prevented you from using Project WILD? *(Check ALL options that apply.)*

	% N = 441
a. _____ Lack of support from school administration/colleagues.	5.9
b. _____ Lack of knowledge about topics featured in Project WILD.	4.5
c. _____ Other *(specify)*: ______________________	42.6

1.10. Indicate which option best describes Project WILD within your school or school district. *(Check All options that apply.)*

a. _____ Mandated program b. _____ Recommended resource c. _____ Other *(specify)*: ______________________

% N = 417: 1.0 54.2 44.6

PART 2: This section asks you to describe how you FEEL about Project WILD.

For each of the following, indicate by circling ONE option: SD = Strongly Disagree; D = Disagree; A = Agree; SA = Strongly Agree. Try to use N/A = Not Applicable as infrequently as possible.

			X	SD	N
2.0.	I am committed to Project WILD	SD D A SA N/A	3.20	0.65	485
2.1.	Project WILD has helped me a gain new understanding about topics it covers	SD D A SA N/A	3.32	0.58	505
2.2.	I have gained new knowledge because of Project WILD	SD D A SA N/A	3.39	0.61	507
2.3.	I have learned new skills because of Project WILD (e.g., teaching in the out-of-doors)	SD D A SA N/A	3.30	0.66	494
	2.4. An example of a new skill is *(specify)* ______________________				
2.5.	I have changed my thinking as a result of Project WILD (e.g., about wildlife, teaching)	SD D A SA N/A	2.72	0.79	477
2.6.	Project WILD has had an important influence on my work	SD D A SA N/A	2.90	0.69	486
2.7.	Project WILD makes me feel positive about my work	SD D A SA N/A	3.05	0.65	481
2.8.	Project WILD has increased my confidence in teaching about wildlife	SD D A SA N/A	3.21	0.66	495
2.9.	The more I know about Project WILD, the more I feel committed to it	SD D A SA N/A	3.07	0.67	484
2.10.	Being involved in Project WILD makes me feel like I have a say in something important	SD D A SA N/A	2.93	0.73	469
2.11.	My involvement in Project WILD has furthered my career	SD D A SA N/A	2.51	0.82	44[illegible]

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Part 3: This section asks you to describe your school context.

For each of the following, indicate by circling ONE option: N = Never; R = Rarely; S = Somewhat; F = Frequently; A = Always. Try to use N/A = Not Applicable as infrequently as possible.

								X	SD	N
3.0.	At my school, teachers get together to talk about teaching	N	R	S	F	A	N/A	3.55	0.90	503
3.1.	At my school, my colleagues and I compare the programs that we use in our classrooms	N	R	S	F	A	N/A	3.30	0.96	501
3.2.	At my school, teachers co-operate together to teach a unit together	N	R	S	F	A	N/A	3.01	1.02	501
3.3.	We look for and review new programs that might be exciting for our students	N	R	S	F	A	N/A	3.24	0.98	500
3.4.	My colleagues and I often question our beliefs about education (e.g., about teaching)	N	R	S	F	A	N/A	3.15	0.96	495
3.5.	We explore a topic that we teach to such an extent that sometimes we decide to make changes (e.g., about how we teach)	N	R	S	F	A	N/A	3.23	0.86	499

PART 4: This section asks you to describe your discussions about Project WILD.

For each of the following, indicate by circling ONE option: N = Never; R = Rarely; S = Somewhat; F = Frequently; A = Always. Try to use N/A = Not Applicable as infrequently as possible.

4.0.	I enjoy telling my colleagues about Project WILD	N	R	S	F	A	N/A	3.32	1.09	476
4.1.	My colleagues at my school support Project WILD	N	R	S	F	A	N/A	3.04	1.01	459
4.2.	I make plans with my colleagues to use Project WILD in our classrooms	N	R	S	F	A	N/A	2.44	0.98	480
4.3.	My colleagues and I compare how we each use Project WILD	N	R	S	F	A	N/A	2.13	0.94	478
4.4.	My colleagues and I compare Project WILD with other wildlife education programs	N	R	S	F	A	N/A	1.93	0.94	478
4.5.	Project WILD stimulates much discussion among colleagues at my school	N	R	S	F	A	N/A	1.99	0.87	482
4.6.	Discussions about Project WILD have made my colleagues and I reconsider how we think about things (e.g., how we teach about wildlife)	N	R	S	F	A	N/A	2.19	0.96	469
4.7.	Discussions among my colleagues about Project WILD lead to decisions to make changes (e.g., how we teach about wildlife, what we think about the environment)	N	R	S	F	A	N/A	2.14	0.97	464

4.8. An example of a change is *(specify)* _____

PART 5: This sections asks you to describe your involvement in Project WILD.

For each of the following, indicate by circling ONE option: N = Never; R = Rarely; S = Somewhat; F = Frequently; A = Always. Try to use N/A = Not Applicable as infrequently as possible.

5.0.	I try out new activities because of information provided by the Project WILD Coordinator	N	R	S	F	A	N/A	2.50	1.07	477
5.1.	I present Project WILD at my school site (e.g., at meetings)	N	R	S	F	A	N/A	1.90	1.06	479
5.2.	I contact the government wildlife department because of Project WILD	N	R	S	F	A	N/A	1.97	1.06	486
5.3.	I share ideas about Project WILD with the Project WILD Coordinator	N	R	S	F	A	N/A	1.64	0.94	484
5.4.	I help host Project WILD workshops at my school	N	R	S	F	A	N/A	1.65	1.06	487
5.5.	I try out new programs if I believe that my students will benefit from them	N	R	S	F	A	N/A	3.66	0.98	489

			X	SD	N
5.6.	Teachers at my school add Project WILD activities into teaching units	N R S F A N/A	2.45	0.93	469
5.7.	My principal supports requests to attend Project WILD workshops	N R S F A N/A	3.22	1.31	393
5.8.	My school district includes Project WILD activities in district-wide teaching units	N R S F A N/A	2.19	1.17	421
5.9.	My school district administration supports my involvement in Project WILD	N R S F A N/A	3.28	1.33	401

PART 6: This section asks you to describe your general contacts with Project WILD.

For each of the following, indicate by circling ONE option: N = Never; R = Rarely; S = Somewhat; F = Frequently; A = Always. Try to use N/A = Not Applicable as infrequently as possible

			X	SD	N
6.0.	Since taking the Introductory Project WILD Workshop, indicate how often you have				
	a. Received a regular publication, such as a Project WILD newsletter, wildlife magazine	N R S F A N/A	3.10	1.41	505
	b. Visited a Project WILD web site (or a related web site)	N R S F A N/A	2.09	1.13	502
	c. Contacted the Project WILD office for information	N R S F A N/A	2.00	1.13	501
	d. Other *(specify)*: _____	N R S F A N/A			

6.1. Indicate the number of times you have engaged in the forms of contact mentioned in question 6.0 during the past year (from October of last year to October of this year).

a. _____ NO contact	b. _____ 1 contact	c. _____ 2 contacts	d. _____ 3 contacts	3.01	4.82	502
e. _____ 4 contacts	f. _____ 5 or more contacts ---> (*specify number*): _____			% N = 450		

6.2. Is this number of contacts more, less or the same as in previous years? a. _____Less b. _____Same c._____More — 17.1 / 72.0 / 10.9

PART 7: This section asks you to describe follow-up with Project WILD.

7.0. Since taking the Introductory Project WILD Workshop, indicate any kind of follow-up that you have received, if any, from the Project WILD Coordinator in your state, province or territory. *(Check ALL options that apply.)* — % N = 509

My Project WILD Coordinator

a. ____ Provided me with response to a request that I indicated in a workshop survey.	25.5
b. ____ Invited me to attend advanced Project WILD workshops or similar events because I indicated an interest.	49.7
c. ____ Placed my name on a mailing list or a list serve to receive wildlife-related information.	59.7
d. ____ Other *(specify)*: _____	11.6

7.1. Since the Introductory Project WILD Workshop, indicate any kind of follow-up, if any, that you have initiated with the Project WILD Coordinator in your state, province or territory. *(Check ALL options that apply.)*

My Project WILD Coordinator

a. ____ Provided updates for my records (e.g., change of address/ e-mail) so I could be easily contacted.	24.4
b. ____ Shared my views about a wildlife-related topic.	19.3
c. ____ Provided information on how to become more involved in the program.	30.3
d. ____ Other *(specify)*: _____	11.4

APPENDIX D

(Instrument for Teachers for Study Proper and Data Summary)

PART 8: Describe your CONTACTS with the Project WILD Coordinator.

(The Project WILD Coordinator is the person responsible for Project WILD in your state, province or territory and is identified on the attached violet form.)

			% Yes	No	N
8.0.	Have you ever had any DIRECT contact with the Project WILD Coordinator? (A direct contact is an interpersonal contact, such as talking with the Coordinator at a workshop or on the telephone.)	____ Yes			
		____ No --> *(SKIP to Question 11.0)*	57.9	42.1	510

8.1. Indicate how often you have had DIRECT contacts with the Project WILD Coordinator:

For each of the following, indicate by circling ONE option: N = Never; R = Rarely; S = Somewhat; F = Frequently; A = Always. Try to use N/A = Not Applicable as infrequently as possible

		X	SD	N
a.	Direct contact through the telephone..... N R S F A N/A	2.54	1.09	282
b.	Direct contact through the e-mail..... N R S F A N/A	2.00	1.20	278
c.	Direct contact through regular mail or fax ..... N R S F A N/A	2.66	1.04	281
d.	Direct contact at face-to-face meetings..... N R S F A N/A	2.60	0.97	284
e.	Direct contact at Project WILD-related activities (e.g., curriculum development projects)... N R S F A N/A	2.59	1.15	278
f.	Direct contact at conferences or workshops (e.g., advanced Project WILD workshops)..... N R S F A N/A	2.93	1.11	282
g.	Other *(specify)*: _____ N R S F A N/A			

8.2. How many times have you been in DIRECT contact with the Project WILD Coordinator during the past year (from October of last year to October of this year)?

a. ____ NO contact b. ____ 1 contact c. ____ 2 contacts d. ____ 3 contacts — 2.77 4.79 300

e. ____ 4 contacts f. ____ 5 or more contacts -----> *(specify number)* _____ — % N = 241

8.3. Is this number of DIRECT contacts more, less or the same as in previous years? a. ____Less b. ____Same c. ____More — 27.8 52.3 19.9

PART 9: Describe your INTERACTIONS with the Project WILD Coordinator.

For each of the following, indicate by circling ONE option: SD = Strongly Disagree; D = Disagree; A = Agree; SA = Strongly Agree. Try to use N/A = Not Applicable as infrequently as possible.

		X	SD	N
9.0.	My first contact with the Project WILD Coordinator increased my interest in Project WILD..... SD D A SA N/A	3.35	067	286
9.1.	Compared with other programs, the Project WILD Coordinator has spent a lot of time with me..... SD D A SA N/A	2.77	0.74	266
9.2.	The Project WILD Coordinator helped me determine how Project WILD was relevant to my teaching..... SD D A SA N/A	3.03	0.69	276
9.3.	The Project WILD Coordinator helped me determine how the program fits with what I teach..... SD D A SA N/A	2.97	0.65	271
9.4.	The Project WILD Coordinator added to my learning about topics covered in Project WILD..... SD D A SA N/A	3.16	0.65	282
9.5.	I added to the Project WILD Coordinator's understanding about how Project WILD fits with what I teach..... SD D A SA N/A	2.82	0.71	260
9.6.	The Project WILD Coordinator has helped me gain a new understanding about wildlife topics..... SD D A SA N/A	3.12	0.64	283
9.7.	My views about wildlife-related topics have changed as a result of this new understanding..... SD D A SA N/A	2.85	0.76	271
9.8.	My contact with the Project WILD Coordinator led to more involvement in other wildlife/ environmental education programs..... SD D A SA N/A	2.90	0.81	272

9.9. An example of a related program is *(specify)* _____

APPENDIX D

(Instrument for Teachers for Study Proper and Data Summary)

PART 10: Describe the IMPORTANCE of BENEFITS from your contact with the Coordinator.

For each of the following, indicate by circling ONE option: NI = Not Important; SI = Somewhat Important; I = Important; VI = Very Important. Try to use N/A = Not Applicable as infrequently as possible.

				X	SD	N
10.0.	I would describe the importance of benefits that I have gained because of my contact with the Project WILD Coordinator as follows:					
	a. Helped me get information (e.g., to share with my students or other teachers or for myself)..	NI SI I VI	N/A	3.11	0.80	278
	b. Encouraged me to talk with the Coordinator and share my point of view about topics of interest (e.g., about an aspect of conservation or environmental education).....	NI SI I VI	N/A	2.41	0.95	254
	c. Led me to learn more about technical things, such as wildlife conservation.....	NI SI I VI	N/A	2.71	0.84	272
	d. Led me to share my professional knowledge about teaching with the Coordinator.....	NI SI I VI	N/A	2.43	0.91	254
	e. Led me to invite the Coordinator to help organize an event (e.g., field trip, conferences).....	NI SI I VI	N/A	2.15	1.02	212
	f. Led me to invite wildlife personnel to speak at my school.....	NI SI I VI	N/A	2.51	0.97	234
	g. Led me to gain more training (e.g., at advanced or Facilitator Project WILD workshops).....	NI SI I VI	N/A	2.88	1.06	245
	h. Encouraged me to make suggestions to enhance Project WILD (e.g., creating new materials to complement Project WILD activities).....	NI SI I VI	N/A	2.46	0.99	249
	i. Helped me gain a new understanding about topics covered in Project WILD.....	NI SI I VI	N/A	2.91	0.83	268
	j. Contributed to thinking about wildlife-related topics in a new way.....	NI SI I VI	N/A	2.84	0.88	270
	k. Other benefits *(specify)*: _____	NI SI I VI	N/A			

10.1. The **MOST** important aspects of my contact are *(Select from above list or add your own.)*

_____

PART 11: Describe CHARACTERISTICS of a Program Coordinator IMPORTANT to you.

For each of the following, indicate by circling ONE option: NI = Not Important; SI = Somewhat Important; I = Important; VI = Very Important. Try to use N/A = Not Applicable as infrequently as possible.

11.0.	Indicate how important the following characteristics are to you about a program coordinator:					
	a. Being available when I call with questions.....	NI SI I VI	N/A	3.23	0.73	479
	b. Delivering technical information when I need it.....	NI SI I VI	N/A	3.32	0.69	482
	c. Being personable when talking with me.....	NI SI I VI	N/A	3.38	0.70	484
	d. Talking about things in ways that are easy to understand.....	NI SI I VI	N/A	3.38	0.71	484
	e. Being willing to hear what I have to say.....	NI SI I VI	N/A	3.29	0.68	486
	f. Being sensitive to different views about an issue.....	NI SI I VI	N/A	3.24	0.67	484
	g. Having technical expertise about wildlife topics.....	NI SI I VI	N/A	3.43	0.68	483
	h. Other characteristics *(specify)*: _____	NI SI I VI	N/A			

11.1. The MOST important characteristic is *(Select from above list or add your own.)* _____

11.2. The LEAST important characteristic is *(Select from above list or add your own.)* _____

APPENDIX D

(Instrument for Teachers for Study Proper and Data Summary)

PART 12: BACKGROUND INFORMATION

12.0. What grade(s) do you primarily teach? Grade(s) _____

% K/8 9/12 K/12 None
N = 513
79.1 15.4 4.1 1.4

12.1. What subject matter do you primarily teach? *(Check ALL options that apply.)*

a.____ Science b. ____ Math c.____ Language Arts d. ____ Social Studies e. ____ Environmental Education

f.____ Other *(specify)*:_____

% N = 515
79.2 56.7 56.3 49.9 48.7
33.4

12.2. How long have you been in the teaching profession?

a.____ First year b.____ 2-3 years c.____ 4-6 years d.____ 8-10 years

e.____ 12-14 years f.____ 15-17 years g.____ 18-20 years h.____ 21+ years

% N = 512
2.3 4.9 13.3 0.6 12.7
0.6 12.1 7.8 9.4 36.3

12.3. Where do you teach? a.___ Urban area b. ___ Suburban area c. ___ Rural area d.___ Other *(specify)*: _____

% N = 505
34.1 32.1 32.7 1.2

12.4. In what state/province/territory do you teach? _____

% Canada US N = 515
30.9 69.1

12.5. Sex: a. _____ Female b. _____ Male

% Female Male N = 515
72.6 27.4

12.6. Offer any comments that you would like to share about this survey: _____

_____

12.7. Would you be willing to volunteer to participate in a 15-30 minute follow-up telephone interview?
(The purpose of the interview will be to probe, clarify, explore and elaborate areas of the research.)
_____ No
_____ Yes —>If yes, provide information about how you can be contacted:

% Yes No N = 489
49.1 50.9

Name: _____ *(Print)*

Address: _____ *(Print)*

_____

% Conf. Anon N = 515
91.9 8.9

Telephone: (Work) _____ (Home) _____ E-mail: _____ *(Print)*

12.8. Provide your name, address and e-mail above **or** e-mail me **or** complete the enclosed white form to receive the resources below. If you are using this questionnaire to request the resources, **CIRCLE** the resources and draws of interest:

Wildlife Poster	Summary of Study Findings	Include me in the early-bird draw for CLASSROOM RESOURCES	Include me in the draw for a WILDLIFE PRINT

% N = 489
77.1 45 74.9 81.1

(If you return your completed questionnaire within ***one week*** *of receiving it, your name will be included for the draw for a tote bag of CLASSROOM RESOURCES. Everyone who returns a completed questionnaire will be included in the draw for a print.)*

Thank you for completing this questionnaire. ALL INFORMATION PROVIDED IN THIS QUESTIONNAIRE WILL BE TREATED AS CONFIDENTIAL. Return this questionnaire in the enclosed self-addressed, postage-paid return envelope to:

Luba Mycio-Mommers, Doctoral Candidate
Faculty of Education, University of Ottawa
c/o 36 Carlotta Avenue
Vanier, Ontario, Canada K1L 6S6

Contact Luba Mycio-Mommers at (613) 599-9594 ext. 224 (phone), (800) 563-9453 (toll-free in Canada), (613) 744-6493 (fax) or lubamm@cwf-fcf.org.

APPENDIX D

(Instrument for Teachers for Study Proper and Data Summary)

I KNOW YOU ARE BUSY ...

I would like to offer you wildlife education materials to thank you for your valuable time.
Your participation is critical to the success of this doctoral study. Your **quick** response also helps me meet deadlines.

WILDLIFE POSTER

When I receive your questionnaire, I will send you a lovely poster donated by the Canadian Wildlife Federation (CWF).

RESPOND EARLY FOR CLASSROOM RESOURCES

If you respond within **one week** of receiving the enclosed questionnaire,
I will include your name in 50 draws for CLASSROOM RESOURCES.

Early-bird draws will be held on December 20, 2001.

CWF, the Council for Environmental Education (CEE) and other wildlife agencies participating in this study donated wildlife education CLASSROOM RESOURCES. The first 10 names drawn will each receive a tote bag filled with a wide selection of resources. The next 30 names drawn will each receive a classroom video (donated by CEE). The last 10 names drawn will each receive a music CD (donated by CWF).

THERE'S MORE ...

Wildlife Print: ALL names of interested teachers who return a completed questionnaire will be included in a draw in January for a striking, framed limited edition wildlife print (donated generously by CWF) by Canadian artist Allan Fournier.

A Summary of Study Findings will be sent to interested teachers who e-mail me or provide their address.

HOW TO REQUEST CLASSROOM RESOURCES

- ***Directly on the questionnaire*** by filling out Section 12.8.

OR

- ***Return this white form*** with your completed questionnaire if you do **not** wish to be identified on the questionnaire. I will **not** attach the white forms to questionnaires.

OR

- ***E-mail me*** (lubamm@cwf-fcf.org) or ***fax this white form*** (613-744-6493) if you wish to complete your questionnaire **anonymously**. Let me know your questionnaire is in the mail and indicate which resources/draws are of interest to you.

If you decide to use this white form, provide the information below:

I am sending this white form because *(Check ALL options that apply.)*

a. _____ I wish to submit my questionnaire **anonymously**. My questionnaire is in the mail.
b. _____ I have enclosed my questionnaire but do not wish to be identified on it.
c. _____ I have **CIRCLED** the resources and draws of interest to me, as follows:

Wildlife Poster	Summary of Study Findings	Include me in the early-bird draw for CLASSROOM RESOURCES	Include me in the draw for a WILDLIFE PRINT

Name: _____
(Print)

Address: _____
(Print)

Telephone: _____ E-mail: _____
(Print)

IMPORTANT NOTE: All questionnaire responses, including information provided on this form, will be confidential and used only for the purpose of this research study. Contact Luba Mycio-Mommers at (613) 599-9594 ext. 224 (phone), (800) 563-9453 (toll-free in Canada), (613) 744-6493 (fax) or lubamm@cwf-fcf.org. If you have questions about your rights as a participant in this research, you may contact Catherine Lesage, Protocol Officer for Ethics in Research, University of Ottawa, 30 Stewart St., Room 301, (613) 562-5387, clesage@uottawa.ca.

APPENDIX D

(Copy of Sheet Providing Contact Information about Participating Coordinator that Was Appended to the Survey)

[Name of Participating State/Province/Territory] PROJECT WILD COORDINATOR

[Name of Coordinator]
Project WILD Coordinator
[Name of Agency]
[Address of Agency]
Tel: *[Telephone number of Coordinator]*
Fax: *[Fax number of Coordinator]*
E-mail: *[Email of Coordinator]*
Web Site: *[Web site address in which Project WILD is featured]*

Names of former Project WILD Coordinators: *[Names of former Project WILD Coordinators, if applicable]*

Name of regular publication sent to*[Name of Participating State/Province/Territory]* Project WILD Teachers: *[Name of publication]*

(Copy of Information Provided on the Surface of the Envelope that Was Used to Mail the Survey)

Luba Mycio-Mommers, Doctoral Candidate
Faculty of Education, University of Ottawa
c/o 36 Carlotta Avenue
Vanier, Ontario, Canada K1L 6S6

PLEASE RESPOND TO ENCLOSED

PROJECT WILD SURVEY

FOR Ph.D. STUDY.

CLASSROOM RESOURCES for early respondents.
Receive a giant WILDLIFE POSTER.

Respond within ONE week of receipt.
This education student appreciates your quick response!

APPENDIX D

(Copy of Thank You Letter Sent to Respondents of the Survey)

November 2001

Dear Project WILD Teacher,

Thank you so much for your response to the Survey on the Usefulness of Project WILD. I am grateful for your valuable contribution toward this research study.

I am pleased to enclose a wildlife poster as a token of thanks, as promised. The poster was kindly donated by the Canadian Wildlife Federation (CWF).

I have also entered your name for draws for additional resources (if you expressed interest in participating in the draws).

If you indicated that you would like to receive a summary of the research findings, I will send you a copy upon completion of the study. My intention is to send the summary by e-mail to all interested teachers who supplied me with their e-mail addresses. If you did not provide an e-mail address but indicated an interest in receiving the summary, I will send you a copy by regular mail. Please notify me of any changes to your e-mail address (or regular mailing address if you do not have e-mail) so that I may attend to your request.

Please note that all information that you provide will be confidential and used only for the purposes of this research.

Once again, thank you for returning your completed questionnaire.

Yours sincerely,

Luba Mycio-Mommers
Doctoral Candidate
University of Ottawa
Faculty of Education
c/o 36 Carlotta Avenue
Vanier, Ontario
K1L 6S6

Contact Luba Mycio-Mommers (613) 599-9594 ext. 224 (telephone), (800) 563-9453 (toll-free in Canada), (613) 744-6493 (fax) or lubamm@cwf-fcf.org if you require further information or have any questions. If you have questions about your rights as a participant in this research, you may contact Catherine Lesage, Protocol Officer for Ethics in Research, University of Ottawa, 30 Stewart St., Room 301, (613) 562-5387, clesage@uottawa.ca. A contact list was also enclosed for your convenience in the survey packet if you require information from your state, provincial or territorial Project WILD Coordinator regarding this study.

APPENDIX D

(Copy of Reminder Letter Sent to Teachers)

November 2001

Dear Project WILD Teacher,

This letter is a reminder regarding the Project WILD Survey that I sent earlier this month.

I know that you are busy with teaching duties. I would be very grateful if you would find time to participate **voluntarily** in this survey.

As you may recall, I am a doctoral candidate at the University of Ottawa. As part of the requirement for the degree, I am conducting a research study on Project WILD in North America. The results of the study will help to provide insights on the use of Project WILD by teaching professionals and dissemination practices that contribute toward teachers' use of the program.

If you agree to participate (and I really hope that you do), please complete and return the questionnaire in the self-addressed and postage-paid envelope that was provided in my previous mailing. Please note that all responses to the questionnaire will be treated confidentially. They will be used only by the researcher and only for the study.

I am looking forward to your response. Your participation is critical to the success of the study. Your response will be a valuable contribution toward the research.

If you have already mailed your completed questionnaire, please accept my thanks for your co-operation.

Yours sincerely,

Luba Mycio-Mommers
Doctoral Candidate
University of Ottawa
Faculty of Education
c/o 36 Carlotta Avenue
Vanier, Ontario
Canada
K1L 6S6

Contact Luba Mycio-Mommers (613) 599-9594 ext. 224 (telephone), (800) 563-9453 (toll-free in Canada), (613) 744-6493 (fax) or lubamm@cwf-fcf.org if you require further information or have any questions. If you have questions about your rights as a participant in this research, you may contact Catherine Lesage, Protocol Officer for Ethics in Research, University of Ottawa, 30 Stewart St., Room 301, (613) 562-5387, clesage@uottawa.ca. A contact list was also enclosed for your convenience in the survey packet if you require information from your state, provincial or territorial Project WILD Coordinator regarding this study.

APPENDIX D

(Copy of Letter Sent to Recipients Whose Names Were Drawn for Resources)

December 2001

Dear Project WILD Teacher,

I am delighted to inform you that your name was drawn to receive a tote bag of classroom resources. As you may recall, I promised an "early bird" draw as a special thank you for teachers who responded early to my Project WILD questionnaire. The resources contained in the bag were donated by a number of wildlife agencies participating in this research.

I would like to thank you once again for volunteering to participate in this research – and especially that you were so prompt with a response.

Sincerely,

Luba Mycio-Mommers
University of Ottawa
Doctoral Candidate
36 Carlotta Avenue
Vanier, Ontario
K1L 6S6

Contact Luba Mycio-Mommers (613) 599-9594 ext. 224 (telephone), (800) 563 9453 (toll-free in Canada), (613) 599-4428 (fax) or lubamm@cwf-fcf.org if you require further information or have any questions. If you have questions about your rights as a participant in this research, you may contact Catherine Lesage, Protocol Officer for Ethics in Research, University of Ottawa, 30 Stewart St., Room 301, (613) 562-5387, clesage@uottawa.ca.

APPENDIX D

(Copy of Letter Sent to Recipients Whose Names Were Drawn for Resources)

December 2001

Dear Project WILD Teacher,

I am delighted to inform you that your name was drawn to receive a video that was kindly donated by the Council for Environmental Education (CEE). As you may recall, I promised an "early bird" draw as a special thank you for teachers who responded early to my Project WILD questionnaire.

I would like to thank you once again for volunteering to participate in this research – and especially that you were so prompt with a response.

Sincerely,

Luba Mycio-Mommers
University of Ottawa
Doctoral Candidate
36 Carlotta Avenue
Vanier, Ontario
K1L 6S6

Contact Luba Mycio-Mommers (613) 599-9594 ext. 224 (telephone), (800) 563 9453 (toll-free in Canada), (613) 599-4428 (fax) or lubamm@cwf-fcf.org if you require further information or have any questions. If you have questions about your rights as a participant in this research, you may contact Catherine Lesage, Protocol Officer for Ethics in Research, University of Ottawa, 30 Stewart St., Room 301, (613) 562-5387, clesage@uottawa.ca.

APPENDIX D

(Copy of Letter Sent to Recipients Whose Names Were Drawn for Resources)

December 2001

Dear Project WILD Teacher,

I am delighted to inform you that your name was drawn to receive a CD of environmental music that was kindly donated by the Canadian Wildlife Federation (CWF). As you may recall, I promised an "early bird" draw as a special thank you for teachers who responded early to my Project WILD questionnaire.

I would like to thank you once again for volunteering to participate in this research – and especially that you were so prompt with a response.

Sincerely,

Luba Mycio-Mommers
University of Ottawa
Doctoral Candidate
36 Carlotta Avenue
Vanier, Ontario
K1L 6S6

Contact Luba Mycio-Mommers (613) 599-9594 ext. 224 (telephone), (800) 563 9453 (toll-free in Canada), (613) 599-4428 (fax) or lubamm@cwf-fcf.org if you require further information or have any questions. If you have questions about your rights as a participant in this research, you may contact Catherine Lesage, Protocol Officer for Ethics in Research, University of Ottawa, 30 Stewart St., Room 301, (613) 562-5387, clesage@uottawa.ca.

APPENDIX D

(Copy of Letter Sent to Recipient of Print)

January 2002

[Personalized]

I am delighted to inform you that your name was drawn to receive a limited edition wildlife print that was kindly donated by the Canadian Wildlife Federation (CWF). Congratulations!

As you may recall, I promised to conduct a draw for this print, which included all interested teachers who responded to my questionnaire respecting Project WILD. I hope you enjoy the print.

I would like to thank you once again for volunteering to participate in this research.

Sincerely,

Luba Mycio-Mommers
University of Ottawa
Doctoral Candidate
36 Carlotta Avenue
Vanier, Ontario
K1L 6S6

Contact Luba Mycio-Mommers (613) 599-9594 ext. 224 (telephone), (800) 563 9453 (toll-free in Canada), (613) 599-4428 (fax) or lubamm@cwf-fcf.org if you require further information or have any questions. If you have questions about your rights as a participant in this research, you may contact Catherine Lesage, Protocol Officer for Ethics in Research, University of Ottawa, 30 Stewart St., Room 301, (613) 562-5387, clesage@uottawa.ca.

APPENDIX E

(Instrument for Disseminators for Study Proper and Data Summary)

Memorandum

To:	Participating Project WILD Coordinator	Date:	April 17, 2002
From:	Luba Mycio-Mommers	cc:	Prof. J. B. Cousins, Thesis Supervisor
Subject:	Request for **7-10 Minutes** to Complete Attached Questionnaire		

Thank you for agreeing to an interview regarding my Project WILD study. The purpose of the study is to investigate how Project WILD is used by teachers and how contacts between teachers and coordinators contribute to that use.

My Request

- Instead of a 30-minute interview, would you volunteer **7-10 minutes** to complete the attached questionnaire?

- I am making this request to:
  1) **Save time.** I realized that the interview questions may be answered more efficiently through a questionnaire.
  2) **Generate data for an analysis** of patterns between coordinators' and teachers' views on common questions (e.g., if views converge on questions such as teachers' learning about topics covered in Project WILD because of their contact and so on).

The attached questionnaire parallels a part of the teacher survey (but is reworded to apply to coordinators).

Your participation will move the study forward quickly. I am getting pressed for time. My leave is almost over and the International PW Conference is coming up. I know you are busy as well.

Study Update
- Almost 600 individuals responded to my survey. Of these, 515 are teachers and eligible members of the study sample.
- The survey attracted a good mix of teachers across North America along a spectrum ranging from high to low to an absence of contacts. This mix means that I will be able to analyze how teachers use Project WILD under different contact scenarios.

Options for Responses
The questionnaire does **not** ask you to identify yourself. All responses will be treated confidentially. They will be used only by me and only for the study. **FAX NUMBER: 613-744-6493.** If you agree to participate, return your questionnaire by

Fax by: Thursday, April 24 (or as soon as possible after that date).

OR

If you wish to respond **anonymously**, mail your questionnaire to (upon receipt, I will remove the mailing envelope):

Luba Mycio-Mommers, Doctoral Candidate
Faculty of Education, University of Ottawa
c/o 36 Carlotta Avenue
Vanier, Ontario, Canada
K1L 6S6

It may be necessary to invite some coordinators for a 10-minutes follow-up interview. Please note that this study is not an evaluation. Its results will help to provide insights on the use of Project WILD by teachers and dissemination practices that contribute toward the use of the program. Thank you for your cooperation

Sincerely, Luba Mycio-Mommers.

Contact Luba Mycio-Mommers (613) 599-9594 ext. 224 (telephone), (800) 563-9453 (toll-free in Canada), (613) **744-6493 (fax)** or lubamm@cwf-fcf.org if you require further information or have any questions. If you have questions about your rights as a participant in this research, you may contact Catherine Lesage, Protocol Officer for Ethics in Research, University of Ottawa, 30 Stewart St., Room 301, (613) 562-5387, clesage@uottawa.ca.

APPENDIX E

(Instrument for Disseminators for Study Proper and Data Summary)

SURVEY ON THE USEFULNESS OF PROJECT WILD

PART 1: Describe your CONTACTS with Project WILD (PW) classroom teachers.

(A PW classroom teacher is any teacher who teaches in a school, including teachers who are also PW facilitators.)

1.0. Indicate how often you have had **DIRECT** contacts with Project WILD classroom teachers:
(A direct contact is an interpersonal contact, such as talking with PW classroom teachers at workshops, on the phone, through e-mail and so on.)

For each of the following, indicate by circling ONE option: N = Never; R = Rarely; S = Somewhat; F = Frequently; A = Always. Try to use N/A = Not Applicable as infrequently as possible

		X	SD	N
a.	Direct contact through the telephone ..... N R S F A N/A	3.22	0.95	23
b.	Direct contact through the e-mail ..... N R S F A N/A	3.13	0.97	23
c.	Direct contact through regular mail or fax ..... N R S F A N/A	2.87	0.92	23
d.	Direct contact at face-to-face meetings ..... N R S F A N/A	2.87	1.01	23
e.	Direct contact at Project WILD-related activities (e.g., curriculum development projects)... N R S F A N/A	3.13	0.76	23
f.	Direct contact at conferences or workshops (e.g., advanced Project WILD workshops)..... N R S F A N/A	3.14	0.77	22
g.	Other *(specify)*: ..... N R S F A N/A			

PART 2: Describe your INTERACTIONS with Project WILD classroom teachers.

For each of the following, indicate by circling ONE option: SD = Strongly Disagree; D = Disagree; A = Agree; SA = Strongly Agree. Try to use N/A = Not Applicable as infrequently as possible.

		X	SD	N
2.0.	My first contact with Project WILD teachers increased their interest in Project WILD ..... SD D A SA N/A	3.30	0.47	23
2.1.	Compared with other programs, I spend a lot of time with Project WILD teachers ..... SD D A SA N/A	2.26	0.93	19
2.2.	I helped Project WILD teachers determine how Project WILD was relevant to their teaching ..... SD D A SA N/A	3.13	0.63	23
2.3.	I helped Project WILD teachers determine how Project WILD fits with what they teach ..... SD D A SA N/A	3.26	0.69	23
2.4.	I added to Project WILD teachers' knowledge about topics covered in Project WILD ..... SD D A SA N/A	3.39	0.66	23
2.5.	Project WILD teachers added to my understanding about how Project WILD fits with what they teach.. SD D A SA N/A	3.39	0.58	23
2.6.	I helped Project WILD teachers gain a new understanding about wildlife topics ..... SD D A SA N/A	3.43	0.66	23
2.7.	Project WILD teachers seem to change their views about wildlife-related topics as a result of this new understanding ..... SD D A SA N/A	2.82	0.59	22
2.8.	My contact with Project WILD teachers led them to more involvement in other wildlife/ environmental education programs ..... SD D A SA N/A	2.95	0.72	22

2.9. An example of a related program is *(specify)* _____

PART 3: Describe FOLLOW-UP with Project WILD classroom teachers.

		%N = 23
3.0.	Indicate the kind of follow-up that <u>you typically initiate</u>, if any, with Project WILD teachers. *(Check ALL options that apply.)*	
a. ____	Respond to a request that teachers indicated in a workshop survey.	65.2
b. ____	Invite teachers to attend advanced Project WILD workshops or similar events because they indicated an interest.	56.5
c. ____	Place teachers' names on a mailing list or a list serve to receive wildlife-related information.	78.3
d. ____	Other *(specify)*: _____	17.4
3.1.	Indicate any kind of follow-up that <u>teachers typically initiate</u> with you, if any. *(Check ALL options that apply.)*	60.9
a. ____	Provide updates for their records (e.g., change of address/ e-mail) so I may easily contact them.	34.8
b. ____	Share their views about a wildlife-related topic.	52.2
c. ____	Ask for information on how to become more involved in the program.	56.5
d. ____	Other *(specify)*: _____	

APPENDIX E

(Instrument for Disseminators for Study Proper and Data Summary)

PART 4: Describe the IMPORTANCE of BENEFITS that you provided for Project WILD Classroom teachers who were in contact with you.

For each of the following, indicate by circling ONE option: NI = Not Important; SI = Somewhat Important; I = Important; VI = Very Important. Try to use N/A = Not Applicable as infrequently as possible.

4.0. The list below outlines some benefits that you may have provided for Project WILD teachers who were in contact with you. Rate the level of importance that teachers, overall, seemed to attribute to each benefit. Base your rating on your opinion.

						X	SD	N
a. Helping teachers get information (e.g., for their personal use or to share with their students or other teachers) was	NI	SI	I	VI	N/A	3.74	0.45	23
b. Encouraging teachers to talk with me and share points of view about topics of interest (e.g., about conservation or environmental education) was	NI	SI	I	VI	N/A	2.43	0.59	23
c. Helping teachers learn more about technical things (e.g., conservation) was	NI	SI	I	VI	N/A	2.86	0.83	22
d. Sharing their professional knowledge about teaching with me was	NI	SI	I	VI	N/A	2.77	0.87	22
e. Inviting me to help organize an event (e.g., field trip, conferences) was	NI	SI	I	VI	N/A	2.39	0.85	18
f. Inviting wildlife personnel to speak at their school through me was	NI	SI	I	VI	N/A	2.38	1.07	21
g. Encouraging teachers to gain more training (e.g., advanced or facilitator workshops) was	NI	SI	I	VI	N/A	2.90	0.89	21
h. Encouraging teachers to make suggestions to enhance Project WILD (e.g., creating new materials to complement Project WILD activities) was	NI	SI	I	VI	N/A	2.91	0.89	21
i. Helping teachers gain a new understanding about topics covered in Project WILD was	NI	SI	I	VI	N/A	3.05	0.79	22
j. Helping teachers think about wildlife-related topics in a new way was	NI	SI	I	VI	N/A	3.05	0.84	22
k. Other benefits that I provided were *(specify)*: _____	NI	SI	I	VI	N/A			

4.1. The **MOST** important benefit that teachers received because of contact with me was *(Select from above list or add your own.)*

_____

PART 5: Describe the importance of CHARACTERISTICS of a Program Coordinator.

For each of the following, indicate by circling ONE option: NI = Not Important; SI = Somewhat Important; I = Important; VI = Very Important. Try to use N/A = Not Applicable as infrequently as possible.

5.0. Indicate how important the following characteristics are to you about a program coordinator:

						X	SD	N
a. Being available when a teacher calls with questions	NI	SI	I	VI	N/A	3.64	0.66	22
b. Delivering technical information when teachers need it	NI	SI	I	VI	N/A	3.18	0.85	22
c. Being personable when talking with teachers	NI	SI	I	VI	N/A	3.91	0.29	22
d. Talking about things in ways that are easy to understand	NI	SI	I	VI	N/A	3.82	0.50	22
e. Being willing to hear what teachers have to say	NI	SI	I	VI	N/A	3.82	0.50	22
f. Being sensitive to different views about an issue	NI	SI	I	VI	N/A	3.77	0.53	22
g. Having technical expertise about wildlife topics	NI	SI	I	VI	N/A	2.91	0.81	22
h. Other characteristics *(specify)*: _____	NI	SI	I	VI	N/A			

5.1. The **MOST** important characteristic is *(Select from above list or add your own.)* _____

5.2. The **LEAST** important characteristic is *(Select from above list or add your own.)* _____

PART 6: Describe how your interactions with Project WILD classroom teachers affected you.

6.0 Comment briefly on how your interactions with teachers affected you in your role as a Project WILD Coordinator. For example, did you modify, or change, anything to make Project WILD more useful to teachers as a result of your interactions? Did you gain insight on how Project WILD might fit better into teachers' work settings? Did you change your view about something?

(Attach an extra sheet if you need more space for your description.)

Thank you for completing this questionnaire.
Return this questionnaire to Luba Mycio-Mommers by FAX at 613-744-6493 or by mail.

APPENDIX F
(Copy of Letter of Invitation Sent to Canadian Wildlife Federation)

July 17, 2001

Mr. Colin Maxwell, Executive Vice-president,
350 Michael Cowpland Dr.,
Kanata, Ontario, K2M 2W1

Dear Mr. Maxwell,

The purpose of this letter is to thank the Canadian Wildlife Federation for its support regarding my proposed research thesis, which involves Project WILD. As you are already aware, I will be conducting a study in partial fulfilment of a doctorate degree in educational administration at the University of Ottawa. This research will investigate implementation implications of a knowledge use model called "sustained interactivity". The model suggests that multiple contacts between program disseminators and users may be an important factor in enhancing the use of a program. My research is designed to test this model within the implementation context of Project WILD. It proposes to examine the use of Project WILD by certified teachers who teach in classroom settings, and explore effects of the program on them that arise from that use, under different conditions of contacts between disseminators and users. The model has not been tested with respect to a well-developed program like Project WILD.

My understanding is that CWF supports my personal effort as a doctoral candidate and it has agreed that I pursue a Project WILD study. In this capacity, I have received permission to use CWF files, data bases, and other information owned by the CWF for the purposes of the study. Further, CWF is aware that I will be asking for the co-operation of Canadian Project WILD Co-ordinators. Interested Co-ordinators will be asked to contribute toward the sample of users for the study, confirm that they have permission from users to be contacted for the research, and participate in follow-up interviews. They will be assured that

- All information provided for the sample will be held in the strictest confidence.
- The privacy of all teachers whose names are provided to me will be respected.
- No names provided for the sample will be published in any manner.
- Names provided for the sample will be used strictly for survey purposes for the study. Respondents to the survey will be asked for their permission for follow-up interviews. Only in cases where such permission is received, respondents may be contacted further for an interview.
- All names provided for this study will be used only for this study and for no other purposes.
- Participating agencies will not incur any costs regarding any aspect of this research study.

Further, as members of the "disseminator sample" that will be interviewed, Co-ordinators will also receive the same assurances as stated above with regard to their participation.

The study will further understandings about how Project WILD is used by teachers. Its findings may provide information that will aid in the implementation of Project WILD. At the more general level, it will contribute toward generating knowledge about the "sustained interactivity" model with respect to a well-developed program. All of these are areas of direct interest to the CWF since most of its programs are well-developed and are national in scale.

I would like to thank you for your support of this study. If you have any questions, please do not hesitate to contact me.

Yours sincerely,

Luba Mycio-Mommers,
University of Ottawa, Doctoral Candidate,
36 Carlotta Ave.,
Vanier, Ontario K1L 6S6

APPENDIX F

(Copy of Consent Form Sent to Canadian Wildlife Federation)

CONSENT FORM TO PARTICIPATE IN PROJECT WILD RESEARCH

Researcher: Luba Mycio-Mommers, Doctoral Candidate, University of Ottawa
36 Carlotta Avenue, Ottawa, Ontario, K1N 6S6, Canada
Telephone: 613-744-1417 (home); 613-599-9594 ext. 224 (voice mail)
Fax: 613-599-4428 (work), 613- 744-6493 (home)
E-mail: lubamm@cwf-fcf.org

Supervisor: Prof. J. Bradley Cousins, Faculty of Education, University of Ottawa
145 Jean-Jacques Lussier, Ottawa, Ontario, K1N 6N5, Canada
Telephone: 613- 562-5800 ext. 4036
E-mail: bcousins@uottawa.ca

Institution: University of Ottawa, Faculty of Education.

The Canadian Wildlife Federation (CWF) is interested in participating in the research conducted by Luba Mycio-Mommers regarding her doctoral thesis study at the Faculty of Education at the University of Ottawa, Canada. The project is under the supervision of Prof. J. Bradley Cousins.

This research will investigate implementation implications of a knowledge use model called "sustained interactivity". The model suggests that multiple contacts between program disseminators and users may be an important factor in enhancing the use of a program. The research is designed to test this model within the implementation context of Project WILD. It proposes to examine the use of Project WILD by certified teachers who teach in classroom settings and explore effects of the program on them that arise from that use, under different conditions of contacts between disseminators and users. The goal of the research is to investigate teachers' use of the Project WILD program under a variety of conditions of contacts, ranging in a continuum from an absence of contacts with any teacher through to intensive contact with teachers. The disseminators of the Project WILD program in this study are Project WILD Co-ordinators. The users of the Project WILD program in this study are certified classroom teachers who have participated, at minimum, in Introductory Project WILD workshops. The results of the study will help show how to make Project WILD more useful to Canadian teachers. Its findings may provide information that will aid in the implementation of Project WILD in Canada.

The participation of the CWF consists of the following:
- Permission to use the Canadian Project WILD program for this research study. Project WILD is a CWF program in Canada.
- Permission to access Project WILD files, data bases, and other related CWF-owned information for the study.
- Permission to access CWF's Project WILD Co-ordinator network to invite Canadian Project WILD Co-ordinators to participate voluntarily in the study.
- Contribution of a list of names, addresses, telephone numbers and email addresses of Ontario teachers and Ontario Project WILD facilitators (who are also teachers) for the study sample, and through this consent form, give permission to use this information for the study. Individuals in the above-mentioned list have given permission for the use of their names, addresses, telephone numbers and email addresses for Project WILD program purposes. Research on Project WILD is regarded as a program purpose.
- Permission to use CWF equipment and office space to conduct the research study, including access to the photocopier, postage for Canadian mailings and use of the telephone for interviewing purposes.
- In-kind contributions of CWF educational resources to use as a token of thanks for survey responses.
- Assurance that requests for similar support that may arise will be considered.

CWF has received the following assurance from Luba Mycio-Mommers:
- All information provided by CWF for the sample will be held in the strictest confidence.

- The privacy of all teachers whose names, addresses, telephone numbers and email addresses, and all other similar forms of information related to them provided for the study by CWF will be respected.
- No names, addresses, telephone numbers and email addresses, nor all other similar forms of information related to individuals provided by CWF for the sample will be published in any manner.
- Names, addresses and available telephone numbers and email addresses provided by CWF for the sample will be used strictly for survey purposes for the study.
- Teachers responding to the survey will be asked to respond anonymously or confidentially. Respondents to the survey will be asked for their permission for follow-up interviews. Only in cases where such permission is received, respondents may be contacted further for an interview. All interviewees will be asked to complete a consent form prior to participating in an interview.
- All names, addresses, telephone numbers and email addresses, and all similar forms of information related to individuals provided for this study by CWF will be used only for this study and no other purposes.
- CWF will not incur any costs relating to mailings with respect to the US component of this research study.
- The co-operation of Canadian Project WILD Co-ordinators will be sought. Co-ordinators interested in participating voluntarily in the study will be asked to contribute lists of names, addresses, telephone numbers and email addresses of teachers for the study sample and to participate in follow-up interviews. They will be asked to provide assurance that individuals on the lists have given permission for the use of their names, addresses, telephone numbers and email addresses for research on Project WILD. Co-ordinators will be given the same assurances as stated above regarding the use of their lists. As members of the "disseminator sample" that will be interviewed, Co-ordinators will also receive the same assurances as stated above with regard to their participation.

Luba Mycio-Mommers has also assured the CWF that she will provide the CWF Executive Vice-president with an opportunity to comment on her draft survey instrument with respect to areas that it covers that pertain to the Project WILD program and the use of the CWF name.

CWF understands that it is free to withdraw from this research study at any time.

Tape recordings of interviews and other data collected, as well as all electronic and hard copies thereof, will be kept in a secure manner on tape, disk and in hard copy in a locked cabinet and will be accessible only to Luba Mycio-Mommers, as well as the Thesis Supervisor, Prof. J. Bradley Cousins, and the members of the Thesis Committee (i.e., Prof. Richard Maclure, Prof. Swee Goh, Prof. David Smith), who are faculty members of the University of Ottawa. The data, and all electronic and hard copies thereof, will be kept by the researcher and will not be destroyed for at least 10 years. When the data are destroyed, tapes and disks, and all electronic and hard copies thereof, will be erased and hard copy will be shredded.

Any information requests or complaints about the ethical conduct of the project may be addressed to the Research Ethics board for Research Involving Human Beings, or by calling the Protocol Officer for Ethics in Research at University of Ottawa, 550 Cumberland Street, Room 246, P.O. Box 450, Station A, Ottawa, Ontario, K1N 6N5, Canada, telephone (613) 562-5800 ext. 1787, fax (613) 562-5318, email lfigaul@uottawa.ca.

There are two copies of the consent form, one of which CWF may keep. If CWF has any questions about the conduct of the research project, the CWF Executive Vice-president may contact the researcher or her supervisor at the above addresses.

If CWF wishes to receive a summary of the research findings, Luba Mycio-Mommers will make it available to the CWF Executive Vice-president within two months following the full completion of her doctoral studies.

Researcher's signature: _____

Signing Authority for
Participating Organization: _____
(Name and Position of Signing Authority)

APPENDIX F

(Copy of Letter of Invitation Sent to Council for Environmental Education)

July 13, 2001

Ms. Josetta Hawthorne,
Council for Environmental Education,
5555 Morningside Drive,
Suite 212,
Houston, Texas 77005

Dear Ms. Hawthorne,

The purpose of this letter is to request the co-operation of the Council for Environmental Education with respect to a research study involving Project WILD that I will be conducting in partial fulfilment of a doctorate degree in educational administration at the University of Ottawa in Canada. This research will investigate implementation implications of a knowledge use model called "sustained interactivity". The model suggests that multiple contacts between program disseminators and users may be an important factor in enhancing the use of a program. My research is designed to test this model within the implementation context of Project WILD. It proposes to examine the use of Project WILD by certified teachers who teach in classroom settings, and explore effects of the program on them that arise from that use, under different conditions of contacts between disseminators and users. The model has not been tested with respect to a well-developed program like Project WILD.

Toward that end, I am writing to request your organization's co-operation in the following ways:
1) by providing a statement that supports research of this nature with respect to Project WILD;
2) by giving permission to adapt some questions (i.e., questions 5, 6, 8, 10 and 17) that were asked in your recent Project WILD evaluation for inclusion in the instrument that I have developed to conduct a survey of users
3) by agreeing that the CEE Executive Director participate as a panel member of the Validity Study associated with the study.

With respect to participating in the Validity Study: The panel will consist of the CEE Executive Director and interested Project WILD Co-ordinators. There will be two tasks associated with this function. The first involves reviewing the user survey prior to its administration. The purpose will be to offer an opinion whether the survey instrument for users (i.e., certified teachers) adequately covers the content that it intends to cover and if the content is clear. The second task will be the same but, in this case, opinion will be sought about the structured interview guide for Co-ordinators, before it is administered to them. I will provide guides at the appropriate time and phase of the study to help in organizing input during both instances. I am hopeful that you will agree to participate.

The co-operation of Project WILD Co-ordinators will also be sought. Interested Co-ordinators will be asked to contribute toward the sample of users for the study, confirm that they have permission from users to be contacted for the research, and participate in follow-up interviews. They will be assured that

- All information provided for the sample will be held in the strictest confidence.
- The privacy of all teachers whose names are provided to me will be respected.
- No names provided for the sample will be published in any manner.
- Names provided for the sample will be used strictly for survey purposes for the study.

Respondents to the survey will be asked for their permission for follow-up interviews. Only in cases where such permission is received, respondents may be contacted further for an interview.

- All names provided for this study will be used only for this study and for no other purposes.
- Participating agencies will not incur any costs regarding any aspect of this research study.

Further, as members of the "disseminator sample" that will be interviewed, Co-ordinators will also receive the same assurances as stated above with regard to their participation.

It is my hope that CEE will be supportive of my research. The study will further understandings about how Project WILD is used by teachers. Its findings may provide information that will aid in the implementation of Project WILD. It will also complement recent findings in the US National Evaluation of Project WILD. At the more general level, it will contribute toward generating knowledge about the "sustained interactivity" model with respect to a well-developed program.

I would like to thank you in advance for taking the time to participate in this study. If you have any questions, please do not hesitate to contact me either by e-mail at lubamm@cwf-fcf.org or by calling 1-800-563-WILD (in Canada) or 1-613-599-9594 or fax at 1-613-599-4428 or by mail at the address provided below.

Yours sincerely,

Luba Mycio-Mommers,
University of Ottawa,
Doctoral Candidate,
36 Carlotta Avenue,
Vanier, Ontario K1L 6S6

APPENDIX F

(Copy of Consent Form Sent to Council for Environmental Education)

CONSENT FORM TO PARTICIPATE IN PROJECT WILD RESEARCH

Researcher: Luba Mycio-Mommers, Doctoral Candidate, University of Ottawa
36 Carlotta Avenue, Ottawa, Ontario, K1N 6S6, Canada
Telephone: 613-744-1417 (home); 613-599-9594 ext. 224 (voice mail)
Fax: 613-599-4428 (work), 613-744-6493 (home)
E-mail: lubamm@cwf-fcf.org

Supervisor: Prof. J. Bradley Cousins, Faculty of Education, University of Ottawa
145 Jean-Jacques Lussier, Ottawa, Ontario, K1N 6N5, Canada
Telephone: 613- 562-5800 ext. 4036
E-mail: bcousins@uottawa.ca

Institution: University of Ottawa, Faculty of Education.

The Council for Environmental Education (CEE) is interested in participating in the research conducted by Luba Mycio-Mommers regarding her doctoral thesis study at the Faculty of Education at the University of Ottawa, Canada. The project is under the supervision of Prof. J. Bradley Cousins.

This research will investigate implementation implications of a knowledge use model called "sustained interactivity". The model suggests that multiple contacts between program disseminators and users may be an important factor in enhancing the use of a program. The research is designed to test this model within the implementation context of Project WILD. It proposes to examine the use of Project WILD by certified teachers who teach in classroom settings and explore effects of the program on them that arise from that use, under different conditions of contacts between disseminators and users. The goal of the research is to investigate teachers' use of the Project WILD program under a variety of conditions of contacts, ranging in a continuum from an absence of contacts with any teacher through to intensive contact with teachers. The disseminators of the Project WILD program in this study are Project WILD Co-ordinators. The users of the Project WILD program in this study are certified classroom teachers who have participated, at minimum, in Introductory Project WILD workshops. The results of the study will help show how to make Project WILD more useful to teachers in the United States. Its findings may provide information that will aid in the implementation of Project WILD in the United States.

The participation of the CEE consists of the following:
- Permission to use the US Project WILD program for this research study. Project WILD is a CEE program.
- Permission to access CEE's Project WILD Co-ordinator network to invite US Project WILD Co-ordinators to participate voluntarily in the study.
- Permission to adapt questions 5, 6, 8, 10 and 17 that were in a recent CEE-sponsored national-level evaluation of the US Project WILD program.
- Participation of the CEE Executive Director in a Validity Study of the pilot of the research instrument.
- In-kind contributions of CEE educational resources to use as tokens of thanks for survey responses.
- Assurance that requests for similar support that may arise will be considered.

CEE has received the following assurance from Luba Mycio-Mommers:
- The co-operation of US Project WILD Co-ordinators will be sought. Co-ordinators interested in participating voluntarily in the study will be asked to contribute lists of names, addresses, telephone numbers and email addresses of teachers for the study sample and participate in follow-up interviews. They will be asked to provide

assurance that individuals on the lists have given permission for the use of their names, addresses, telephone numbers and email addresses for research on Project WILD. Co-ordinators will be assured of the following:
- All information provided for the sample will be held in the strictest confidence.
- The privacy of all teachers whose names, addresses, telephone numbers email addresses, and all other similar forms of information related to individuals provided for this study by Co-ordinators will be respected.
- No names, addresses, telephone numbers and email addresses, nor all other similar forms of information related to individuals provided by Co-ordinators for the sample will be published in any manner.
- Names, addresses and available telephone numbers and email addresses provided by Co-ordinators for the sample will be used strictly for survey purposes for the study.
- Teachers responding to the survey will be asked to respond anonymously or confidentially. Respondents to the survey will be asked for their permission for follow-up interviews. Only in cases where such permission is received, respondents may be contacted further for an interview. All interviewees will be asked to complete a consent form prior to participating in an interview.
- All names, addresses, telephone numbers and email addresses, and all similar forms of information related to individuals provided for this study by Co-ordinators will be used only for this study and no other purposes.
- Participating agencies will not incur any costs relating to this research study.
Further, as members of the "disseminator sample" that will be interviewed, Co-ordinators will also receive the same assurances as stated above with regard to their participation.

Luba Mycio-Mommers has also assured the CEE that she will provide the CEE Executive Director with an opportunity to comment on her draft survey instrument with respect to areas that it covers that pertain to the Project WILD program and the use of the CEE name.

CEE understands that it is free to withdraw from this research study at any time.

Tape recordings of interviews and other data collected, as well as all electronic and hard copies thereof, will be kept in a secure manner on tape, disk and in hard copy in a locked cabinet and will be accessible only to Luba Mycio-Mommers, as well as the Thesis Supervisor, Prof. J. Bradley Cousins, and the members of the Thesis Committee (i.e., Prof. Richard Maclure, Prof. Swee Goh, Prof. David Smith), who are faculty members of the University of Ottawa. The data, and all electronic and hard copies thereof, will be kept by the researcher and will not be destroyed for at least 10 years. When the data are destroyed, tapes and disks, and all electronic and hard copies thereof, will be erased and hard copy will be shredded.

Any information requests or complaints about the ethical conduct of the project may be addressed to the Research Ethics board for Research Involving Human Beings, or by calling the Protocol Officer for Ethics in Research at University of Ottawa, 550 Cumberland Street, Room 246, P.O. Box 450, Station A, Ottawa, Ontario, K1N 6N5, Canada, telephone (613) 562-5800 ext. 1787, fax (613) 562-5318, email lfigaul@uottawa.ca.

There are two copies of the consent form, one of which CEE may keep. If CEE has any questions about the conduct of the research project, the CEE Executive Director may contact the researcher or her supervisor on behalf of the CEE at the above addresses.

If CEE wishes to receive a summary of the research findings, Luba Mycio-Mommers will make it available to the CEE Executive Director within two months following the full completion of her doctoral studies.

Researcher's signature: _____

Signing Authority for
Participating Organization: _____
(Name and Position of Signing Authority)

APPENDIX F

(Copy of Letter of Invitation Sent to Coordinators)

July 2001

Dear Project WILD Colleague,

It is a pleasure to contact you with respect a research study involving Project WILD that I will be conducting in partial fulfilment of a doctorate degree in educational administration at the University of Ottawa in Canada. As you know, I am the Canadian Director of Project WILD. Having worked in that capacity with the Canadian Wildlife Federation, I share a keen interest in investigating the use of Project WILD by teachers with you. As a doctoral candidate, I have the good fortune of exploring this dimension in association with my studies. I would like to invite you to be a part of that effort.

This research will investigate implementation implications of a knowledge use model called "sustained interactivity". The model suggests that multiple contacts between program disseminators and users may be an important factor in enhancing the use of a program. My research is designed to test this model within the implementation context of Project WILD. It proposes to examine the use of Project WILD by certified teachers who teach in classroom settings and explore effects of the program on them that arise from that use, under different conditions of contacts between disseminators and users. The model has not been tested with respect to a well-developed program like Project WILD.

My goal is to investigate use under a variety of conditions of contacts, ranging in a continuum from an absence of contact with any teacher through to intensive contact. Your co-operation in providing names of members for the sample, together with permission to use those names, along those dimensions will be very helpful.

Toward that end, I would like to invite you to participate in the following ways:
1) by contributing to the sample for the study;
2) by providing a list of your facilitators;
3) by participating personally in interviews once the study gets underway, and
4) by circulating a letter to potential participants of the study to ensure that their permission is in place to be contacted by the researcher (or to contact the researcher), if such a letter is necessary in your state, province or territory.
Attached, I am enclosing a protocol to guide contributions for the sample. The protocol provides full details about the kind of teachers to include in the sample and in what numbers.

If you decide to participate, please be assured of the following:
- All information provided for the sample will be held in the strictest confidence.
- The privacy of all teachers whose names are provided to me will be respected.
- No names provided for the sample will be published in any manner.
- Names provided for the sample will be used strictly for survey purposes for the study.

Respondents to the survey will be asked for their permission for follow-up interviews. Only in cases where such permission is received, respondents may be contacted further for an interview.
- All names provided for this study will be used only for this study and for no other purposes.
- Your agency will not incur any costs regarding any aspect of this research study.

Further, as member of the "disseminator sample" that will be interviewed, please be assured that the above will also apply to you and your participation. You will ***not*** be identified personally, nor will references be made within the study such that your affiliation, as an interviewee, is revealed in the study.

It is my hope that you will agree to be a part of this effort. The study will further understandings about how Project WILD is used by teachers. Its findings may provide information that will aid in the implementation of Project WILD. At the more general level, it will contribute toward generating knowledge about the "sustained interactivity" model with respect to a well-developed program. I would like to thank you in advance for taking the time to participate in this study. If you have any questions, please do not hesitate to contact me either by e-mail at lubamm@cwf-fcf.org or by calling 1-800-563-WILD (in Canada) or 1-613-599-9594 or fax at 1-613-599-4428 or by mail at the address provided below.

Yours sincerely,

Luba Mycio-Mommers,
University of Ottawa, Doctoral Candidate.
c/o 36 Carlotta Avenue
Vanier, Ontario K1L 6S6

APPENDIX F

(Copy of Attachment to Letter of Invitation to Coordinators)

PROTOCOL FOR PROJECT WILD STUDY SAMPLE

This protocol is a general guideline to select names for the samples.

Please ensure that all teachers

- **are certified classroom teachers currently teaching in a school setting, and**
- **have participated in an Introductory Project WILD workshop.**

The study sample will consist of two kinds of teachers:
1) Teachers who are "known" to a Project WILD Co-ordinator and
2) Teachers who are "not known" to the Co-ordinator.

Please supply three lists as follows:

1. List of "Known" Teachers

A teacher who is "known" to a Project WILD Co-ordinator is defined as one that would fall under any of the following criteria:

1) a teacher whose name is *vaguely familiar* when you see it;
2) a teacher whose name is *more familiar* because you remember it from a workshop;
3) a teacher who you know *better* because, for example, you might have talked to him/her on the phone, or received an email, or you flagged the name as a potential facilitator or someone who you know has participated in other programs offered by your agency;
4) a teacher with whom you are *well acquainted* because of regular interaction;
5) a teacher who is *well known* because you know her/him personally, and
6) a teacher who is *also a facilitator.*

Please include any teacher that qualifies in any of the above criteria from 1 through to 6. *The most desirable list is one that includes teachers in all of the six criteria.*
NOTE: In some larger states, Co-ordinators tend not to interact with as many teachers as regional staff or other active facilitators do. In these cases, Co-ordinators may provide a list of teachers who are known to their facilitators.

2. List of "Not Known" Teachers

Teachers who are "not known" to a Project WILD Co-ordinator are defined as:

- teachers whose names are not recognizable but have taken an Introductory Project WILD workshop in the last one and a half to three years.

NOTE: If your data base is not broken down by year, please supply what you can in the "not known teacher" category.

... see page two for more information

Numbers to Send

1) **NUMBER OF "KNOWN" TEACHERS:**

As many names as possible that fit under the above criteria. The more the merrier!!

2) **NUMBER OF "NOT KNOWN" TEACHERS:**

Please include a list that contains at least three times as many names than that which appears on your "known" teachers list. For example, if you provide a list of 10 teachers that are known to you, please provide a list of 30 teachers who are not known to you, and so on.

PLEASE **DON'T** MIX YOUR "KNOWN" TEACHERS LIST WITH YOUR "NOT KNOWN" TEACHERS LIST.

If you are sending your data base, I will make a selection on your behalf of teachers not known to you.

NOTE: The reason for asking for greater numbers in the "not known" category is because of the experience arising from the Project WILD evaluation where it was found that many addresses were not valid. I would like to send additional surveys if mail is returned as "undeliverable".

3. Facilitators List

Co-ordinators are invited to provide a list of their facilitators and indicate on the list

- Facilitators who are also *classroom teachers*

PLEASE DO NOT MIX YOUR FACILITATOR LIST WITH THE OTHER TWO LISTS.

SEND YOUR LISTS/ DATA BASES TO:

Luba Mycio-Mommers,
University of Ottawa, Doctoral Candidate
36 Carlotta Avenue
Vanier, Ontario
K1L 6S6
Tel: (613) 599-9594 (telephone); Fax: (613) 599-4428; (800) 563-9453 (toll-free in Canada), or
lubamm@cwf-fcf.org

Thank you.

APPENDIX F

(Copy of Consent Form Sent to Coordinators)

CONSENT FORM TO PARTICIPATE IN PROJECT WILD RESEARCH

Researcher: Luba Mycio-Mommers, Doctoral Candidate, University of Ottawa
36 Carlotta Avenue, Ottawa, Ontario, K1N 6S6, Canada
Telephone: 613-744-1417 (home); 613-599-9594 ext. 224 (voice mail)
Fax: 613-599-4428 (work), 613- 744-6493 (home)
E-mail: lubamm@cwf-fcf.org

Supervisor: Prof. J. Bradley Cousins, Faculty of Education, University of Ottawa
145 Jean-Jacques Lussier, Ottawa, Ontario, K1N 6N5, Canada
Telephone: 613- 562-5800 ext. 4036
E-mail: bcousins@uottawa.ca

Institution: University of Ottawa, Faculty of Education.

I, (*Name of research subject*), am interested in participating in the research conducted by Luba Mycio-Mommers regarding her doctoral thesis study at the Faculty of Education at the University of Ottawa, Canada. The project is under the supervision of Prof. J. Bradley Cousins.

This research will investigate implementation implications of a knowledge use model called "sustained interactivity". The model suggests that multiple contacts between program disseminators and users may be an important factor in enhancing the use of a program. The research is designed to test this model within the implementation context of Project WILD. It proposes to examine the use of Project WILD by certified teachers who teach in classroom settings and explore effects of the program on them that arise from that use, under different conditions of contacts between disseminators and users. The goal of the research is to investigate teachers' use of the Project WILD program under a variety of conditions of contacts, ranging in a continuum from an absence of contacts with any teacher through to intensive contact with teachers. The disseminators of the Project WILD program in this study are Project WILD Co-ordinators. The users of the Project WILD program in this study are certified classroom teachers who have participated, at minimum, in Introductory Project WILD workshops. The results of the study will help show how to make Project WILD more useful to teachers.

My participation consists of the following:
1) contributing a list of names, addresses, telephone numbers and email addresses of teachers for the study sample and, through this consent form, give permission for the use of those names, addresses, telephone numbers and email addresses for the study;
2) providing a list of names, addresses, telephone numbers and email addresses of facilitators who are also classroom teachers and, through this consent form, give permission for the use of those names, addresses, telephone numbers and email addresses for the study, and
3) participating personally in an interview once the study gets underway.
I have assured Luba Mycio-Mommers that individuals in the above-mentioned lists have given permission for the use of their names, addresses, telephone numbers and email addresses for Project WILD program purposes. Research on Project WILD is an example of a program purpose.

I have received the following assurance from Luba Mycio-Mommers:
- All information provided for the sample will be held in the strictest confidence.
- The privacy of all teachers whose names, addresses, telephone numbers and email addresses, and all other similar forms of information related to them provided by me for this study will be respected.

- No names, addresses, telephone numbers and email addresses, nor all other similar forms of information related to individuals provided for the sample will be published in any manner.
- Names, addresses and available telephone numbers and email addresses provided for the sample will be used strictly for survey purposes for the study.
- Teachers responding to the survey will be asked to respond anonymously or confidentially. Respondents to the survey will be asked for their permission for follow-up interviews. Only in cases where such permission is received, respondents may be contacted further for an interview. All interviewees will be asked to complete a consent form prior to participating in an interview.
- All names, addresses, telephone numbers and email addresses, and all similar forms of information related to individuals provided for this study by me will be used only for this study and no other purposes.
- My agency will not incur any costs regarding any aspect of this research study.

Further, as a member of the "disseminator sample" that will be interviewed, I have also been assured by Luba Mycio-Mommers that the above-mentioned assurances will also apply to me and my participation as an interviewee. I will not be identified personally as an interviewee, nor will references be made within the study such that my affiliation, as an interviewee, will be revealed in the study. As an interviewee, my participation will consist of a taped telephone interview that will not be longer than one hour. The interview will be scheduled at a date and at a time that will be convenient for me. I understand that the contents of the interview will be used only for the research study.

Luba Mycio-Mommers has also assured me that she will provide me with an opportunity to offer comments on her draft survey instrument with respect to areas that it covers that pertain to the Project WILD program. If I decide to participate by offering comments, I have been assured that my comments will be confidential.

I understand that I am free to withdraw from this research study at any time. I am also free to withdraw at any time before or during the interview, refuse to participate and refuse to answer questions without prejudice.

Tape recordings of interviews and other data collected, as well as all electronic and hard copies thereof, will be kept in a secure manner on tape, disk and in hard copy in a locked cabinet and will be accessible only to Luba Mycio-Mommers, as well as the Thesis Supervisor, Prof. J. Bradley Cousins, and the members of the Thesis Committee (i.e., Prof. Richard Maclure, Prof. Swee Goh, Prof. David Smith), who are faculty members of the University of Ottawa. The data, and all electronic and hard copies thereof, will be kept by the researcher and will not be destroyed for at least 10 years. When the data are destroyed, tapes and disks, and all electronic and hard copies thereof, will be erased and hard copy will be shredded.

Any information requests or complaints about the ethical conduct of the project may be addressed to the Research Ethics board for Research Involving Human Beings, or by calling the Protocol Officer for Ethics in Research at University of Ottawa, 550 Cumberland Street, Room 246, P.O. Box 450, Station A, Ottawa, Ontario, K1N 6N5, Canada, telephone (613) 562-5800 ext. 1787, fax (613) 562-5318, email lfigaul@uottawa.ca.

There are two copies of the consent form, one of which I may keep. If I have any questions about the conduct of the research project, I may contact the researcher or her supervisor at the above addresses.

If I wish to receive a summary of the findings of this research, I will indicate my wish to Luba Mycio-Mommers. She will make it available to me either through the mail or through email, whichever method is convenient for me, within two months following the full completion of her doctoral studies.

Researcher's signature: _____

Research Subject's signature: _____

Appendix G

(Sample Pages from Protocol to Develop the Instrument)

Protocol for the User Instrument

Introduction

This document is a protocol for items, and the scales, that will be used for the user instrument. It is organized to correspond to the variable sets that are identified in Figure 3 of the thesis proposal. The document is divided into two parts where each part corresponds to the main variable sets to be used in the proposed study: criterion variable and predictor variables. Items that relate to each main variable are grouped and organized numerically so that they may be easily identified for discussion purposes. Items that are repeated will only be used once in the survey; they are shown here simply to illustrate how they figure within a scale. The numbers do ***not*** indicate their order in the questionnaire. The intent is to show how items were clustered for measurement purposes.

The following codes describe response choices that request a respondent's opinion: SD = Strongly Disagree; D = Disagree; A = Agree; SA = Strongly Agree. The following codes describe response choices that request a respondent's behaviour: N = Never; R = Rarely; S = Somewhat; F = Frequently; A = Always. The following codes describe response choices involving degree of importance: NI = Not Important; SI = Somewhat Important; I = Important; VI = Very Important. The symbol N/A = Not Applicable.

Criterion Variable: Use

Use of Program Variable

The scale developed to measure the *Use of Program* variable consists of six items that would enable respondents to situate their use of Project WILD along a continuum of use. These six items are adapted from Larsen's (1985) framework, which was also used by Cousins and Leithwood (1993). This continuum also provides a means to distinguish between the least amount of use of the program, identified as *no use* (Item 1.1), *conceptual* use (Item 1.2) and *instrumental* use (Items 1.3-1.6). The lowest level of use of the program corresponds to a decision not to use the program (Item 1.1); the highest level of use corresponds to the use of at least one activity from each section of the Project WILD Activity guide, transformed into a form that is meaningful to the user (Item 1.6). Further refinements of these uses (e.g., Levels of Implementation), together with *symbolic* use, are dealt with below. Items 1.5 and 1.6 also draw from the Canadian Wildlife Federation's definition of faithful use of the innovation as intended: use of at least one activity from each section of the Project WILD Activity Guide during a school year. The six items will form a 6-point scale, producing continuous data for analysis purposes.

1.0 Please indicate which situation best describes your current use of the Project WILD program (**Check only ONE** option):

1.1 _____ After taking the Project WILD introductory workshop, I decided not to use this program.

1.2 _____ I am thinking about using Project WILD as a teaching resource.
[Measure to identify that conceptual use has occurred.]

1.3 _____ I am making plans to use Project WILD in my classroom.
[Measure to identify that instrumental use has occurred — decision to use]

1.4 _____ I am using selected activities from Project WILD that fit my day-to-day needs.
[Measure to identify that instrumental use has occurred — Implementation]

1.5 _____ I am using at least one activity from each section of Project WILD during a school year in the form that the activities were presented.
[Measure which includes CWF's least requirement for faithful implementation.]

1.6 _____ I am using at least one activity from each section of Project WILD during a school year in a form modified to fit my needs.

Conceptual Use Variable

The following items, drawn and adapted from Cousins and Leithwood (1993), form a 6-point scale to measure the degrees of *conceptual use* of Project WILD: The lowest form of is consideration of the innovation; the highest form is influence of the innovation on a user's work.

2. I am thinking about using Project WILD as a teaching resource.
[Repeat of Item 1. 2]

3. Project WILD has helped me a gain new understanding about topics it covers. SD D A SA N/A

4. I have gained new knowledge because of Project WILD. SD D A SA N/A

5. I have learned new skills because of Project WILD. SD D A SA N/A

6. I have changed my thinking as a result of Project WILD. SD D A SA N/A

7. Project WILD has had a tremendous influence on my work. SD D A SA N/A

Level of Implementation Variable

This scale addresses use on the *Level of Implementation* variable. Items 11- 20 form a 10-point scale to generate data about the level of implementation of the innovation, where four main categories of levels are identified as: *Initiation/Adoption, Implementation, Stabilization* and *Institutionalization* (Miles & Huberman, 1984). The lowest level of implementation is associated with initiation or adoption; the highest is institutionalization. Hall's et al. (1975) framework helps to refine degrees of initiation, implementation and stabilization as follows:

a. ***Orientation*** (state in which user has acquired information about the innovation).
b. ***Routine use*** (use is stabilized with little thought to improving the innovation or its consequences).
c. ***Refinement*** (user varies use to increase impact on students; variations are based on knowledge of short- and long-term consequences for students).
d. ***Integration*** (user is combining own efforts to use innovation to achieve a collective impact on students within their sphere of influence).

e. ***Renewal*** (user re-evaluates quality of use of innovation, seeks modifications or alternatives to present innovation to increase impact on students).

The researcher has added the items 19 and 20 as an indicator of institutionalization: the highest level of implementation where the innovation has become part of the routine of use.

A. **Orientation** Variable

11. What motivated you to first become involved with the Project WILD program? (Check **ALL** that apply.)
__ To obtain the Activity Guide
__ Belief in Project WILD values/ ideology
__ Requirement at my school site or district
__ Looking for a way to incorporate science into my classroom
__ Looking for activities to fulfill my curriculum requirements
__ My colleagues suggested that I participate in this program
[Repeat of Item 8]. *[Measure to identify **initial** motivation to use the program].*

B. **Routine Use** Variable

12. During a regular school year, I typically use some Project WILD activities
__ 1-3 times __ 4-6 times __ 7-9 times __ 10+ times

C. **Refinement** Variable

13. I am using Project WILD activities to fit the needs of my students by using the following kind of activities (Check **ALL** that apply):
__ Construction/arts and crafts projects __ Physical challenges/games __ Other: ___
__ Writing/reading/discussing activities __ Student research projects
[These categories were derived from the Project WILD US evaluation.]

D. **Integration** Variable

14. I use these activities primarily as (Check **ONE** from each pair below):
__ As part of my curriculum Or __ As a supplementary activity as time permitted
__ As an individual lesson Or __ As part of a series of Project WILD activities
__ One my own Or __ In co-operation with my colleagues
__ As they are presented Or __ In a modified form to fit my student's needs
[These categories were derived from the Project WILD US evaluation.]

15. I selected these particular activities because (Check **ALL** that apply): *[Repeat of Item 9]*
__ Content of the activities fits my curriculum
__ Format of the activities is easy to use
__ Thought that students would enjoy the activities
__ Have a personal interest in the activities' content
__ Activities reflect my personal beliefs about wildlife
__ My colleagues recommended these activities
__ Learned how to do these activities in the Project WILD workshop
__ Other _____

APPENDIX H

(Pilot Instrument for Teachers for Pilot Study)

PILOT TEST OF SURVEY ON THE USEFULNESS OF PROJECT WILD

Dear Project WILD Teacher: June 2001

I am contacting you to invite you to participate in a **pilot test** of a survey that will be used for a research project on Project WILD. Your co-operation by contributing about **20-30 minutes** of your time to **anonymously** complete and return the enclosed draft survey will be greatly appreciated.

I am a doctoral candidate at the University of Ottawa in Canada. As a part of the requirement for the doctoral degree, I will be conducting a research study on Project WILD to provide information to help make Project WILD more useful to teachers.

The purpose of the pilot is to test the draft survey instrument. In its final form, the survey will be administered to a sample of Project WILD teachers during the fall of 2001. Teachers across the United States and in Canada who have participated in Project WILD workshops will be invited to take part in the survey.

The purpose of the study itself is to investigate how Project WILD is being used by classroom teachers in school settings, what the perceived effects of Project WILD are on teachers, and how direct or indirect contacts and follow-up associated with Project WILD Co-ordinators contribute toward teachers' use of the program. The results of the study will help make Project WILD more useful to teachers and better serve them.

If you agree to participate (and I really hope that you do), please complete and return the enclosed draft survey in the self-addressed and postage-paid envelope **within *one* week of receipt** to:

Luba Mycio-Mommers, Doctoral Candidate
Faculty of Education, University of Ottawa
c/o 36 Carlotta Avenue
Vanier, Ontario, Canada
K1L 6S6

All information provided in this survey will be completely anonymous. It will be used only by the researcher and only for the study. The Council for Environmental Education, which conducts Project WILD in the United States, and the Canadian Wildlife Federation, which sponsors it in Canada, support this research. Your state or provincial or territorial Project WILD Co-ordinator is also a participant in the study.

Please also note that the survey will ask if you would like to **voluntarily** participate in a follow-up interview. If you agree to participate, I may be contacting you for an interview. The interview will be approximately **20 minutes** in length. Its purpose will be to ask you for your opinions about how the survey may be improved.

Your reply will be a valuable contribution. I am pleased to provide you with an Oceans Day Teacher's Kit as a token of my thanks for taking the time to provide your input. Also, please indicate within the survey if you would like to receive a copy of the findings of the study.

Sincerely,

Luba Mycio-Mommers,
Doctoral Candidate.

Please contact Luba Mycio-Mommers (613) 599-9594 (telephone), (613) 599-4428 (fax), lubamm@cwf-fcf.org, or (800) 563 9453 (toll-free in Canada) if you require further information or have any questions. If you have questions about your rights as a participant in this research, you may contact Lise Frigault, Protocol Officer for Ethics in Research, University of Ottawa, 30 Stewart St., Room 301, 613-562-5800 ext. 1787, ifrigaul@uottawa.ca. A contact list is also enclosed for your convenience if you require information from your state, provincial or territorial Co-ordinator regarding this study.

APPENDIX H

(Pilot Instrument for Teachers for Pilot Study)

DRAFT SURVEY ON THE USEFULNESS OF PROJECT WILD

A. Are you a classroom teacher? ____Yes ____No ——> B. If no, please SKIP to question 8.8 (last section).

C. Have you attended a Project WILD Introductory Workshop? ____No ____Yes —> D. If yes, when did you take it?
___ Before 1994 ___ Between 1995-97 ___ In 1998 ___ In 1999 ___ In 2000 ___ In 2001 ___ Do not recall

E. Are you in contact with the facilitator who conducted the Introductory Workshop? ___No ___Yes —> F. If yes, indicate if this facilitator was also the state/ provincial Project WILD Co-ordinator? ___No ___Yes ___ Do not recall

G. Have you received training to become a Project WILD Facilitator? ____No ____Yes —> H. If yes, have you given a Project WILD Introductory Workshop to teachers? ____No ____Yes

PART 1: This section asks you to describe how you use Project WILD.

1.0. Please indicate which option BEST describes your current use of Project WILD. *(Check only ONE option.)*
a. ____ After taking the Project WILD introductory workshop, I decided not to use the program.
b. ____ I am thinking about using Project WILD as a teaching resource.
c. ____ I am making plans to use Project WILD in my classroom.
d. ____ I am using selected activities from Project WILD that fit my day-to-day needs.
e. ____ I am using at least one activity from each section of Project WILD during a school year in the form that the activities were presented in the activity guide.
f. ____ I am using at least one activity from each section of the Project WILD during a school year in a form *modified* to fit my needs.

1.1. What motivated you to first become involved with the Project WILD program? *(Check ALL that apply.)*
____ To obtain the Activity Guide. ____ For activities to fulfill my curriculum requirements.
____ Belief in Project WILD values/ ideology. ____ Project WILD is mandated by our school district.
____ My colleagues suggested this program. ____ Other _____ (Please specify.)

1.2. During a regular school year, I typically use some Project WILD activities *(Check only ONE option)*
____ 1-3 times ____ 4-6 times ____ 7-9 times ____ 10+ times

1.3. I am using the following kind of Project WILD activities with my students *(Check ALL that apply):*
___ Construction/arts and crafts projects ____ Physical games ____ Other: _____ (Please specify).
___ Writing/reading/discussing activities ____ Student research projects

1.4. I use these activities primarily *(Check ONE from each pair below)*:
a. ___ On my own OR ___ In co-operation with my colleagues
b. ___ As they are presented OR ___ In a modified form to fit my student's needs

1.5. I selected these particular activities because *(Check ALL that apply)*:
___ Content of the activities fits my curriculum ___ Activities reflect my personal beliefs about wildlife
___ My colleagues recommended these activities ___ Other _____ (Please specify.)

1.6. Overall, how would you rate Project WILD activities? *(Check ONE from each pair below.)*
a. ___ Poor educational quality OR ____ High educational quality
b. ___ Difficult to use OR ____ Easy to use
c. ___ Difficult to connect to curriculum OR ____ Easy to connect to curriculum

1.7. During the past year, what, if anything, prevented you from using Project WILD? *(Check ALL that apply.)*
_____ Lack of support from school administration ____ Lack of support from colleagues
_____ Lack of knowledge about the issues featured in Project WILD. ____ Other: _____ (Specify.)

1.8. Compared with other wildlife programs, please rate the overall quality of Project WILD *(Check ONE option.)*:
___ Project WILD is superior ___ Project WILD is about the same ___ Project WILD is inferior

APPENDIX H

(Pilot Instrument for Teachers for Pilot Study)

PART 2: This section asks you to describe the school context in which you work as well as your involvement with, and your discussions, about Project WILD.

For each of the following, indicate by circling ONE option: N = Never; R = Rarely; S = Somewhat; F = Frequently; A = Always. Try to use N/A = Not Applicable as infrequently as possible.

2.0.	At my school, teachers get together to talk about teaching.	N R S F A	N/A
2.1.	At my school, my colleagues and I compare the programs that we use in our classrooms.	N R S F A	N/A
2.2.	At my school, teachers co-operate together to teach a unit together.	N R S F A	N/A
2.3.	When my colleagues and I talk together, I learn something new about what I am doing.	N R S F A	N/A
2.4.	My colleagues and I explore a topic that we teach to such an extent that sometimes we decide to make changes.	N R S F A	N/A
2.5.	After I took the Project WILD introductory workshop, I discussed it with my peers.	N R S F A	N/A
2.6.	My colleagues at my school support the values that Project WILD promotes	N R S F A	N/A
2.7.	I am making plans with my colleagues to use Project WILD in our classrooms.	N R S F A	N/A
2.8.	My colleagues and I compare how we each use Project WILD.	N R S F A	N/A
2.9.	My colleagues and I compare Project WILD with other wildlife programs.	N R S F A	N/A
2.10.	Project WILD stimulates much discussion among some colleagues at my school.	N R S F A	N/A
2.11.	Discussions about Project WILD have made my colleagues and I reflect about how we think about things (for example, how we teach).	N R S F A	N/A
2.12.	Discussions among my colleagues about Project WILD led to decisions to make changes.	N R S F A	N/A
2.13.	An example of a change is _____ (Please specify.)		
2.14.	I closely examine programs that might be exciting for my students.	N R S F A	N/A
2.15.	I enjoy telling my colleagues about Project WILD.	N R S F A	N/A
2.16.	I try out a new program if I believe that my students will benefit from it.	N R S F A	N/A
2.17.	I try out new activities because of information provided by the Project WILD Co-ordinator.	N R S F A	N/A
2.18.	I encourage school district administrators to use Project WILD as curriculum support.	N R S F A	N/A
2.19.	I am interested ONLY in programs mandated by my school district for teaching.	N R S F A	N/A
2.20.	I presented Project WILD at my school site (for example, at meetings).	N R S F A	N/A
2.21.	My involvement in Project WILD has led to more contact with the government wildlife department.	N R S F A	N/A
2.22.	I share ideas about Project WILD with the Project WILD Co-ordinator.	N R S F A	N/A
2.23.	I have helped to host a Project WILD workshop at my school.	N R S F A	N/A

2.24. I have observed that *(Check ALL that apply)*:

___ Teachers add Project WILD activities into teaching units at my school.
___ My principal supports requests to attend Project WILD workshops.
___ Our school district includes Project WILD activities in teaching units.
___ Our school district supports requests to attend Project WILD workshops.

APPENDIX H

(Pilot Instrument for Teachers for Pilot Study)

PART 3: This section asks you to describe how you FEEL about how Project WILD.

For each of the following indicate by circling ONE option: SD = Strongly Disagree; D = Disagree; A = Agree; SA = Strongly Agree. Try to use N/A = Not Applicable as infrequently as possible.

3.0.	I am committed to Project WILD.	SD D A SA	N/A
3.1.	Project WILD has helped me a gain new understanding about topics it covers.	SD D A SA	N/A
3.2.	I have gained new knowledge because of Project WILD.	SD D A SA	N/A
3.3.	I have learned new skills because of Project WILD (for example, teaching in the out-of-doors).	SD D A SA	N/A
	3.4 An example of a new skill is _____ (Please specify.)		
3.5.	I have changed my thinking as a result of Project WILD.	SD D A SA	N/A
3.6.	Project WILD has had a tremendous influence on my work.	SD D A SA	N/A
3.7.	Project WILD makes me feel positive about my work.	SD D A SA	N/A
3.8.	I feel confident teaching about wildlife because of Project WILD.	SD D A SA	N/A
3.9.	The more know about Project WILD, the more I feel committed to it.	SD D A SA	N/A
3.10.	Being involved in Project WILD makes me feel like I have a say in something important.	SD D A SA	N/A
3.11.	My involvement in Project WILD has furthered my career.	SD D A SA	N/A

PART 4: Please describe your CONTACTS with the Project WILD Co-ordinator.

For each of the following, indicate by circling ONE option: N = Never; R = Rarely; S = Somewhat; F = Frequently; A = Always. Try to use N/A = Not Applicable as infrequently as possible

4.0. Please indicate the type of **DIRECT** contact you have had with the Project WILD Co-ordinator:
(A direct contact = an interpersonal contact, such as talking on the telephone.)

a. Direct contact through the telephone	N R S F A	N/A
b. Direct contact through fax	N R S F A	N/A
c. Direct contact through the e-mail	N R S F A	N/A
d. Direct contact through regular mail	N R S F A	N/A
e. Direct contact at face-to-face and one-to-one meetings	N R S F A	N/A
f. Direct contact to participate in such activities as curriculum development	N R S F A	N/A
g. Direct contact by being invited to advanced Project WILD workshops	N R S F A	N/A
h. Direct contact by being invited to related events (such as Aquatic WILD)	N R S F A	N/A
i. Other: _____ (Please specify.)		

4.1. Please indicate the number of times that you have been in **DIRECT** contact with the Project WILD Co-ordinator during the past year (that is, from June of last year to June of this year):
_____ NO direct contact _____ one (1) direct contact _____ two (2) direct contacts
_____ three (3) direct contacts _____ four (4) direct contacts _____ five (5) or more ------> If more than five (5) direct contacts during a school year, please indicate the approximate number _____

4.2. Is this number of **DIRECT** contacts more, less or the same as in previous years? ____Less ____Same ____More

4.3. Please indicate the type of **INDIRECT** contact that you have had with the Project WILD Co-ordinator:
(An indirect contact = a non-personal contact, such as receiving a newsletter in the mail).

a. Indirect contact through a regular publication, such a newsletter or magazine	N R S F A	N/A
b. Indirect contact through visiting a web site	N R S F A	N/A
c. Indirect contact at school-related professional development events	N R S F A	N/A
d. Other: _____ (Please specify.)		

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4.4. Please indicate the number of times that you have been in INDIRECT contact with the Project WILD Co-ordinator during the past year (that is, from June of last year through to June of this year):
_____ NO indirect contact _____ one (1) indirect contact _____ two (2) indirect contacts
_____ three (3) indirect contacts _____ four (4) indirect contacts _____ five (5) or more ----> If more than five (5) indirect contacts during a year, please indicate the approximately number _____

4.5. Is this number of INDIRECT contacts more, less or the same as in previous years? _____Less _____Same _____More

4.6. Since taking the introductory workshop, the Project WILD Co-ordinator has *(Check ALL that apply)*:
a. ____ Provided a response to a request that I indicated in a workshop survey.
b. ____ Invited me to an advanced Project WILD workshop because I was interested.
c. ____ Asked me to circulate information at my school.
d. ____ Asked me to become a facilitator of the program.
e. ____ Invited me to participate in other programs.
f. ____ Other _____ (Please specify.)
g. ____ The Co-ordinator has not contacted me.

4.7. Since the introductory workshop, I have contacted the Project WILD Co-ordinator for *(Check ALL that apply)*:
a. ____ More information about a specific areas of interest.
b. ____ To express my views about wildlife.
c. ____ Information to circulate to teachers at my school.
d. ____ More information on how I can become more involved in the program.
e. ____ Information on how to become a facilitator.
f. ____ Other _____ (Please specify.)
g. ____ I have not contacted the Co-ordinator.

4.8. If you have had NO CONTACTS (direct or indirect) WHATSOEVER with the Co-ordinator, please SKIP to PART 7.

PART 5: Please describe your INTERACTIONS with the Project WILD Co-ordinator.

For each of the following indicate by circling ONE option: SD = Strongly Disagree; D = Disagree; A = Agree; SA = Strongly Agree. Try to use N/A = Not Applicable as infrequenily as possible.

5.0.	My first contact with the Project WILD Co-ordinator increased my interest in Project WILD.	SD	D	A	SA	N/A
5.1.	I share my views about Project WILD with the Project WILD Co-ordinator.	SD	D	A	SA	N/A
5.2.	Compared with other programs, the Project WILD Co-ordinator has spent a lot of time with me.	SD	D	A	SA	N/A
5.3.	The Project WILD Co-ordinator helped me determine how the program was relevant to my teaching.	SD	D	A	SA	N/A
5.4.	The Project WILD Co-ordinator helped me determine how the program fits with what I teach.	SD	D	A	SA	N/A
5.5.	The Project WILD Co-ordinator added to my learning about topics covered in Project WILD.	SD	D	A	SA	N/A
5.6.	I added to the Project WILD Co-ordinator's understanding about how Project WILD fits with what I have to teach.	SD	D	A	SA	N/A
5.7.	The Project WILD Co-ordinator has helped me gain a new understanding about wildlife topics.	SD	D	A	SA	N/A
5.8	My views about wildlife-related topics have changed as a result of this new understanding.	SD	D	A	SA	N/A
5.9.	My contact with the Co-ordinator led to more involvement in other programs	SD	D	A	SA	N/A

5.10. An example of a related program is _____ (Please specify.)

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(Pilot Instrument for Teachers for Pilot Study)

PART 6: Identify the IMPORTANCE of BENEFITS from your contact with the Co-ordinator.

For each of the following indicate by circling ONE option: NI = Not important; SI = Somewhat Important; I = Important; VI = Very Important. Try to use N/A = Not Applicable as infrequently as possible.

6.0. My contact with the Project WILD Co-ordinator has *(Please rate ALL of the following)*:

a. Helped me get information I wanted for my own use	NI	SI	I	VI	N/A
b. Helped me get information I wanted to distribute to my students	NI	SI	I	VI	N/A
c. Helped me get information that I can share with other teachers	NI	SI	I	VI	N/A
d. Involved talking with the Co-ordinator about a topic of interest (for example, an aspect of conservation or environmental education)	NI	SI	I	VI	N/A
e. Helped me learn more about things, such as wildlife conservation	NI	SI	I	VI	N/A
f. Stimulated me to try out new Project WILD activities	NI	SI	I	VI	N/A
g. Involved sharing my point of view about wildlife topics with the Co-ordinator	NI	SI	I	VI	N/A
h. Led me to get involved in helping to promote Project WILD	NI	SI	I	VI	N/A
i. Led me to invite wildlife personnel to speak at my school	NI	SI	I	VI	N/A
j. Led me to participate in an advanced Project WILD workshop	NI	SI	I	VI	N/A
k. Encouraged me to make suggestions, such as requesting that new materials be created that I need to do Project WILD activities	NI	SI	I	VI	N/A
l. Encouraged me to become a Project WILD Facilitator	NI	SI	I	VI	N/A
m. Helped me get a new understanding about topics covered in Project WILD	NI	SI	I	VI	N/A
n. Made me think about wildlife-related topics in a new way	NI	SI	I	VI	N/A
o. Other: _____ (Please specify.)					

6.1. OTHER aspects of your contact that are important to you are _____

6.2. The MOST important aspect of your contact is *(Select only ONE)* _____

6.3. The LEAST important aspect of your contact is *(Select only ONE)* _____

PART 7: Describe CHARACTERISTICS of a program co-ordinator that are IMPORTANT to you.

7.0. Please indicate how important the following characteristics are to you about a program co-ordinator? *(Rate ALL of the following)*

a. Being available when I call with questions	NI	SI	I	VI	N/A
b. Delivering technical information when I need it	NI	SI	I	VI	N/A
c. Being personable when talking with me	NI	SI	I	VI	N/A
d. Talking about things in ways that I find easy to understand	NI	SI	I	VI	N/A
e. Being willing to hear what I have to say	NI	SI	I	VI	N/A
f. Being sensitive to different views about an issue	NI	SI	I	VI	N/A
g. Having technical expertise about wildlife topics	NI	SI	I	VI	N/A

7.1. OTHER characteristics, if any, that are important to you are: _____

7.2. The MOST important characteristic is *(Select only ONE)*: _____

7.3. The LEAST important characteristic is *(Select only ONE)*: _____

PART 8: BACKGROUND INFORMATION

8.0. What grade(s) do you primarily teach? _____ Grade(s)

8.1. What subject matter do you primarily teach? *(Check ALL that apply.)*

____ Science ____ Math ____ Language Arts ____ Social Studies ____ Environmental Education

____ Other _____ (Please specify.)

8.2. How long have you been in the teaching profession?

____ First year ____ 2-4 years ____ 5-8 years ____ 9-14 years ____ 15-20 years ____ 21+ years

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8.3. Where do you teach? ___ In an urban area ___ A suburban area ___ A rural area ____ Other _____ (Specify.)

8.4. In what state/province/territory do you teach? _____ In what zip/address code(s) _____

8.5. Are you: __ Female? __ Male?

8.6. Please offer any comments that you would like to share about this survey:

_____
_____
_____
_____

8.7. Would you be willing to participate in a 20-minute follow-up interview? _____ No _____ Yes ->If yes, please provide information about how you can be contacted **during this summer** and the best dates for contact:

Name: _____
Address: _____
_____
Telephone: _____ (work) _____ (home) E-mail: _____

The best dates to contact you **this summer** are: _____

8.8. Would you like to receive a summary of the findings of this study upon its completion?
____ No _____ Yes ----> If yes, please provide your name and address (including e-mail address) above.

Thank you for completing this survey. ALL INFORMATION PROVIDED IN THIS SURVEY WILL BE COMPLETELY ANONYMOUS. Please return this survey in the enclosed self-addressed, postage-paid return envelope to:

Luba Mycio-Mommers, Doctoral Candidate
Faculty of Education, UNIVERSITY OF OTTAWA
c/o 36 Carlotta Avenue
Vanier, Ontario, Canada K1L 6S6

Contact Luba Mycio-Mommers at (613) 599-9594 ext. 234 (voice mail) , (613) 744-1419 (home), (613) 599-4428 (fax) or 1 (800) 563-9453 (in Canada) or E-mail: lubamm@cwf-fcf.org.

PILOT TEACHERS:
PLEASE OFFER YOUR COMMENTS REGARDING THIS DRAFT SURVEY

A. Please indicate the approximate amount of time it took to complete this draft survey:
__ less than 20 min. __ 25-30 min. __ more than 30 min. -> If more than 30 min, please indicate time: _____ .

B. Please indicate your opinion about the amount of time required to complete this survey:
__ it was the right amount of time ___ it was lengthy but not overly long ___ it took too much time

C. Please rate the following general aspects of the format of the survey:

a. Wording of Questions: __ Mostly unclear __ somewhat unclear __ mostly clear __ clear

b. Wording of Instructions: __ Mostly unclear __ somewhat unclear __ mostly clear __ clear

c. Spacing of Questions: __ Mostly crowded __ somewhat crowded __ mostly well spaced __ well spaced throughout

(Over)

APPENDIX H

(Pilot Instrument for Teachers for Pilot Study)

d. Smoothness of Flow of Questions: __Mostly not smooth __Somewhat smooth __smooth __very smooth

e. Font size: __too small __somewhat small __just right __should be larger

f. Booklet Format: __too bulky __bulky __convenient __very convenient

E. Please offer recommendations regarding the following:

a. What, if any, question(s) should be re-worded? Please indicate the specific question(s) that should be re-examined, along your reasoning: _____

b. How could this draft survey be improved so that it will encourage teachers to complete it?

c. Other comments: _____

F. I would like to offer incentives to encourage high responses and express my thanks to teachers for participating in the survey. Examples of incentives that may be possible are:

i) To send a summary of the research findings.
ii) To send a poster on a wildlife theme to all teachers that respond to the survey.
ii) To hold a draw for a limited number of items for teachers who respond promptly, such as:
   a) Oceans Day teachers kits, like the one you received OR
   b) Tote bags or T-shirts that depict a wildlife theme OR
   c) A book on wildlife gardening OR
   d) A hand-bag of resources to use in the classroom.

Please share your thoughts about incentives. For example, do you think that incentives are appropriate for teachers? If so, what kind of incentives are worthy of pursing? My experience in this domain is limited. Your comments will valued.

Thank you, again, for participating in this pilot of the draft survey.

APPENDIX H

(Copy of Reminder Letter Sent to Pilot Teachers)

July 2001

[Name and Address]

Dear *[Name of Teacher]*,

I would like to once again personally thank you for your willingness to be a part of the pilot test of the survey on the usefulness of Project WILD.

As a token of my appreciation for your time, I am delighted to enclose a copy of the Oceans Day kit as a resource for your classroom. If you want additional copies of posters that are contained within the kit, please feel free to contact me at any time.

I am looking forward to receiving your completed survey. If you have already mailed it, please accept my gratitude for your co-operation.

Yours sincerely,

Luba Mycio-Mommers
Doctoral Candidate
36 Carlotta Avenue
Vanier, Ontario
Canada
K1L 6S6

Please contact Luba Mycio-Mommers (613) 599-9594 (telephone), (613) 599-4428 (fax), lubamm@cwf-fcf.org, or (800) 563 9453 (toll-free in Canada) if you require further information or have any questions. If you have questions about your rights as a participant in this research, you may contact Lise Frigault, Protocol Officer for Ethics in Research, University of Ottawa, 30 Stewart St., Room 301, 613-562-5800 ext. 1787, ifrigaul@uottawa.ca.

APPENDIX H

(Copy of Note Attached to Kits in Pilot Questionnaire)

I am pleased to provide you with a copy of the year 2000 Oceans Day teachers' kit. It has been kindly donated by the Canadian Wildlife Federation (CWF). Kits are produced annually to celebrate World Oceans Day on June 8. Each year, they feature a different theme associated with marine wildlife resources. The teachers' guide contains lessons that support the theme, together with an attractive poster.

The year 2001 kit has also been donated. I will have copies of these shortly and will be pleased to send you with a copy. I will also have extra posters on hand should you be interested in a supply for your classroom.

APPENDIX I

(Instrument for Content Validity Review)

CONTENT REVIEW OF SURVEY ON THE USEFULNESS OF PROJECT WILD CO-ORDINATOR'S FEEDBACK FORM

Dear Participating Project WILD Co-ordinator July 2001

I am pleased to invite you to participate in a review of a DRAFT copy of the survey that will be directed at teachers with respect to the research study on Project WILD. Your co-operation in contributing about 30-40 **minutes** of your time to complete and return the enclosed DRAFT SURVEY and the CO-ORDINATOR'S FEEDBACK FORM will be greatly appreciated.

The objective of the research is to examine the use of Project WILD by certified teachers who teach in classroom settings and explore effects of the program on them that arise from that use, under different conditions of contacts between disseminators and users. The conditions range in a continuum from an absence of contacts through to intensive contacts. The disseminators of Project WILD in this study are Project WILD Co-ordinators. The users in this study are certified classroom teachers who have participated, at minimum, in Introductory Project WILD workshops. The results of the study will help show how to make Project WILD more useful to teachers.

The purpose of the content review is to provide you with an opportunity to offer comments that will help improve the DRAFT instrument to be as relevant, appropriate and useful as possible with respect to the content that it covers about Project WILD for the purposes of the research. I will be using the information that you provide as part of the validity study to improve the survey instrument. As a Project WILD Co-ordinator, you possess expertise about the program and about types of contacts and interactions with teachers that are outside of my domain of experience. By sharing your expertise and wisdom, your input will help to add value to the final version of the instrument. The following suggestions are intended to provide a structure for the review of content:

Suggested Approach to Conduct Your Review

1. By assuming the role of a teacher, please read the covering DRAFT letter directed at Project WILD teachers. Then, complete the DRAFT survey for teachers. The intent of playing the role of a teacher is to get a sense of such things as how a teacher might react to the survey, the ease of flow of questions, the ease of filling out different sections of survey, etc.

2. Next, in your capacity as a Project WILD Co-ordinator, please complete the Co-ordinator's Feedback Form. This form is divided into four parts:

A) The first part (Section A) will ask you for your general reactions while filling out the survey.
B) The second part (Section B) will ask for your comments about the DRAFT covering letter for teachers.
C) The third part (Section C) will ask for your comments about the content of each part of the DRAFT survey as it relates to Project WILD.
D) The fourth part (Section D) will ask you for your general comments about the overall survey.

If you agree to participate, please complete and return the DRAFT SURVEY **AND** the CO-ORDINATOR FEEDBACK FORM within ***one week of receipt*** to: Luba Mycio-Mommers, Doctoral Candidate, c/o 36 Carlotta Avenue, Vanier, Ontario, Canada, K1L 6S6 by mail OR by fax (613) 599-4428.

The information that you provide will be completely **confidential**. Please also note that the Feedback Form will ask if you would like to **voluntarily** participate in a follow-up interview. If you agree to participate, I may be contacting you for an interview. The interview will be approximately **20 minutes** in length. Its purpose will be to probe further about how the survey may be improved.

I am looking forward to receiving your comments. Thank you in advance for your time to participate.

Sincerely,

Luba Mycio-Mommers,
Doctoral Candidate.

Please contact Luba Mycio-Mommers (613) 599-9594 (telephone, use extension 224 for voice mail), (613) 599-4428 (fax), lubamm@cwf-fcf.org, or (800) 563-9453 (toll-free in Canada) if you require further information or have any questions. If you have questions about your rights as a participant in this research, you may contact Lise Frigault, Protocol Officer for Ethics in Research, University of Ottawa, 30 Stewart St., Room 301, (613) 562-5800 ext. 1787, ifrigaul@uottawa.ca.

APPENDIX I

(Instrument for Content Validity Review)

CO-ORDINATOR'S FEEDBACK FORM

Your name: _____

Please indicate if you would be willing to participate in a 20-minute follow-up interview regarding the content of this survey, if such an interview is needed: ___ No ___ Yes -> If yes, please specify when would be the best dates to contact you during this summer:

_____

SECTION A: General Reactions to the DRAFT Survey for Teachers.

A.1 Please indicate the approximate amount of time it took to complete the DRAFT survey for teachers:
__ less than 20 min. __ 25-30 min. __ more than 30 min. -> If more than 30 min, please indicate time: _____.

A.2 Please indicate your opinion about the amount of time required to complete the DRAFT survey for teachers:
____ it was the right amount of time _____ it was lengthy but not overly long _____ it took too much time

A.3 Please rate the following general aspects of the format of the DRAFT survey for teachers:

A.4. Wording of Questions:	____ Mostly unclear	____ somewhat unclear	____ mostly clear	____ clear
A.5. Wording of Instructions:	____ Mostly unclear	____ somewhat unclear	____ mostly clear	____ clear
A.6. Spacing of Questions:	____ Mostly crowded	____ somewhat crowded	____ mostly well spaced	____ well spaced throughout
A.7. Smoothness of Flow of Questions:	____ Mostly not smooth	____ Somewhat smooth	____ smooth	____ very smooth
A.8. Font size:	____ too small	____ somewhat small	____ just right	____ should be larger

A.9. Other comments: _____
_____
_____
_____

SECTION B: Comments on DRAFT Covering Letter for Teachers Receiving Survey.

B.1. Please re-read the ***covering letter*** that will directed **at teachers** who will receive the survey. Indicate your opinion about the covering letter:

B.2. Wording of Letter	____ Mostly unclear	____ somewhat unclear	____ mostly clear	____ clear

B.3. Was all the content that you expected to see in the covering letter to teachers included? ____ Yes ____ No -> B.4. If no, please indicated what content was **missing**:

_____
_____
_____
_____

B.5. Re-read the last sentence at the bottom of the covering letter. This sentence reads as follows: "A contact list is also enclosed for your convenience if you require information from your state, provincial or territorial Co-ordinator regarding this study".

A contact list is suggested so that survey respondents will 1) be clearly aware of WHO is the Project WILD Co-ordinator in their jurisdiction, and 2) have a convenient way to contact the Co-ordinator if such is their wish.

Please indicate below your opinion of this section of the letter (*Check ALL that apply*):

a. ___ The sheet should list ONLY the contact name, address, telephone number, fax and email of the Co-ordinator for the state/province/territory to which the survey is directed. For example, if the survey is going to a teacher in Ontario, then the contact information would be for the Ontario Co-ordinator only, and so on.

b. ___ The sheet should list ONLY the names, address, etc. of Project WILD Co-ordinators PARTICIPATING in this research study.

c. ___ The sheet should contain ALL names, addresses, etc. of ALL Project WILD Co-ordinators in the US and in CANADA.

d. ___ There should be NO LIST. Respondents should contact the researcher by email, fax or by telephone for such contact information.

e. ___ Other (please specify): _____

_____

_____

_____

B.6. Other comments about the covering letter: _____

_____

_____

_____

SECTION C: Comments on the DRAFT Survey.

To complete this section, please scan ***each part*** of the DRAFT survey and provide your comments about each part. Please be specific when referring to an item or question in this survey. Use extra pages if needed.

C.1. The **Introductory** section (Items A to H) of the survey is fine as is: ____ Yes ____ No -> C.2. If no, please complete any of the following items that apply, along with your rationale:

C.3. What should be *modified* in the Introductory section? _____

_____

_____

C.4. What should be *deleted* in the Introductory section? _____

_____

_____

C.5. What is *missing* in the Introductory section? _____

_____

_____

C. 6. Other: _____

_____

APPENDIX I

(Instrument for Content Validity Review)

C.7. **Part 1** of this survey (which asks respondents to describe how they use Project WILD) is fine as is: ___ Yes ___ No -> C.8. If no, please complete any of the following items that apply, along with your rationale:

C.9. What should be *modified* in Part 1? _____

C.10. What should be *deleted* in Part 1? _____

C.11. What is *missing* in Part 1? _____

C.12. Other: _____

C.13. **Part 2** of this survey (which asks respondents to describe their school context and their involvement in and discussions about Project WILD) is fine as is: ___ Yes ___ No -> C.14. If no, please complete any of the following items that apply, along with your rationale:

C.15. What should be *modified* in Part 2? _____

C.16. What should be *deleted* in Part 2? _____

C.17. What is *missing* in Part 2? _____

C. 18. Other: _____

C.19. **Part 3** of this survey (which asks respondents to describe their feelings about Project WILD) is fine as is: ___ Yes ___ No -> C.20. If no, please complete any of the following items that apply, along with your rationale:

C.21. What should be *modified* in Part 3? _____

C.22. What should be *deleted* in Part 3? _____

C.23. What is *missing* in Part 3? _____

C.24. Other: _____

C.25. **Part 4** of this survey (which asks respondents to describe their contacts with the Project WILD Co-ordinator) is fine as is: ___ Yes ___ No -> C.26. If no, please complete any of the following items that apply, along with your rationale:

C.27. What should be *modified* in Part 4? _____

C.28. What should be *deleted* in Part 4? _____

C.29. What is *missing* in Part 4? _____

C. 30. Other: _____

C.31. **Part 5** of this survey (which asks respondents to describe their interactions with the Project WILD Co-ordinator) is fine as is: ___ Yes ___ No -> C.32. If no, please complete any of the following items that apply, along with your rationale:

C.33. What should be *modified* in Part 5? _____

C.34. What should be *deleted* in Part 5? _____

C.35. What is *missing* in Part 5? _____

C. 36. Other: _____

C.37. **Part 6** of this survey (which asks respondents to identify the importance of benefits from their contact with the Project WILD Co-ordinator) is fine as is: ___ Yes ___ No -> C.38. If no, please complete any of the following items that apply, along with your rationale:

C.39. What should be *modified* in Part 6? _____

C.40. What should be *deleted* in Part 6? _____

C.41. What is *missing* in Part 6? _____

C. 42. Other: _____

C.43. Part 7 of this survey (which asks respondents to identify characteristics of a program co-ordinator that is important to them) is fine as is: ___ Yes ___ No -> C.44. If no, complete any of the following items that apply, along with your rationale:

C.45. What should be *modified* in Part 7? _____

C.46. What should be *deleted* in Part 7? _____

C.47. What is *missing* in Part 7? _____

C. 48. Other: _____

C.49. Part 8 of this survey (which asks respondents to provide background information about themselves) is fine as is: ___ Yes ___ No -> C.50. If no, please complete any of the following items that apply, along with your rationale:

C.51. What should be *modified* in Part 8? _____

C.52. What should be *deleted* in Part 8? _____

C.53. What is *missing* in Part 8? _____

C. 54. Other: _____

C.55. Other comments: _____

SECTION D: General Comments.

D.1. While role-playing a teacher, indicate if there was anything that you expected to see covered within this DRAFT survey but was missing: _____

D. 2. Ask yourself the following question and respond accordingly: "*If this were my survey to investigate a teacher's use of Project WILD under different conditions of contacts with the Project WILD Co-ordinator, what would I include in this survey that is not already covered?*" _____

Thank you for reviewing this survey. Return this form and the completed survey to Luba Mycio-Mommers by fax or mail.

APPENDIX J

GUIDE FOR INFORMAL CONVERSATIONAL INTERVIEW WITH PILOT TEACHERS

Was there anything important that I seemed to have missed in the survey about topics that have to do with

- **contacts with the coordinator**
- **about the way I have described contact with program**
- **follow up from the coordinator**
- **teachers being involved in the program**
- **teachers talking about the program at school**
- **about interactions between teachers and coordinators**
- **the kind of benefits that teachers get from coordinators**

Was there anything missing with respect to the list of characteristics about a program coordinator?

Was there anything missing overall?

What suggestions do you have about ways to encourage teachers to respond?
What suggestions do you have for how the survey envelope should be designed?

APPENDIX J

(Copy of Consent Form Sent to Interviewees)

CONSENT FORM REGARDING PROJECT WILD RESEARCH

Researcher: Luba Mycio-Mommers, Doctoral Candidate, University of Ottawa
36 Carlotta Avenue, Ottawa, Ontario, K1N 6S6, Canada
Telephone: 613-744-1417 (home); 613-599-9594 (voice mail)
E-mail: lubamm@cwf-fcf.org

Supervisor: Prof. J. Bradley Cousins, Faculty of Education, University of Ottawa
145 Jean-Jacques Lussier, Ottawa, Ontario, K1N 6N5, Canada
Telephone: (613) 562-5800 ext. 4036
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Institution: University of Ottawa, Faculty of Education.

I, *(Name of research subject)*, am interested in participating in the research conducted by Luba Mycio-Mommers in her doctoral thesis study, of the Faculty of Education at the University of Ottawa. The project is under the supervision of Prof. J. Bradely Cousins. The purpose of the research is to investigate how Project WILD is being used by classroom teachers in school settings, what the perceived effects of Project WILD are on teachers, and how direct or indirect contacts and follow-up associated with Project WILD Co-ordinators contribute toward teachers' use of the program. The results of the study will help show how to make Project WILD more useful to teachers.

My participation consisted of participating in a 30-minute taped telephone interview. The interview was scheduled at a time convenient for me, which was on Saturday, September 22, 2001 at *(time)*. Prior to the interview, Luba Mycio-Mommers asked for my consent that the interview be taped and she outlined the contents of this consent form. I understood that the contents of the interview would be used only for the research study and that my confidentiality would be respected because my name and my affiliation would not be revealed in the study. My privacy will be also be respected as I have also been assured by Luba Mycio-Mommers that I will not be contacted in any way after the interview except to receive a summary of study's findings, if I wish to receive a copy. I also gave her my permission to contact me again, either by telephone or by email, if she needed any further comments about her draft questionnaire.

I understood that I was free to withdraw from the interview at any time, before or during an interview, refuse to participate and refuse to answer questions without prejudice.

I have received assurance from Luba Mycio-Mommers that the information that I shared will remain strictly confidential. Confidentiality will be assured in that my name will not be disclosed in any manner as a participant in the study.

Tape recordings of interviews and other data collected will be kept in a secure manner on tape, disk and in hard copy in a locked cabinet and will be accessible only to Luba Mycio-Mommers, as well

as the Thesis Supervisor, Prof. J. Bradley Cousins, and the members of the Thesis Committee (i.e., Prof. Richard Maclure, Prof. Swee Goh, Prof. David Smith), who are faculty members of the University of Ottawa. The data will be kept by the researcher and will not be destroyed for at least 10 years. When it is destroyed, tapes and disks will be erased and hard copy will be shredded.

Any information requests or complaints about the ethical conduct of the project may be addressed to the Research Ethics board for Research Involving Human Beings, or by calling the Protocol Officer for Ethics in Research at University of Ottawa, 550 Cumberland Street, Room 246, P.O. Box 450, Station A, Ottawa, Ontario, K1N 6N5, Canada, telephone (613) 562-5800 ext. 1787, fax (613) 562-5318, e-mail lfigaul@uottawa.ca.

There are two copies of the consent form, one of which I may keep.

If I have any questions about the conduct of the research project, I may contact the researcher or her supervisor at the above addresses.

I wish to receive a summary of the findings of this research, which will be available within two months upon completion of the study from Luba Mycio-Mommers.

Researcher's signature: _____

Research Subject's signature: _____

APPENDIX K

(Reliability Results of Pilot Questionnaire)

Variable Construction and Descriptive Statistics for Pilot Study

Variable Name and Description	Scale	Mean[1]	SD	N	Alpha
PREDICTOR VARIABLES: Sustained Interactivity consists of a set of 7 variables as presented below:					
1) **Social Processing** (Mean of 5 items on a 5-point Likert frequency scale from always (5) to never (1) scale. Items are presented below.)	1-5	2.39	0.79	34	.85
• 2.5) After I took the Project WILD introductory workshop, I discussed it with my peers.					
• 2.7) I am making plans with my colleagues to use Project WILD in our classrooms.					
• 2.10) Project WILD stimulates much discussion among some colleagues at my school.					
• 2.11) Discussions about Project WILD have made my colleagues and I reflect about how we think about things (for example, how we teach).					
• 2.12) Discussions among my colleagues about Project WILD led to decisions to make changes.					
2) **Engagement/Involvement** (Mean of 5 items on a 5-point Likert frequency scale always (5) to never (1) scale. Items are presented below.)	1-5	2.42	.92	52	.81
• 2.16) I try out new activities because of information provided by the Project WILD Co-ordinator.					
• 2.18) I encourage school district administrators to use Project WILD as curriculum support.					
• 2.20) I presented Project WILD at my school site (for example, at meetings).					
• 2.22) I share ideas about Project WILD with the Project WILD Co-ordinator.					
• 2.23) I have helped to host a Project WILD workshop at my school.					

(continued)

[1] Statistics are rounded off to the second decimal point.

Variable Construction and Descriptive Statistics for Pilot Study (con't)

Variable Name and Description	Scale	Mean	SD	N	Alpha
3) **Intensity of Sustained Interactivity** (Mean of 14 items on a 4-point Likert very important (4) /not important (1) scale. Items are presented below.)	1-4	2.76	0.97	18	.97
6.0) My contact with the Project WILD Co-ordinator has • a. Helped me get information I wanted for my own use. • b. Helped me get information I wanted to distribute to my students. • c. Helped me get information that I can share with other teachers. • d. Involved talking with the Co-ordinator about a topic of interest (for example, an aspect of conservation or environmental education). • e. Helped me learn more about things, such as wildlife conservation. • f. Stimulated me to try out new Project WILD activities • g. Involved sharing my point of view about wildlife topics with the Co-ordinator. • h. Led me to get involved in helping to promote Project WILD. • i. Led me to invite wildlife personnel to speak at my school. • j. Led me to participate in an advanced Project WILD workshop. • k. Encouraged me to make suggestions, such as requesting that new materials be created that I need to do Project WILD activities. • l. Encouraged me to become a Project WILD Facilitator. • m. Helped me get a new understanding about topics covered in Project WILD. • n. Made me think about wildlife-related topics in a new way.					
4a) **Type of Contact: Direct** (Mean of 8 items on a 5-point Likert frequency scale from always (5) to never (1) scale. Items are presented below.)	1-5	2.09	1.22	52	.96
4.0) Please indicate the type of DIRECT contact you have had with the Project WILD Co-ordinator: • a. Direct contact through the telephone • b. Direct contact through fax • c. Direct contact through the e-mail • d. Direct contact through regular mail • e. Direct contact at face-to-face and one-to-one meetings • f. Direct contact to participate in such activities as curriculum development • g. Direct contact by being invited to advanced Project WILD workshops • h. Direct contact by being invited to related events (such as Aquatic WILD)					

(continued)

Variable Construction and Descriptive Statistics for Pilot Study (con't)

Variable Name and Description	Scale	Mean	SD	N	Alpha
4.b) **Type of Contact: Indirect** (Mean of 3 items on a 5-point Likert frequency scale from always (5) to never (1)scale. Items are presented below.)	1-5	2.28	1.16	55	.81
4.3) Please indicate the type of INDIRECT contact that you have had with the Project WILD Co-ordinator: • a. Indirect contact through a regular publication, such a newsletter or magazine. • b. Indirect contact through visiting a web site. • c. Indirect contact at school-related professional development events. •					
5) **Users' Perception of Sustained Interactivity** (Mean of 10 items on a 4-point Likert strongly agree (4)/strongly disagree (1) scale. Items are presented below.)	1-4	3.10	.49	21	.86
• 5.0) My first contact with the Project WILD Co-ordinator increased my interest in Project WILD. • 5.1) I share my views about Project WILD with the Project WILD Co-ordinator. • 5.2) Compared with other programs, the Project WILD Co-ordinator has spent a lot of time with me. • 5.3) The Project WILD Co-ordinator helped me determine how the program was relevant to my teaching. • 5.4) The Project WILD Co-ordinator helped me determine how the program fits with what I teach. • 5.5) The Project WILD Co-ordinator added to my learning about topics covered in Project WILD. • 5.6) I added to the Project WILD Co-ordinator's understanding about how Project WILD fits with what I have to teach. • 5.7) The Project WILD Co-ordinator has helped me gain a new understanding about wildlife topics. • 5.8) My views about wildlife-related topics have changed as a result of this new understanding. • 5.9) My contact with the Co-ordinator led to more involvement in other programs					

(continued)

Variable Construction and Descriptive Statistics for Pilot Study (con't)

Variable Name and Description	Scale	Mean	SD	N	Alpha
6) **Ongoing Direct Contact** (Number of contacts on a 0-5 scale from no contact (0) to 5 or more contacts (5).	0-5	1.62	2.02	63	n.a.
4.1) Please indicate the number of times that you have been in DIRECT contact with the Project WILD Co-ordinator during the past year (that is, from June of last year to June of this year):					
Number of contacts = Number of responses	0-20	0 = 32 1 = 8 2 = 3 3 = 3 4 = 6 5 = 3 10 = 1 11 = 1 12 = 2 15 = 1 17 = 1 20 = 1	n.a.	63	n.a.
4.2) Is this number of DIRECT contacts more, less or the same as in previous years? 1 = less 2 = same 3 = more	1-3	1 = 8 2 = 41 3 = 9	n.a.	58	n.a.
7) **Ongoing Indirect Contact** (Number of contacts on a 0-5 scale from no contact (0) to 5 or more contacts (5).	0-5	1.59	1.81	61	n.a.
4.4) Please indicate the number of times that you have been in INDIRECT contact with the Project WILD Co-ordinator during the past year (that is, from June of last year to June of this year):					
Frequencies Number of contacts = Number of responses	0-48	0 = 27 1 = 8 2 = 8 3 = 7 4 = 3 5 = 3 6 = 1 8 = 1 10 = 1 12 = 2	n.a.	61	n.a.

(continued)

Variable Name and Description	Scale	Mean	SD	N	Alpha
4.5) Is this number of INDIRECT contacts more, less or the same as in previous years?					
1 = less 2 = same 3 = more	1-3	1 = 10 2 = 42 3 = 4	n.a.	56	n.a.
8) **FollowUp**					
0 = no 1 = yes					
4.6) Since taking the introductory workshop, the Project WILD Co-ordinator has					
• a. Provided a response to a request that I indicated in a workshop survey.	0-1	0 = 48 1 = 11	n.a.	59	n.a.
• b. Invited me to an advanced Project WILD workshop because I was interested.		0 = 39 1 = 21	n.a.	60	n.a.
• c. Asked me to circulate information at my school.		0 = 39 1 = 21	n.a.	60	n.a.
• d. Asked me to become a facilitator of the program.		0 = 45 1 = 15	n.a.	60	n.a.
• e. Invited me to participate in other programs.		0 = 28 1 = 32	n.a.	60	n.a.
• f. Other		0 = 55 1 = 5	n.a.	60	n.a.
• g. The Co-ordinator has **not** contacted me.		0 = 39 1 = 21	n.a.	60	n.a.

(continued)

Variable Name and Description	Scale	Mean	SD	N	Alpha
8) **FollowUp** (con't)					
0 = no 1 = yes					
4.7) I have contacted the Project WILD Co-ordinator for					
• a. More information about a specific areas of interest.	0-1	0 = 40 1 = 20	n.a.	60	n.a.
• b. To express my views about wildlife.	0-1	0 = 55 1 = 5	n.a.	60	n.a.
• c. Information to circulate to teachers at my school.	0-1	0 = 46 1 = 14	n.a.	60	n.a.
• d. More information on how I can become more involved in the program.	0-1	0 = 47 1 = 13	n.a.	60	n.a.
• e. Information on how to become a facilitator.	0-1	0 = 46 1 = 13	n.a.	60	n.a.
• f. Other	0-1	0 = 56 0 = 56	n.a.	60 60	n.a.
• g. I have **not** contacted the Co-ordinator.	0-1	0 = 28 1 = 31	n.a.	59	n.a.
CRITERION VARIABLES					
1) **Conceptual Use/ Process Use: Learning** (Mean of 3 items on a 4-point Likert strongly agree (4)/strongly disagree (1) scale. Items are presented below.)	1-4	3.17	.58	60	.82
• 3.1) Project WILD has helped me a gain new understanding about topics it covers. • 3.2) I have gained new knowledge because of Project WILD. • 3.5) I have changed my thinking as a result of Project WILD.					

(continued)

Variable Construction and Descriptive Statistics for Pilot Study (con't)

Variable Name and Description	Scale	Mean	SD	N	Alpha
2) **Process Use: Learning/Affective/Political** (Mean of 7 items on a 4-point Likert strongly agree (4)/strongly disagree (1) scale. Items are presented below.)	1-4	2.94	.57	44	.89
• 3.3) I have learned new skills because of Project WILD (for example, teaching in the out-of-doors).					
• 3.6) Project WILD has had a tremendous influence on my work.					
• 3.7) Project WILD makes me feel positive about my work.					
• 3.8) I feel confident teaching about wildlife because of Project WILD.					
• 3.9) The more know about Project WILD, the more I feel committed to it.					
• 3.10) Being involved in Project WILD makes me feel like I have a say in something important.					
• 3.11) My involvement in Project WILD has furthered my career.					
3) **Program Use** (Consists of 1 item that identifies the type of use (i.e., no use through to conceptual or instrumental use. Item is presented below.)	1-6	4.25	1.12	59	n.a.
1.0) Please indicate which option **BEST** describes your current use of Project WILD.					
• a. After taking the Project WILD introductory workshop, I decided not to use the program.[2]					
• b. I am thinking about using Project WILD as a teaching resource.[3]					
• c. I am making plans to use Project WILD in my classroom.[4]					
• d. I am using selected activities from Project WILD that fit my day-to-day needs.[4]					
• e. I am using at least one activity from each section of Project WILD during a school year in the form that the activities were presented in the activity guide.[4]					
• f. I am using at least one activity from each section of Project WILD during a school year in a form *modified* to fit my needs.[4]					

(continued)

[2] Indicator of No Use.

[3] Indicator of Conceptual Use.

[4] Indicator of Instrumental Use /Level of Implementation.

Variable Construction and Descriptive Statistics for Pilot Study (con't)

Variable Name and Description	Scale	Mean	SD	N	Alpha
Indicators of degree of **Stabilization** in the use of Project WILD are: **Routine Use, Refinement, Integration, Renewal**, as follows:.					
a) **Routine Use** (use is stabilized with little thought to improving the innovation or its consequences.)	1-4	2.22	1.14	60	n.a.
1.2) During a regular school year, I typically use some Project WILD activities: 1 = 1-3 times 2 = 4-6 times 3 = 7-9 times 4 = 10+ times	1-4	1 = 21 2 = 17 3 = 10 4 = 12	n.a.	60	n.a.
b) **Refinement** (User varies use to increase impact on students; variations are based on knowledge of short- and long-term consequences for students.)					
1.3) I am using the following kind of Project WILD activities with my students: 0 = no 1 = yes					
• a. Construction/arts and crafts projec	0-1	0 = 31 1 = 30	n.a.	61	n.a.
• b. Physical games	0-1	0 = 12 1 = 49	n.a.	61	n.a.
• c. Writing/reading/discussing activities	0-1	0 = 19 1 = 42	n.a.	61	n.a.
• d. Student research projects	0-1	0 = 39 1 = 22	n.a.	61	n.a.
• e. Other	0-1	0 = 57 1 = 4	n.a.	61	n.a.
1.5) I selected these activities because:					
• Content of the activities fits my curriculum.	0-1	0 = 10 1 = 52	n.a.	62	n.a.

(continued)

Variable Construction and Descriptive Statistics for Pilot Study (con't)

Variable Name and Description	Scale	Mean	SD	N	Alpha
c) **Integration** (user is combining own efforts to use innovation to achieve a collective impact on students).					
1.4) I use these activities primarily					
1 = On my own 2 = In co-operation with my colleagues	1-2	1 = 36 2 = 12	n.a.	48	n.a.
1 = As they are presented 2 = In a modified form to fit my student's needs	1-2	1 = 13 2 = 43	n.a.	56	n.a.
d) **Renewal** (User re-evaluates quality of use of innovation, seeks modifications or alternatives to present innovation to increase impact on students) (Mean of 2 items on a 5-point Likert frequency scale from always (5) to never (1) scale. Items are presented below.)	1-4	1.96	.89	55	.76
• 2.8) My colleagues and I compare how we each use Project WILD. • 2.9) My colleagues and I compare Project WILD with other wildlife programs.					
4) **Institutionalization**					
2.24) I have observed that 0 = no 1 = yes					
• a. Teachers add Project WILD activities into teaching units at my school.	0-1	0 = 35 1 = 30	n.a.	65	n.a.
• b. My principal supports requests to attend Project WILD workshops.	0-1	0 = 41 1 = 24	n.a.	65	n.a.
• c. Our school district includes Project WILD activities in teaching units.	0-1	0 = 53 1 = 12	n.a.	65	n.a.
• d. Our school district supports requests to attend Project WILD workshops.	0-1	0 = 35 1 = 30	n.a.	65	n.a.
1.1d) Project WILD is mandated by our school district.	0-1	0 = 64 1 = 1	n.a.	65	n.a.

(continued)

Variable Construction and Descriptive Statistics for Pilot Study (con't)

Variable Name and Description	Scale	Mean	SD	N	Alpha
Symbolic Use [5] 0 = no 1 = yes					
• 1.1b) Belief in Project WILD values/ ideology.	0-1	0 = 16 1 = 49	n.a.	65	n.a.
• 1.1c) My colleagues suggested this program.	0-1	0 = 41 1 = 24	n.a.	65	n.a.
• 1.5b) My colleagues recommended these activities	0-1	0 = 59 1 = 3	n.a.	62	n.a.
• 1.5c) Activities reflect my personal beliefs about wildlife	0-1	0 = 21 1 = 41	n.a.	62	n.a.
1.7) During the past year, what, if anything, prevented you from using Project WILD?					
• 1.7a) Lack of support from school administration	0-1	0 = 58 1 = 5	n.a.	63	n.a.
• 1.7b) Lack of support from colleagues	0-1	0 = 60 1 = 3	n.a.	63	n.a.
2.6) My colleagues at my school support the values that Project WILD promotes.	1-5	3.40	.92	57	n.a.

(continued)

[5] Initially, the researcher considered including symbolic (or persuasive) use as a criterion variable. The decision not to use it was based on two main considerations. First, this aspect of utilization was not vital to the focus of this study's investigation. Second, the length of the questionnaire was a serious concern since it was already very long without this dimension.

Variable Construction and Descriptive Statistics for Pilot Study (con't)

Variable Name and Description	Scale	Mean	SD	N	Alpha
CONTROL VARIABLES					
1) Degree of **Orientation to Change** (Mean of 3 items on a 5-point Likert frequency scale from always (5) to never (1) scale. Items are presented below.)	1-5	4.25	.51	56	.37
• 2.14) I closely examine programs that might be exciting for my students. • 2.16) I try out a new program if I believe that my students will benefit from it. • 2.19) I am interested ONLY in programs mandated by my school district for teaching.					
2) Amount, depth and quality of **Collaboration** among teachers at a school site. (Mean of 5 items on a 5-point Likert frequency scale from always (5) to never (1) scale. Items are presented below.)	1-5	3.42	.66	54	.81
• 2.0) At my school, teachers get together to talk about teaching. • 2.1) At my school, my colleagues and I compare the programs that we use in our classrooms. • 2.2) At my school, teachers co-operate together to teach a unit together. • 2.4) When my colleagues and I talk together, I learn something new about what I am doing. • 2.5) My colleagues and I explore a topic that we teach to such an extent that sometimes we decide to make changes.					
3) Users' Perception of Disseminator Characteristics (Mean of 7 items on a 4-point Likert very important (4)/ not important (1) scale. Items are presented below.)	1-4	3.37	.51	61	.85
7.0) Please indicate how important the following characteristics are to you about a program co-ordinator: • a. Being available when I call with questions. • b. Delivering technical information when I need it. • c. Being personable when talking with me. • d. Talking about things in ways that I find easy to understand. • e. Being willing to hear what I have to say. • f. Being sensitive to different views about an issue. • g. Having technical expertise about wildlife topics.					

(continued)

Variable Construction and Descriptive Statistics for Pilot Study (con't)

Variable Name and Description	Scale	Mean	SD	N	Alpha
4) **Level of Commitment** to the innovation (Mean of one item on a 4-point Likert strongly disagree (1)/strongly agree (4) scale. Item is presented below.)	1-4	3.32	0.60	60	n.a.
• 3.0) I am committed to Project WILD.					
5) **Users' Perception of Quality of Product**					
1.8) Compared with other wildlife programs, please rate the overall quality of the Project WILD program:					
1 = Project WILD is inferior 2 = Project WILD is the same 3 = Project WILD is superior	1-3	1 = 0 2 = 14 3 = 39	n.a.	53	n.a.
1.6) Overall, how would you rate Project WILD activities? 1 = poor educational quality 2 = high educational quality	1-2	1 = 0 2 = 59	n.a.	59	n.a.
1 = Difficult to use 2 = Easy to use	1-2	1 = 1 2 = 57	n.a.	58	n.a.
1 = Difficult to connect to curriculum 2 = Easy to connect to curriculum	1-2	1 = 2 2 = 60	n.a.	62	n.a.
Gender 1 = female 2 - male	1-2	1 = 53 2 = 12	n.a.	65	n.a.
Average years of **Teaching Experience** Years of experience = Number of responses	1-21	1 = 9 3 = 7 7 = 12 11 = 9 17 = 9 21+ = 8	n.a.	65	n.a.
Experience with Project WILD Program 1 = Before 1994 [approx. 7 or more years] 2 = Between 1995-97 [approx. 4-7 yrs] 3 = In 1998 [approx. 3 yrs] 4 = In 1999 [approx. 2 yrs] 5 = In 2000 [approx. 1 yr] 6 = In 2001 [< 1 yr]	1-6	1 = 18 2 = 13 3 = 7 4 = 5 5 = 12 6 = 1	n.a.	56	n.a.

(continued)

Variable Construction and Descriptive Statistics for Pilot Study (con't)

Variable Name and Description	Scale	Mean	SD	N	Alpha
Grade Level 1 = K-8 2 = 9-12, OAC 3 = Other	1-3	1 = 52 2 = 8 3 = 4	n.a.	64	n.a.
Grouping of teachers based on prior knowledge of contacts between teachers and co-ordinators 1 = No known contact between teachers and co-ordinators 2 = Indirect contact through newsletters 3 = Some direct contact between teachers and co-ordinators 4 = Higher direct contact	1-4	1 = 15 2 = 16 3 = 14 4 = 20	n.a.	65	n.a.
[**Organizational Learning** Indicators of Organizational Learning Capacity drawn from items in **Social Processing**. • Project WILD stimulates much discussion among some colleagues at my school. • Discussions about Project WILD have made my colleagues and I reflect about how we think about things (for example, how we teach). • Discussions among my colleagues about Project WILD led to decisions to make changes.]					

APPENDIX L

(Sample copies of Pages from the Content Validity Study Data)

List of Comments of Survey by Co-ordinators and Teachers

Comments on DRAFT Covering Letter

Comments made by Co-ordinators

-"ing" from "covering" should be dropped and "be" inserted after "directed"
-wording in covering letter is Clear
-wording in covering letter is Mostly clear
- All content that should be included in covering letter is included
-Need a description of PW nomenclature, What is a user, facilitator, coordinator? Make it clear that this survey is for classroom teachers. Given the instruction in A (if no skip), it isn't worth a non-classroom teacher to even start.
-One week may be too short of time to respond.
-May need to distinguish between facilitator and coordinator in cover letter to get teachers focused on correct contact person.
-Time frame for (1) conducting survey; (2) compiling/evaluating results, and (3) publishing finding. Include example of "areas of the research".
-State how you got their name and why they are part of the survey. Refresh their memory about PW, What it is, etc.
-Would it be worthwhile mentioning in your previous in PW or will this lead teachers to suspect bias in your results?
-Change wording from "conducts" to "administers" in paragraph 6. Add "telephone" before interview in paragraph 7.
-Italicize key points either by bullet or by alpha-numberic order
-No sure you need to bold "valuable contribution" – kind of implied already

Comments on How Individual Co-ordinators Should be Identified in Survey

Comments made by Co-ordinators

- Agree that I should include a list containing only the name of the Co-ordinator in a State or Province (ABCDE: indicated "This could be difficult if people are in a different location than when they took the workshop
-Agree that I should include a list containing only Co-ordinators participating in research (D: indicated: "Just to avoid confusion, the list should be as limited as possible. What would you do about regional co-ordinators?)
-Agree that I should include a list of all State or Provincial Co-ordinators (F indicated: but whatever is most convenient)
-Agree that I should include a list of co-ordinators

Other comments made by Co-ordinators

-I'm going back and forth on this item- between "a" and "c". Finally decided on "c" because it would be more feasible (quicker) than providing separate list for each state, or generating a separate letter for each state with the coordinator listed in the main part of the letter instead of as an attached list.
-Indicate status of participating coordinator (e.g. past coordinator, present coordinator)

Survey

Q.A-F Introductory Questions

General

Comments from teachers responding to Section E of the Pilot Teacher Section of the Survey

-What if they have never taken a Project WILD workshop? Or are these only going to people who have atttended PW. In that cast question C should be reworded to <u>when</u> have you attended. (re40)
-I do not always work with other teachers. I am a resource teacher now and only go out on "request". I answered in relation to the times I worked with them. (re51)
-The very first question singles out only classroom teachers. This leaves out many others, i.e. gym teachers, art teachers, music teachers and those of us who work in special education. All the ones I mention here could be involved if aspects of Project WILD are used as themes for the entire school, or to complement classroom or grade themes. (re24)

(continued)

Comments made by co-ordinators
-Fine as is
-Spread things out a bit so that A thru H are each on separate lines
-formatting
-See A.9 under section A of Feedback form
-See A.9 comment

Q. A
Comments made by individual teachers ON survey (regular type) and my comments when I noticed while reviewing individual surveys (italics).
- rules out librarians, suggested "Are you a classroom teacher an//or librarian/ resource person in a school setting?" (1- re6)
- supply teacher has difficulty completing this question (1-re3)
- outdoor ed teacher (1-re63)

Change wording of "classroom teacher"

Comments made by Co-ordinators
-Instructions for those who are not classroom teachers [should be modified]. Should you be making the distinction between current, recent, and teachers entering the program?
-What if the teacher has just retired or changed jobs over the summer of 2001. Can they still be included?

Q. C
Comments made by individual teachers ON survey (regular type) and my comments when I noticed while reviewing individual surveys (italics).
- when not sure, indicated before 1994 and between 95-97 (1-re11)

Make a coding decision: select a mid-point – choose 95-97.

Comments made by Co-ordinators
-PW workshops are often conducted by two facilitators, section E only refers to a single facilitator
-We don't use the term "Introductory workshops". We call them "Educator Workshops" or six-hour workshops.
-Question C - see survey: indicated change in wording "When did you attend a Project WILD Basic Workshop?" Same change in word "basic" in E and G. In F, indicated change to "was/is" instead of "was"
-"Do not recall" in section E should be replaced with "Do not know" as do not recall implies that the respondent must have known at one time. Many participants were likely never told who the coordinator was.

Q. E
Comments made by individual teachers ON survey (regular type) and my comments when I noticed while reviewing individual surveys (italics).
- question raised about whether or not to indicate that respondent can, if needed, contact the workshop facilitator (1-re6)
- question raised that respondent has attended many workshops, some by co-ordinator and some by another facilitator (1-re54)
Is it necessary to make changes? Should I put in another question about "other workshops" other than the Introductory workshop?

Comments made by Co-ordinators
-On E. I would suggest a scale indicating the degree of contact with the facilitator – How often.
-Question C - see survey: indicated change in wording "When did you attend a Project WILD Basic Workshop?" Same change in word "basic" in E and G. In F, indicated change to "was/is" instead of "was"
-My only concern is that some workshop participants may not understand the difference between a facilitator and coordinator
-change "facilitator" to "person"

Q.F
Comments made by individual teachers ON survey (regular type) and my comments when I noticed while reviewing individual surveys (italics).
This question completed appropriately but having a category N/A would make it easier to complete the questionnaire. Or, place a skip pattern in Q.E.

Comments made by Co-ordinators
-Question C - see survey: indicated change in wording "When did you attend a Project WILD Basic Workshop?" Same change in word "basic" in E and G. In F, indicated change to "was/is" instead of "was"

Table 4.7

Detailed Summary of Follow Up Under the "Other" Option Initiated by Program Coordinators and Teachers

Summary of "Other" Follow Up	Type of Dissemination Function	% of Response
INITIATED BY PROGRAM COORDINATORS		
Sent Unrequested Information Sent updates/ newsletter/information	SPREAD	25%
Provided Follow Up to Workshops Provided me with "goodies" for doing workshops Verified my attendance for an advanced workshop Contacted me to thank me for doing workshops	EXCHANGE	8%
Sent Invitations to Events Put me on a list to be a facilitator Invited me to PW Facilitators Conference Invited me for an animal study session Invited me to attend special weekend teacher workshops	IMPLEMENTATION	22%
Asked for Assistance to Implement the Program Asked me to facilitate workshop Came to my home to get acorns Invited me to teach an advanced PW workshop Asked me to coordinate presentations Asked me to man/help with a PW exhibit booth Keeps me in mind for new ideas/info Asked me to do a workshop at a conference Asked me to engage teachers to voice support for educational programs like PW to government Invited me to volunteer in an advisory capacity Recommended me for governor's EE committee	IMPLEMENTATION	33%

(continued)

Table 4.7

Detailed Summary of Follow Up Under the "Other" Option Initiated by Program Coordinators and Teachers (cont')

Summary of "Other" Follow Up	Type of Dissemination Function	% of Response
Invited Teacher to Participate in Other Projects	IMPLEMENTATION	11%
Invited me to participate in other teaching opportunities		
Invited me to a national writing workshop		
Invited me to write a new PW activity for the new guide in the US		
Invited me to co-relate new guide with state standards		
Tested activities in the classroom		
Worked on projects with other schools		
TOTAL		100%
INITIATED BY TEACHERS		
Supplied Specific Information Requested by Teacher	SPREAD	26%
Provided manuals for out of country use		
Provided additional information		
Provided me with resources for use with other projects		
Provided grant information		
Supplied me with resources		
I received your Big Backyard which I use as a teaching aid		
Printed updated lessons		
Provided me and my school with French version of PW guide		
Provided me and my school with updated activities		

(continued)

Table 4.7

Detailed Summary of Follow Up Under the "Other" Option Initiated by Program Coordinators and Teachers (cont')

Summary of "Other" Follow Up	Type of Dissemination Function	% of Response
Responded to Requests to Talk	EXCHANGE	12%
Responds to my communications		
Met to talk about needs		
Always responds to my communications		
Provided contact by phone		
Provided a letter of recommendation		
Turned in PW Grant reports to show how money was spent		
I suggested modifications to activities		
Put me in contact with other program (e.g., PLT)		
Provided Assistance with Use of PW Activities	IMPLEMENTATION	6%
Provided help with activities		
Provided connection with curriculum		
Advise to where to find & how to get things		
Help with PW activities with student disabilities		
Helped with activities/ supplies/plan units		
Provided Assistance Associated with PW workshops	IMPLEMENTATION	27%
Asked co-ordinator to help me facilitate my own workshops		
Provides support for my workshops		
Advanced workshop follow-up		
Assisted me in mentoring new facilitators		
Helped me when I had scheduling problems at my district site		
Trained me as a facilitator		
Helped me when a workshop was scheduled at last minute		
Facilitated workshops		
Conducted workshops and ordered materials		
Conscious attempt to do at least 2 workshops a year		
Annual Meeting Attendance / training		

(continued)

Table 4.7

Detailed Summary of Follow Up Under the "Other" Option Initiated by Program Coordinators and Teachers (cont')

Summary of "Other" Follow Up	Type of Dissemination Function	% of Response
Participated at School /District Site	IMPLEMENTATION	15%
Helped work PW into district curriculum		
Started wildlife club at school/was a resource for teachers		
Coordinator told teachers about PW		
Requested her as a speaker for another organization		
I helped our school become a Schoolyard Habitat School		
Coordinated in the past PW workshops through our Teacher centers		
Put on workshop/presentation at my school		
Coordinator visited our site/school		
Coordinator personally delivered fall material at my school		
OTHER	NONE	14%
I joined LEAF League of Environmental Educators		
Coordinator is doing a good job		
I know there is a PW Coordinator should I want something		
TOTAL		100%

APPENDIX N

Table 4.13

Summary of Characteristics of Sustained Interactivity (S.I.)

Variable	General Characteristics	Specific Characteristics
Social Processing	Fairly rare	Frequent individual talk Fairly low depth of reflection for change Fairly low depth of decisions for change Very low collective discussion
Engagement/ Involvement	Rare	Somewhat frequent individual involvement Fairly rare contact with innovation office Fairly rare presenting innovation at school Rarely hosting of workshops at school Rarely sharing of ideas with coordinator
Intensity of Indirect Contact	Fairly rare	Somewhat frequent receipt of publications/newsletters Fairly rare visits to web sites Fairly rare contact with innovation office
Ongoing Indirect Contact	About 2/year	Lower (1-4/yr): About 50% (increasing) Never: About 30% (increasing) Higher (5+/year): About 20% (decreasing)
Intensity of Direct Contact	Moderate	Fairly frequent at conference/workshops Somewhat through mail/fax Somewhat at meetings and related activities Somewhat frequent through telephone Rarely through e-mail
Ongoing Direct Contact	About 2/year	Lower (1-4/year): About 50% (increasing) Never: About 25% - 30% (increasing) Higher (5+/year): 20% - 25% (decreasing)
Amount Follow Up	Very low	
Coordinator Follow Up (Type)	Mostly spread/ implementation oriented	Mostly creating lists to send information Mostly inviting to workshop Some fulfilment of requests on surveys Fewer "other" follow up–mostly involvement oriented

(continued)

Table 4.13

Summary of Characteristics of Sustained Interactivity (con't)

Variable	General Characteristics	Specific Characteristics
Coordinator Follow Up (Amount)	Low	More than teacher-generated follow up
Teacher Follow Up (Type)	Mostly spread/ implementation oriented.	Mostly requests for more involvement Some forwarding of updates for records Few exchanges with coordinator Fewer "other" follow up–mostly involvement oriented
Teacher Follow Up (Amount)	Very low	
Users' Perceptions of S. I.	Optimistic/ general agreement	Highly agree that teachers' interest enhanced Highly agree learning about innovation enhanced Highly agree that new understandings gained Agreement relevance to teaching enhanced Some agreement that fit to what is taught enhanced Some agreement that contact led to other programs Less agreement that views changed Less agreement of enhancing coordinators' understanding Least agreement that time spent was more compared with other programs
Intensity/Benefits of S.I.	Benefits of exchanges tended to be important. Exchanges fairly intense.	Help getting information very important (LI) Help gaining new understandings important (VHI) Led to thinking in new ways fairly important (VHI) Led to gaining more training fairly important (HI) Led to learning about technical things somewhat important (MI) Inviting speakers somewhat important (HI) Suggesting improvements somewhat important (HI) Sharing professional knowledge somewhat important (MI) Sharing views with coordinator somewhat important (MI) Inviting coordinator to help organize events not important (HI)

Note. LI = Low Intensity; MI = Medium Intensity; HI = High Intensity; VHI = Very High Intensity.

TEACHING-RELATED SKILLS: 76.9% of respondents reported the following new teaching skills:

Using game activities
Facilitating teacher groups
Team building
Ways of student management
Game connections to science
Physically acting out concepts
Using park as a resource
Creating interdisciplinary units
Monitoring 2nd graders outdoors
Involving students in activities
Rendering 3-part theme (food, water, shelter)
How to use classification keys
Pros/cons on controversial topics
Lead to student nature hikes
Simulations
Teaching about biodiversity
Combing art and science
How to use the resources available
Using hands-on learning approach
Facilitating outdoor education activities
Cooperative learning
Integrating lessons
Speaking to large groups
Storyteller
Integrating with other subjects
Use of schoolyard as teaching tool
Making plaster of Paris casts of animal tracks
Helping students connect with outdoors
Using drama/physical movement in science
Scientific Nomenclature
Doing group activities
Adapting lessons to subjects
Use of scenarios
How to teach different grade levels
How to make teaching lively
Inquire-based lessons
Experiential activities
Making concepts hands-on
Teaching students to role play
Questioning
Reflection
Guided Imagery
Observation
Role playing
Using different strategies
Teaching watershed concepts
Teaching kids to be more aware of World around them
Learning through activity
Incorporating wilderness experiences into student writing
Attaching concepts to games
Ability to direct nature games
New type of education activity
Questioning my students, not telling them answers
Effective competition
Teamwork
Outdoor Education has been strengthened
How to better teach food chains
Experiments with habitat
Safety
Writing content-specific activities
Locating content-specific activities
How to plan outdoor activities
Cooperative group activities
Teaching outside (field trips)
New teaching methods
Combining literacy with activities
How to make science more exciting and hands-on
Adapting tried and true strategies in outdoor settings
Help ADDH students
Using school grounds to draw with chalk
Expanded my teaching into areas not I did not use
Modeling ecological concepts
How to plan for activities to explore the environment
Teaching outside
Creating a schoolyard habitat
Student evaluation opportunities
Kinesthetic learning opportunities
Use of Spanish vocabulary
Using energizers
Varied age groups
Super Bowl Flush
Teaching inner city schools about environment on a different level
Setting specific goals
Teaching different learning styles

WILDLIFE-RELATED SKILLS: 23.2% of the respondents reported the following new wildlife-related skills:

Identifying wildlife habitat needs
Identifying trees
Plant identification
New Knowledge
Camouflage
Carrying capacity
Tracking
Looking more closely at environment
Understanding of compass
Wildlife survival
Animal signs
Wildlife identification
Orienteering
Life of wild birds
Salmon Enhancement
Pond/river/stream study
Protection
Adaptation
Setting up a bear trap
Survival skills
Macro Invertebrate sampling
Tree rings
Wildlife habitat knowledge
Evaluation of healthy ecosystems
Making a fish viewing scope
Understanding of habitat
Environmental issues knowledge
Forests, Land Use, Ecosystems
Urban wildlife
Estimating herds
The riparian ecosystem
Life cycle
Habitat restoration
Making paper
Soil Classification
Enjoying the out of doors
Fly tying
Food chains
Survey skill

Figure 5.1: New skills gained by teachers because of their participation in the innovation (N = 281).

DISCUSSIONS LEADING TO CHANGES RELATED TO TEACHING PRACTICES: 82.1% of Respondents

To Integrate Project WILD Activities into Existing Teaching Units/Curriculum Topics
Selection of which activities to use.
Use of "Oh Deer" to teach life needs and data collection.
Incorporated some activities into our movement program.
Helps integrate our environmental magnet theme.
Added a report & model project on native wildlife.
Matching Project WILD activities to state mandated test.
How teaching can include Project WILD in science.
Extended subjects.
We constructed an environmental courtyard on computer.
Make special effort to teach about local environment and our impact on wildlife.
In studying our state, we now include researching/exploring wildlife in our state, using many Project WILD activities.
Teaching controversial topics, e.g. wolf reintroduction.
Types of scientific experiments.

To Do Action Projects
More environment recycling. We use less paper.
Not to raise butterflies from out of state.
We planted host plants and capture local butterflies.
Created outdoor classrooms to enhance student learning.
We put in a butterfly garden.
Creating a "Wildlife Walk" at our school.
Cleaning up our playground/ allowing children to build forts (from designated/already cut) trees –not destroying new ones.
Created an outdoor learning centre.
Purchased a fish tank for salmonid enhancement program.
Created wildlife habitat on school grounds.
Landscaping to include needs of small creatures.
Composting/wetlands conservation.
Leaving insects in natural environment.

To Make Greater Use of Out-of-doors
More use of outside environment.
Spending more time outdoors.
Increased outdoor lessons.
Use of nature trails.
Including field trips in units/ overnight trips.

To Integrate PW Activities at different Grade Levels
To include certain lessons at certain grade levels.
We decided what areas we will cover at our grade level.
I have expanded my 1st grade curriculum.
Teach about wildlife in primary grades.

To Make Greater Use of Hands-on or Physical Activities
Use of hands on activities rather than learning from a book.
Added more hands-on activities into units.
More physical activities.

To Make Greater Use of Simulation Activities
Doing more simulations to help students get personally involved.

To Shift to an Interdisciplinary Teaching Approach
More interdisciplinary units.
Change to an integrated curriculum.
I wrote an out-of-door unit for our school environment.

To Encourage Other Teachers to Use Activities
Some people have used a couple of the activities.
That they have confidence trying the activities (but have not had the workshop).

To Collaborate More
Trying to build a conceptual context.
Finding/making time to collaborate.

To Let Students form Opinions/ Gain Better Understanding
Give students information, let them form opinions.
What leads to better understanding.

To Create Special Events Around Project WILD Program
Beginning our "WILD Friday" Program.
Whole school Project WILD Day.

To Contact Wildlife Agencies
Connects us to government Fish & Wildlife department.
Using trunk available from Fish & Wildlife department.

Other
We were "changed" dramatically before we incorporated Project WILD.
My colleagues are not certified in Project WILD.

DISCUSSIONS LEADING TO CHANGES IN ATTITUDES ABOUT WILDLIFE/ENVIRONMENT: 17.9% of Respondents

Change in Attitudes Related to Wildlife Issues
Pollution.
Thinking about managing people versus wildlife.
Wildlife management issue.
River/stream/pond bank erosion.
Salmon issues.
That hunting has pros and cons to consider.
Impact of transportation on environment/ wildlife habitat.
Deadly Links –Toronto might ban pesticide use.
More of us support removal of dams to increase salmon.
Supporting the silvery minnow.
High populations (cougars) and it has influenced bus rider ship – parents drive kids to school, teachers support control/hunting seasons.
A like of bats instead of a dislike.

Change in Attitudes Related to Wildlife/Environment
Care of the environment.
The emphasis placed on the environment.
Caring for environment via environmentally friendly logging practices anti-litter, saving trees, recycling, beach studies.
Leaving no trace.

Figure 5.2: List of discussion topics that led to reported changes in teaching practices and attitudes about wildlife and the environment (N = 95).

APPENDIX Q

Table 5.10

Summary of Characteristics of Use of Innovation

Variable	General Characteristics	Specific Characteristics
Level of Program Use	Tends to instrumental use	Use is mostly instrumental with almost a quarter use it as it was intended.
Level of Implementation	Moderate	Intensity of putting innovation into practice tended toward lower end of the scale.
-Routine use	Low to moderate	Most use innovation 1 to 6 times a year.
-Refinement	Moderate	An average of about 3 different types of activities is selected to vary impact of innovation. Teachers are mindful to serve students' interests in their choices. Science, physical and language arts activities chosen most frequently. Most select activities because content fits curriculum and students enjoy them.
-Integration	Low	Majority of teachers use innovation on their own, in a modified form and as sets of lessons.
-Renewal	Fairly low	Some collective effort made to compare use of innovation among colleagues but effort to compare it with other similar programs is less.
-Institutionalization	Moderate but with caution	Fairly strong support among colleagues and administrators at building/district levels. Innovation tends not to be integrated into teaching units. Innovation might tend toward being part of the routine but appears not to be embedded as part of it.
Conceptual Use	High	Most very optimistic about new knowledge and learning gained about topics in the innovation. Many changed their thinking because of the innovation.
Process Use	Fairly high	Most agreed fairly strongly that new skills acquired (new teaching practices mostly) and confidence in teaching increased. High agreement that innovation inspired positive feelings about work and more commitment to innovation. Teachers tended to agree innovation gave voice and influenced their work but less agreed that it empowered them. Some organizational learning evident.

APPENDIX R

Table 7.4

Summary of Results of Hierarchical Linear Regression on Use of the Innovation

Criterion Variable	% Explained	% Explained	Component of Sustained Interactivity
	Global Measure of Sustained Interactivity	Components of Sustained Interactivity	
Process Use	47%	58%	Benefits of Sustained Interactivity Social Processing
Level of Implementation	43%	54%	Social Processing Engagement/Involvement
Conceptual Use of the Innovation	24%	34%	Benefits of Sustained Interactivity
Level of Program Use	NS	N/A	N/A

Note. NS = No statistical significance; N/A = Not applicable.

ABILITY TO ACCESS INFORMATION
Having access to information.
Networking/ knowing who to contact.
Knowing where to find wildlife resources.
Access to government publications.

ACCESSIBILITY
Being available when I call with questions.
Being easy to approach with questions.
Coordinator is there if I want/ need him/her.

LISTENING
Being willing to hear what I have to say.

RESPECT FOR DIVERSE VIEWS
Being sensitive to different views about an issue.

RESPONSIVE
Delivering technical information when I need it.
Getting material.
Providing supplies.
Providing workshop publicity.
Getting back to me with information.
Quick response.
To be able to help me.
Help in developing program units.
Willing to serve.
Coming to school to demonstrate an activity.

ABILITY TO INVOKE RAPPORT
Being personable when talking with me.
Flexible.
Being supportive/ caring/ friendly.
Excited positive attitude.
Inspiring others to learn more.
Inspiring others to teach more.
Enthusiasm and generating enthusiasm/ motivational.
Humour/ fun to be around.
Encouraging participation

COMMUNICATION SKILLS
Talking about things in ways that are easy to understand.
Communication.
Email communication.
Providing updates on training.
Providing program updates.
Contacting me about other related EE opportunities.

CREDIBILITY/STRONG TECHNICAL SKILLS
Having technical expertise about wildlife topics.
Knowledgeable about the program.
Being a resources.
Expertise with activities.
Understanding of teaching.
Able to explain how to fit activities into my classroom/ mandated curriculum.
Knowledgeable enough about wildlife topics to answer questions and suggest resources.

ORGANIZATIONAL SKILLS
Being organized.
Organizing a structure to disseminate information.
Assembling a great support team.
Works well with staff.
Working together for common goal.
Time to organize learning opportunities.
Serving as a model for leadership.
Providing opportunities to network with professionals.
Bringing a new perspective to school (via speaker, event, etc.) to make activities more meaningful.

CREATIVITY
Shapes new ideas and resources.
Coordinating creation of new topically relevant curriculum.

DEDICATION TO PROGRAM
Dedication to Project WILD.
Love of wildlife.
Passionate about wildlife education.

Figure 8.2: List of most important characteristics of a program coordinator from the teachers' perspective.

Table 8.8

Mann-Whitney U Test Results

ITEM CATEGORY / Differentiating Items	Teachers Mean Rank	Teachers n	Coordinators Mean Rank	Coordinators n	z	Probability
Type of Direct Contact (5-point frequency scale)	144.7	274	200.6	23	-3.01	**
Amount of Follow Up with Coordinator (5-point frequency scale)	265.8	515	352.9	23	-2.71	**
Amount of Follow Up with Teachers (5-point frequency scale)	263.4	515	406.3	23	-4.66	***
Perceptions of Sustained Interactivity (4-point strongly disagree/ strongly agree scale)	135.6	251	158.2	23	-1.32	NS
Intensity of Sustained Interactivity (4-point not important/ very important scale)	120.5	223	148.0	22	-1.45	NS
Characteristics of Program Coordinator (4-point not important/ very important scale)	249.3	483	334.6	22	-2.70	**

Note. NS = No statistical difference; * = * $p < .05$; ** $p < .01$; *** $p < .001$.