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COMPUTER APPLICATIONS IN SCHOOL PSYCHOLOGY: CURRENT PRACTICE, ETHICAL-LEGAL PROBLEMS AND IMPLICATIONS FOR TRAINING

by

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A Thesis submitted in conformity with the requirements
for the Degree of Master of Arts in the
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ABSTRACT

A survey of 224 school psychologists from the Canadian Association of School Psychologists (CASP) was conducted to evaluate the current use of computer applications, level of computer training, and the nature and extent of ethical-legal problems associated with computer use in school psychology. Usefulness of existing ethical and professional standards and guidelines was assessed. One hundred and forty-six questionnaires were included in the analysis.

Responses indicated high current or anticipated use of computers for assessment, administrative and professional purposes. Some training in computers was reported by two-thirds of respondents but the majority (88%) desired further education, particularly in topics related specifically to computer applications. Ethical-legal problems associated with computer applications were reported to have occurred in the service area by 39% of respondents and 77% felt there was a strong likelihood of their occurrence in the future. Professional concerns related to these problems were high. Although almost two-thirds of the sample had consulted one or more professional documents for guidance regarding computer use, only a very small percentage (15%) had consulted the American Psychological Association guidelines for computer-based tests and interpretations (COPS & CPTA, 1986). This survey points to the need for education regarding professional guidelines and improved and continuing computer training for graduate students and practicing professionals.

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TABLE OF CONTENTS

Page

Chapter One: Introduction 1

1.1 Computer Uses in School Psychology 3

1.1.1 Administrative Uses 3

1.1.2 Professional Uses 4

1.1.3 Assessment Uses 5

Test Administration Programs 6

Scoring Programs 8

Interpretive Programs 9

Guidance and Counseling Programs 12

1.2 Guidelines 14

1.3 Ethical and Legal Issues Concerning Computer Applications in School Psychology 17

1.3.1 Record Keeping Issues 17

1.3.2 Computer Test Administration Issues 20

1.3.3 Issues in Program Quality 25

1.3.4 Interpretive Program Issues 28

1.3.5 User Issues 31

1.4 Training 35

1.5 Purpose of the Current Study 38

Chapter Two: Method 39

2.1 Materials 39

2.2 Subjects and Procedure 41

2.3 Data Analyses 42

Page

Chapter Three: Results 44

3.1 Demographic Characteristics of the Sample 44

3.2 Use of Computers 44

3.3 Training 46

3.4. Ethical-Legal Problems 47

3.5 Use and Helpfulness of Existing Guidelines 50

3.6 Summary of Results 51

Chapter Four: Discussion 53

4.1 Limitations of the Survey 53

4.2 Extent of Computer Usage 54

4.3 Training 55

4.4 Occurrence of Ethical-Legal Problems 56

4.5 Access To and Use of Guidelines 58

4.6 Implications 60

References 63

Appendix A Survey of Computer Use, Training and Ethical Concerns Among School Psychologists 72

Appendix B Item and Wording Changes to Jacob and Brantley (1987) Questionnaire 76

Appendix C Letters to Participants 78

Appendix D Tables 80

LIST OF TABLES

Page

Table 1 Distribution and Response Rate of Sample 80

Table 2 Characteristics of Respondents 81

Table 3 Frequency of Computer Use and Ownership and Training Source and Time of Training in Percentages 82

Table 4 Current and Anticipated Use and Desire for Training in Computer Applications in Percentages 83

Table 5 Percentage of Respondents Having and Desiring Training in Computer Skills 84

Table 6 Percentage of Respondents Reporting Past and Potential Ethical-Legal Programs and Concern 85

Table 7 Accessibility and Consultation of Professional Documents in Percentages 87

CHAPTER ONE: INTRODUCTION

Rapid advances in computer technology in the past two decades have profoundly affected the field of school psychology. From administrative uses in record keeping, database management and word processing, research assistance through statistical software and information databanks, to psychological assessment, computers have been integrated into many facets of the profession. Indeed, the proliferation of inexpensive, user friendly yet powerful microcomputers in schools, homes and businesses attests to computers' remarkable popularity. With the minimal computer expertise now required to operate many computer programs, their exceptional potential is available to a wide population of users.

Increased professional interest in computer applications in psychology is readily evident in the professional literature: New journals such as Computers in Human Behavior, Computers in Human Services, and Computers in Psychiatry/Psychology have evolved in the past six years. In addition, a number of established psychological and educational journals regularly review new software and have devoted entire issues to applications-related topics. A recent survey of members of the Ontario Psychological Association (OPA) including clinicians, researchers, administrators, academics and students found 82% used computers in their professional work (Pollock & Maenpaa, 1990). In school settings, reports of current use of computers indicate that a

similar high proportion (72%) of one sample of American school psychologists were using computers in some capacity in their work (Jacob & Brantley, 1987). Indeed, Brown (1984) predicted that school psychologists in the 1990s would be using computerized assessment as the principle means for collecting standardized data on their clients.

There is little doubt that computers can positively impact the scope and efficiency of school psychological services. The issue is not whether computers should be used in the field, but rather which applications and under which conditions will they best impact the provision of services. It is important to explore the full potential of the new technology yet much confusion and uncertainty over acceptable, ethical practice and widespread concern over its potential misuse abounds.

What are the advantages and limitations of computer applications in school psychology? Are school psychologists using computer applications and if so, which ones? What ethical and legal issues arise in their use? Are professional concerns well founded? The types, advantages and limitations of computer applications in school psychology will be overviewed. Following this, an analysis of related ethical-legal issues will be explored.

1.1 Computer Uses in School Psychology

1.1.1 Administrative Uses

The remarkable storage capacity, data processing and retrieval features of mainframe and microcomputers have made their use for record keeping purposes particularly appealing for school psychologists. Indeed, automated data management is a positively viewed and widely used application by school psychologists (Kerber, 1983; McCullough & Wenck, 1984). Referral information, test scores, reports, client contacts, scheduling, billing, budgeting and accounting data can be stored and retained in a format which can easily, rapidly and efficiently be searched and reorganized. Office and service accountability reports can easily be generated for stored data and computerization of client files provides instant access for updates, deletions or content reorganization (McCullough & Wenck, 1984).

A variety of word processing packages are available for mainframe and microcomputers. They greatly increase efficiency of correspondence, professional publication preparation and report writing — perhaps one of the most time consuming responsibilities of the school psychologist. Baker (1983 as cited in McCullough & Wenck, 1984) estimates that word processing packages decrease report preparation time by as much as 75%. Programs provide the writer the freedom to edit reports at will and can function as a storage centre for pre-prepared report blocks (eg. test descriptions, lists of frequently used recommendations). Some

programs provide report templates which allow psychologists to insert relevant assessment information into a standard report format. Report generator programs produce reports based entirely on entered raw test scores. Although appealing as professional time savers, the program output is limited in perspective, in their reliance primarily on test data, with little or no integration of behavioral observations or other clinical information (McCullough & Wenck, 1984). Of concern is their potential for misuse by those unqualified to evaluate their contents objectively and critically.

1.1.2 Professional Uses

Computers have long played a role in educational and psychological research. Statistical packages, once the domain of the mainframe computer, are now widely available for many microcomputer systems. Databases and statistical packages together provide the opportunity to generate systematically gathered extensive normative data bases not easily possible with traditional methods (Jackson, 1985; Merrell, 1985). In addition, the computer's complex graphics and response recording capabilities provide the practitioner a wealth of research possibilities.

Telecommunication networks provide the school psychologist instant access to current professional information and happenings, and facilitate communication among users. Services include electronic mail, systems bulletin boards, and data collection and

information management systems for storing and analyzing information. Through networks, it is now possible to rapidly access and efficiently search vast background and research information held in large database organizations such as ERIC (Educational Resources Information Centre) and PSYCHLIT (a database of psychological abstracts). They are invaluable professional tools (McCullough & Wenck, 1984) which allow the practitioner to remain current with the ever expanding professional literature.

1.1.3 Assessment Uses

School psychologists spend a large proportion of their professional time in assessment. Indeed, Smith (1984), in a large scale national survey of practicing school psychologists in the United States, found that the average practitioner spends 54% of his or her own time in assessment-related activities. Currently available assessment software for test administration, scoring, interpretation and counseling may positively impact on professional service provision through reduction in assessment time and error, and improved assessment efficiency, thus freeing psychologists to further expand their professional roles. The OPA survey found 55% of clinicians, administrators, researchers and students currently used computers for direct clinical applications (Pollock & Maenpaa, 1990). Among school psychologists in particular, Jacob & Brantley (1987)'s national survey on computer usage found 60% of respondents used or planned to use computers

for test scoring, interpretation and reports.

Psychological testing programs vary widely in the type of assessment instrument automated, the modes of administration and processing, and their output format and content. Tests may be administered conventionally or via computer and processed either centrally, locally or via teleprocessing, after test responses or raw scores have been coded on answer sheets or directly entered into the computer via the clinician.

Test Administration Programs. Test administration programs have been developed for a variety of paper and pencil personality, vocational and interest inventories and clinical interviews with true/false or multiple choice questions. Most administration programs to date have been developed for adult clientele. Fewer standardized tests used with school aged children are available for test administration although criterion referenced and teacher prepared tests for academic subjects are widely marketed (McCullough & Wenck, 1984).

With automated administration, it is the client who interacts directly with the computer, thus freeing up professional time (Brown, 1984; Erdman, Klein, & Greist, 1985) and reducing the influence of examiner bias (Merrell, 1985; Vale & Keller, 1987). Krug (1987a) estimates that test administration time is reduced by 15% to 50% when executed by computer. In addition, measurement error is reduced for tests requiring complex presentation of stimuli and/or tightly controlled time limits (Krug, 1987a) and

administration conditions are better standardized (Brown, 1984; Masden, 1986; McCullough & Wenck, 1984). Automated test administration also permits those clients with visual, auditory or physical disabilities to take tests with minimal assistance (Burke & Normand, 1987; Jackson, 1985; Sampson & Pyle, 1983). Of concern with this approach, however, is the limited or absence of observations of testing behaviour -- important information sources for evaluating the validity of test administration and for generating hypotheses to explain test results (Butcher, Keller & Bacon, 1985). Furthermore, the unknown effects of computer-related factors on test results and the equivalency of computer and conventional test administrations are of critical importance in valid test administration, yet are often overlooked by test program developers.

Expanding technological capabilities provide new possibilities for the development of innovative assessment measures to be administered by computer. Abilities which are difficult to measure through paper and pencil techniques such as response latencies, short term memory, and visual tracking can be measured using automated systems (Roid & Gorsuch, 1984). With graphics capabilities and voice synthesizers, the possibilities for psychological test development are endless (Brown, 1984; Hofer & Green, 1985; Space, 1981). One recent computerized test development is adaptive testing which involves logical branching of test items. Questions are based on the individual's previous responses, resulting in only the most relevant questions

being asked. Although still in its infancy in development, adaptive testing has potential to reduce assessment time and improve measurement accuracy by focusing on key issues or abilities (Burke & Normand, 1987; Eyde, 1987; Hofer & Green, 1985; Meier & Geiger, 1986; Merrell, 1985; Skinner & Pakula, 1986; Weiss, 1985).

Scoring Programs. Scoring programs are the most widely accepted computer application in school psychology (Troutman, 1985) and are available for a wide variety of tests, including intelligence, personality, achievement, projective tests and adaptive behavior scales. Test scoring programs may depend on the examiner (or assistant) to type the raw data into the computer or on the clients themselves in the case of automated test administration. Program output may include lists of scores and descriptive statements of test scores. By rapidly computing raw scores, derived scores and factor and scale scores, these programs significantly decrease clerical scoring time and the time lag between testing and results (Butcher, 1987b; Jackson, 1985; Merrell, 1985; Sampson & Pyle, 1983). Viewed as more accurate, and more cost and time effective (Burke & Normand, 1987; Byers, 1985; Fowler & Butcher, 1987; McCullough & Wenck, 1984; Merrell, 1985; Roid & Gorsuch, 1984; Sampson & Pyle, 1983; Walker & Myrick, 1985), the clerical time savings are especially apparent for long paper and pencil questionnaires and self-report inventories. By eliminating the need for hand calculations, potential scoring

error is also decreased (Jackson, 1985; Krug, 1987a; Sampson & Pyle, 1983; Space, 1981; Walker & Myrick, 1985). Tests with a heavy reliance on the qualitative aspects of answers, however, may be less amenable to computerized scoring (McCullough & Wenck, 1984; Merrell, 1985). In addition, any input typing errors will undoubtedly decrease the accuracy of the program output.

Descriptive statement programs provide profiles, lists of scores and generate descriptions of the client's performance based on the scale and factor scores (Roid & Gorsuch, 1984). The basis of interpretations in these reports is overly simplistic, however, as interpretations are often matched to single scaled scores rather than to patterns of scaled scores (Butcher et al, 1985; Moreland, 1987a). They are, therefore, more subject to internal inconsistencies and/or redundancies and may completely omit any interaction effects (Vale & Keller, 1987).

Interpretive Programs. The most controversial aspect of computer use in psychological assessment is that of interpretive programs. Proceeding one step further than descriptive programs, they provide detailed interpretations of test results based on a set of pre-specified automated rules which analyze, interpret and assign particular explanations to a response or patterns of responses (Harris, 1987). These rules form an algorithm, or decision tree, which guides the computer in the analysis (Harris, 1987). The underlying basis for these rules rests either on clinical judgment or empirically established research patterns for

various score configurations.

The majority of interpretive programs are clinically-based, and are founded on published research, clinical hypotheses and experience. Called clinician-modelled or "expert system" programs, they are designed to simulate the interpretive processes of a renowned expert clinician. Programs are developed by having the clinician think aloud to form a logical decision tree (Vale & Keller, 1987) and are limited by the difficulty in making explicit the expert's judgmental rules (Butcher et al, 1985). Some expert systems are based on a mathematical model, usually linear, of the expert's prediction process derived from the statistical analysis of the expert's judgments (Roid & Gorsuch, 1984). That the expert can make accurate predictions and can be simulated by a linear model rather than a configural approach is the somewhat shaky assumption upon which the validity of these clinician-based approaches rest (Butcher et al, 1985; Vale & Keller, 1987). These approaches are improved by using the judgment consensus of several experts in developing the program thereby decreasing the individual unreliability and bias of one individual expert (Vale & Keller, 1987). Few programs, however, have been developed using this approach.

Moreland (1987a) cautions test users in the use of clinical program interpretations in situations of unusual response sets, rare score combinations and in the detection of low probability events (eg. suicide). In such instances, there is increased likelihood that the interpretations are based more on the expert's

personal experience and clinical lore and may be inaccurate. Interpretations for extreme scores, especially in programs using coarse classification groupings, and for scores near classification cutoff points may be more erroneous as well.

Expert systems can furnish the practitioner with valuable outside opinions and provide a powerful learning experience for development and refinement of clinical skill (Butcher, 1987b; Sampson, 1986). Interpretations generated are viewed as more objective, for they are less subject to examiner bias (Butcher, 1987b). The program base of interpretive rules also can be easily updated to reflect recent research and local norms (Space, 1981). The level of expertise in some interpretive programs is of question (Eyde & Kowal, 1985; Krug, 1987b), however, and software quality control is indeed a serious issue. The validity of clinically based interpretive reports is a key concern (Lanyon, 1984; Matarazzo, 1983, 1985, 1986). There is a general consensus in the field that validation of computer-generated reports is indeed a difficult but imperative task (Moreland (1985b, 1987b).

Clinical-actuarially-based programs produce narratives which are determined by

> "the empirical demonstration of statistical regularities that may exist between specified psychological test data and equally clearly specified socially, clinically or theoretically significant non-test characteristics of the persons tested" (Sines, 1966, p. 133 as cited in Fowler, 1985).

Research on statistical prediction has shown that given the same information, statistical prediction is more accurate than clinical prediction (Harris, 1987; Hofer, 1985). Actuarially based programs

have the advantage of incorporating a wide pool of empirical knowledge which leads to more representative clinical decisions (Troutman, 1985). Most interpretive systems, however, are not totally actuarially based, and most rely to a some degree on expert interpretations (Butcher et al, 1985; Harris, 1987). Validity is not an issue with actuarial programs; rather it is the generalizability of the system to populations other than that upon which the system was based which is its major limitation.

Interpretive programs as a whole have the potential to provide useful quantitative assistance to the practitioner. The reliability of interpretations is guaranteed, for barring system failures, the system will consistently generate the same report if identical test results are entered into the program each time (Burke & Normand, 1987; Kramer, 1988; Space, 1981; Vale & Keller, 1987). Allowing rapid access to extensive information, such programs function as archival memory banks of expert clinical experience and empirical knowledge.

Guidance and Counseling Programs. School psychologists involved in career counseling may find computer resources particularly useful. Available for many age groups, career information and guidance systems are found in public schools, colleges, libraries, employment offices, and private agencies to facilitate career decisions through assessment of values, skills and interests.

A more controversial use of computers in the mental health

field is in the provision of therapy. Troutman (1985), in a national survey of school psychologists in the United States, found that computerized counselling was the least desirable of computer applications. Computers were viewed as "dehumanizing" and impersonal, increasing the distance between client and counselor (Troutman, 1985). Many issues must be resolved before computerized counseling becomes a recognized means of intervention (Reynolds, McNamara, Marion, & Tobin, 1985). It is unclear which theoretical perspectives and methods are best suited to automation (Reynolds et al, 1985). Early attempts to model free form psychotherapy in the 1960s failed, although more recent automated cognitive behavioral approaches have shown some success (for review see Erdman et al, 1985). Further evaluative research on the utility of automated therapies is clearly warranted.

Part of the counseling assessment process involves time consuming client interviews. Lengthy structured histories, special topics interviews, behavior assessment and psychiatric interviews have been automated and their results found to be more reliable, more comprehensive and cost effective (Space, 1981). Erdman et al (1981) cite 19 studies involving computer interviews with psychiatric patients and report the interviews were reliable, accurate and highly acceptable to patients. They conclude that the concern that computers are too impersonal is refuted (Erdman et al, 1981).

Faced with this confusing array of software for a wide range of professional purposes, where does the school psychologist turn for advice on evaluating and using the available programs? Are there any guidelines?

1.2 Guidelines

Computerized psychological applications are not new phenomena, for scoring and interpretive programs have been in use since the 1950s and 1960s (Fowler & Butcher, 1987; Moreland, 1987b). Yet prior to 1986, guidelines specific to computerized testing were scattered among general professional standards, with the exception of a short policy statement addressing service providers' responsibilities regarding automated scoring and interpretation practices (Newman, 1966). Ethical principles of psychologists (American Psychological Association [APA], 1977, 1981) refers briefly to service provider's responsibilities to ensure the validity of automated interpretive services (Ethical Principle [EP] 8e). Standards for providers of psychological services (APA, 1977) addressed the use of computer data banks for record keeping purposes (Standard 2.3.5). Guidance regarding test development and publication of computerized assessment instruments are provided in Standards for educational and psychological tests (APA, American Education Research Association [AERA] & National Council on Measurement in Evaluation [NCME], 1985), in Standards 3.16, 5.4, 5.11 and 6.13. "Principles for professional ethics" (National Association of School Psychologists [NASP], 1985)

addressed computer use in the areas of informed consent (Principle [PPE] IV-C.3), copyright violations (PPE IV-C.2), test security (PPE IV-C.1), and professional responsibility for services (PPE IV-C.4-7). Many standards, however, were subsumed under those for conventional assessment and professional practice, which left the interpretation of their implications for computerized applications to the practitioner.

The degree to which professional school psychologists use these documents for guidance regarding automated psychological services was investigated in an American national survey by Jacob and Brantley (1987). Of the 268 psychologists who responded, 37% had consulted one of Principles for professional ethics (NASP, 1985), Standards for educational and psychological tests (APA, AERA & NCME, 1985), and Ethical principles of psychologists (APA, 1977, 1981). Only 10% percent of respondents felt these documents were useful as reminders and most expressed the need for more specific guidance regarding responsible implementation of computer applications in school psychology.

In response to the widespread concerns arising from the increasing use and potential misuse of computerized assessment tools and the confusion and uncertainty over acceptable professional practice, a number of authors and state psychological associations formulated their own guidelines (Colorado Psychological Association, 1982; Hofer & Bersoff, 1983; Hofer & Green, 1985; Jacob & Brantley, 1987; Merrell, 1985; Ohio Psychological Association, 1983; Roid & Gorsuch, 1984; Sampson,

1986; Sampson & Pyle, 1983; Walker & Myrick, 1985; Zachary & Pope, 1984). In 1986, the American Psychological Association published professional guidelines solely targeting computerized tests and interpretations. Developed by the Committee on Professional Standards (COPS) and the Committee on Psychological Tests and Assessment (CPTA) of the American Psychological Association, the American Psychological Association guidelines for computer-based tests and interpretations (COPS & CPTA, 1986), referred to here on in as CBTI Guidelines, were intended to incorporate and clarify the implications of previously established standards as they apply to computerized testing and interpretations. Their function is advisory rather than technical in nature, delineating the responsibilities of both developers, publishers and users and practices essential to protect clients' interests. Their publication is indeed timely and vital to the profession. Although not law, standards and guidelines play significant roles in legal actions concerning professional negligence and malpractice (Hofer, 1985). The comprehensiveness and utility of the CBTI Guidelines to professionals has yet to be evaluated.

Recent Canadian ethical principles and standards have been embodied in the Canadian code of ethics for psychologists (Canadian Psychological Association [CPA], 1988). They are similar to pre-1986 American regulations and standards in that they make no specific reference to computer usage in psychology.

1.3 Ethical and Legal Issues Concerning Computer Applications in School Psychology

Computer applications have great potential for school psychological services, yet their effectiveness remains highly dependent on the ways in which they are employed. Indeed, computer usage in the psychological profession as a whole has precipitated serious ethical and legal concerns surrounding record keeping, test administration, program quality, misuse of interpretive programs and the growing population of unqualified users. The American national survey by Jacob and Brantley (1987) mentioned earlier is the only research to date investigating the prevalence of such problems in school psychology. Thirty-two percent of their 268 respondents indicated that at least one ethical-legal problem had occurred in service areas and 74% felt these were likely to occur in the future. What are these issues?

1.3.1 Record Keeping Issues

Automation of records presents both old and new ethical concerns for school psychologists. Record security is of prime concern for both traditional paper and computerized records. Psychologists bear the responsibility for maintaining client confidentiality and must secure client records against unauthorized access and use, regardless of its form [EP 5c (APA, 1981); PPE IV-C.1 (NASP, 1985); "Purpose", (COPS & CPTA, 1986); Standard 1-32, 33 (CPA, 1988)]. Some authors believe that the potential vulnerability of records to unauthorized access is

greatly increased with automation, especially in multiple location systems where greater numbers of individuals can access the system (Sampson & Pyle, 1983). Others argue that the increased complexity in accessing computer files will afford them greater security than paper files (Burke & Normand, 1987; Morgan & Crawford, 1974; Wolkon & Lyon, 1986). Jacob and Brantley (1987) found a small number (3%) of school psychologists surveyed reported unauthorized access to computerized records as having occurred in their workplace, yet 35% anticipated this to be a future problem. It is likely that the computerization of records adds no further risk of unauthorized access, but it is readily apparent that new procedures and controls are necessary to maintain security and confidentiality.

Practitioners undoubtedly must be aware of threats to computerized record security and take appropriate preventative steps to ensure confidentiality of the information and the privacy of the test taker. Averting unauthorized access can be accomplished through physical security (locking) of equipment and data media (Eberlein, 1990; Merrell, 1985; Wolkon & Lyon, 1986), and access guarding, which limits program use to authorized personnel with access codes and passwords (Eberlein, 1990; Jacob & Brantley, 1987; Sampson & Pyle, 1983). In addition, access to sensitive data can be limited to authorized personnel through multiple access points within a record (Reynolds et al, 1985; Sampson, 1983). It is also common practice among testing companies to use identification numbers for clients (Hofer, 1985; Merrell,

1985; Reynolds et al, 1985; Sampson & Pyle, 1983, Zachary & Pope, 1984). Encryption programs are also useful to ensure the security of data storage and the transmittal of information is limited to authorized users (Eberlein, 1990).

These security measures are not foolproof, for passwords and procedures may be stolen, thus, computerized files should be erased when no longer needed for the provision of services (Merrell, 1985; Sampson & Pyle, 1983). There is greater potential, however, to keep records longer than required given the greatly reduced storage space they require (Jacob & Brantley, 1987; Sampson & Pyle, 1983). Such indiscriminate storage increases the risk of potential misuse of obsolete data for current decisions regarding a client (Sampson & Pyle, 1983; Zachary & Pope, 1984), which violates ethical principles regarding storage and disposal of client records and misuse of reports [EP 5e, 8d & 8e, (APA, 1981); Standard 1-32, 33 (CPA, 1988)]. Purging of records no longer of value for service provision is essential to avoid such misuse.

Practitioners must also ensure that records are accurate and complete by ensuring data integrity is not lost in the event of equipment failures (Jacob & Brantley, 1987) or environmental hazards. Such threats as power failures, surges, temperature and humidity fluctuations, static electricity, air contaminants, and magnetic fields can result in data loss, program errors, and serious hardware damage (Cronin, 1986). The practitioner must take steps to avoid such catastrophes by using preventative measures

against environmental threats and by backing up data and records. Routine equipment maintenance is critical to avoid equipment failure.

A final issue surrounding computerized records involves the use of record contents for purposes for which no informed consent was obtained. Computer storage and rapid data processing features are particularly appealing (and tempting) for the development of local norms and the facilitation of complex research not easily feasible without such technology (Zachary & Pope, 1984). Without informed consent from the clients whose records are involved, such uses constitute a violation of research ethics [Principle E (APA, 1982)].

1.3.2 Computer Test Administration Issues

Many companies utilize the psychometric and normative data from conventional standardized tests in the automated test versions. Yet, are computerized administrations of psychological tests comparable to those of conventional test versions? Are the same constructs being measured and the same results obtained? Herein lies the primary issue in computerized administration of psychological tests. Without evidence of equivalency of results between the two administration modes, or measures taken to correct nonequivalent results should they result, the norms, cutting scores, reliability and validity data from conventional tests may not be applicable to the computerized version (COPS & CPTA, 1986). Unfortunately, many companies assume equivalency without its

empirical demonstration (Butcher et al, 1985; Duthie, 1984; Farrell, 1984; Hofer & Green, 1985).

According to CBTI Guidelines (COPS & CPTA, 1986), the responsibility for the determination of equivalency lies primarily with the test developer. The ultimate responsibility for the appropriate use of the test, however, lies with the test user. Awareness of the existence of equivalency data, its type, and the equating formula used, if needed, is essential for clinicians to judge the suitability of the computerized version for a particular client (Hofer & Green, 1985). High correlations between the results of the two administration modes is insufficient evidence for the justification of generalizing conventional norms to the computerized version. Nonequivalence may occur as a shift in scores, a metric change in score distribution or a change in rank ordering of test takers. Although transformations applied to scores can correct nonequivalence in the first two cases, the latter warrants restandardization and validation of the computerized version (Hofer & Green, 1985).

Automation of certain item types and contents have been demonstrated to change test results significantly. Research reviews find altered results in computerized administration of traditional tests with speeded items, items requiring matching responses, adjective checklists and explicit "cannot say" options (Hofer, 1985; Jackson, 1985; Moreland, 1985a, 1987b). Reviews of output from interviews addressing sensitive or embarrassing topics concluded clients tended to be more willing to deal honestly with

sensitive material when interacting with a computer than with a human interview or on a paper and pencil questionnaire (Burke & Normand, 1987; Erdman et al, 1985; Hofer & Green, 1985; Moreland, 1985a; Reynolds et al, 1985). Equivalency research, as of yet, is sparse and inconsistent and has not comprehensively identified all item types, nor item content which may not be equivalent when automated (Hofer, 1985; Moreland, 1985a, 1987b).

The practitioner must be alert to, evaluate the effects of, and take measures to avoid a number of factors associated with automation which may alter their clients' performance on a computer-administered test or interview. The most apparent factors are the test takers' familiarity and experience with computers, equipment functioning and deviations from the normative equipment.

The test taker unfamiliar with computers is likely at a disadvantage in comparison to those more experienced with the technology. The inexperienced examinee may become overwhelmed or intimidated by the computer, focus more on the use of the equipment rather than on the questions at hand, experience anxiety stemming from lack of expertise or fear of damaging equipment (Kenneth, 1988), and anxiety already present may escalate (Sampson & Pyle, 1983). Indeed, clients experiencing substantial emotional difficulties may be incapable of interacting with a computer (Sampson, 1986). If users are insecure in their ability to use a system, the resultant anxiety will negatively affect performance (Shneiderman, 1980) and compromise the validity of test results.

Hofer and Green (1985) see computer familiarity as a modern

bias against groups less comfortable with computers particularly when operating procedures are complicated. Although significant differences in performance on computerized tests by different groups such as ethnicity, gender, age and socioeconomic status may result, group membership per se may not be the direct explanation (Hofer & Green, 1985). Rather unfamiliarity with computers is likely the underlying cause of the nonequivalence of scores and its correction may be possible through the provision of adequate training and practice prior to test administration (Hofer, 1985). Burke and Normand (1987)'s review of such research notes that the performance of anxious elderly clients was significantly improved with a one hour training period in comparison with those who did not receive training. The importance of the provision of adequate training and practice prior to computerized test administration cannot be understated.

Client attitudes towards computers and computerized testing can significantly impact assessment results. Reviews of empirical research on client reactions to computerized test administration have found overall positive results, noting a tendency for the young to be more positive and the elderly negative (Burke & Normand, 1987; Erdman et al, 1985; Hofer, 1985; Moreland, 1985a; Romanczyk, 1986). Lawton and Gerschner (1982) reviewed the literature on children's attitudes towards computers and computerized instruction, noting that in general children appear to enjoy working with computers. Unfortunately, computer acceptability in most studies was measured as an afterthought,

using idiosyncratic, psychometrically unsound measures, which makes these conclusions tentative at best.

Problems with the design and functioning of the equipment also can seriously affect test results (Duthie, 1984; Hofer, 1985; Jacob & Brantley, 1987; Skinner & Pakula, 1986; Thomas, 1984). Screens vary in their physical size, type size, characters per line, background illumination, colour etc., as do keyboards in their ease, number and size of exposed keys (Sampson, 1986; Thomas, 1984). Such equipment variability affects the ease of reading and responding on computers which may unduly effect results. Malfunctioning equipment is an obvious problem which impacts the integrity of the data, comfort of the client, and validity of the administration. CBTI Guidelines acknowledge the effect these equipment variations and potential difficulties can have on the test results and specify that any major departures from the normative equipment must be shown to have no appreciable effect on the scores and documented in the manual before the administration may be considered acceptable (COPS & CPTA, 1986). Test users shoulder the responsibility of assuring properly functioning, glare free standardized equipment, and comfortable testing conditions to eliminate these potential confounds. Close monitoring of the testing session is warranted to guard against equipment failures and clarify any questions.

Further research efforts are clearly needed to determine the specific client characteristics of those most (and least) receptive to computerized assessment. Indeed, prior negative

experiences with computers such as incorrect billing, bank machine confusions or personal computer failures, may result in unfavourable attitudes towards computer, or a genuine computer fear -- or cyberphobia (Duthie, 1984). Although in general, it appears that most children and adult clients view automated test administration favourably, the clinician must still evaluate the appropriateness of computer test administration on a case-by-case basis in light of the client's particular personality, background experiences and preferences.

1.3.3 Issues in Program Quality

Because psychological testing can play an important role in assessment decisions regarding diagnosis, intervention, placement, and employment of individuals, it must meet acceptable quality standards to protect the clients' best interests. Quality control of assessment programs is indeed a serious issue. Much variability exists in the development and quality of computerized test programs available (Burke & Normand, 1987; Walker & Myrick, 1985; Zachary & Pope, 1984). The output of a program clearly is limited by the quality of the data behind its development. Increasing numbers of programs are developed by novice or unqualified test developers marketing programs of limited perspective, and are often inappropriately normed, rely on the psychometrics of the conventional test form and/or are based on inaccurate, inadequate or outdated research (Butcher, 1987b; Eyde & Kowal, 1987). In addition, many testing programs are based on

conventional tests for which no validity data exists (Fowler, 1985; Moreland, 1985b, 1987a; Skinner & Pakula, 1986), and thus are of no professional value. Farrell (1984) notes that no clear criteria exist for determining when a computer test program is ready to be marketed and points to the desperate need for the establishment of quality and marketing standards (Butcher, 1987c).

Programs for scoring, administration and interpretation must be carefully and repeatedly examined for errors which undermine their accuracy, reliability and validity, both before and after their marketing. Errors are easy to make yet difficult to locate given the complexity of programming. They can occur at the item, scale, aggregation of scales, or algorithm level (Most, 1987). A program containing logic or syntax errors still may run and because of computers's reliability, errors will be replicated faithfully (Farrell, 1984; Most, 1987). This contributes to the error of the test and thus decreases its accuracy, for the errors are no longer random as assumed by psychometric theory (Most, 1987). Independent critical review is therefore essential to evaluate the thoroughness and accuracy of a system (Hofer, 1985) and ensure high quality programs.

A major issue in reviewing software is the conflict of interest between the test reviewers' obligation to review the program and the publishers' proprietary rights to their algorithms (Hofer, 1985; Matarazzo, 1985). Publishers are reluctant to release critical information regarding software development, such as the decision rules and interpretive statements comprising the

program's algorithm, to prevent the illegal marketing of their products by others (Kramer, 1988; Skinner & Pakula, 1986; Zachary & Pope, 1984). This conflict must be resolved to prevent concealment of inadequate test development under the guise of test information protection rights (Meier & Geiger, 1986). The CBTI Guidelines (COPS & CBTA, 19876) compromise in this issue, suggesting that the program manual provide users with adequate and reasonable access to sufficient information. When it is necessary to reveal trade secrets, a written agreement of nondisclosure which carefully delineates the nature of the secret information and procedures used to protect the proprietary interests of the test author, software author and the test publisher, should be signed (COPS & CPTA, 1986). Full disclosure of all decision rules and algorithms, then, is not deemed essential.

Programs can be limited by numerous factors and cooperation will clearly be needed between reviewers, test authors and publishers in the adequate review of a program. In light of the proliferation and variable quality of testing software, quality standards must be developed and scholarly review of testing software mandatory. Until this is standard practice, the professional must remain critically evaluative and alert to quality issues and limit program usage to those which are professionally reviewed as acceptable. Buros' Mental Measurements Yearbook and peer-refereed journals are excellent sources of reviews.

1.3.4 Interpretive Program Issues

Concerns have been raised which specifically pertain to computer-generated reports. The output from interpretive programs is often produced in the form of a narrative psychological report. Coupled with the view that computerized administration and scoring provides a more unbiased assessment, these reports carry with them an "aura of objectivity" (Matarazzo, 1983, 1986) or "illusion of credibility" (Romancyzk, 1986; Skinner & Pakula, 1986), which deters practitioners from carefully evaluating their content. The danger thus presented is that of users unquestioningly accepting the quality and validity of the program and interpretations (Butcher, 1987c; Zachary & Pope, 1984). Fourteen percent of school psychologists responding to Jacob and Brantley's (1987) survey indicated the use of interpretative software without its critical evaluation for accuracy and validity had occurred in their workplace. Interpretive reports, however, are not, and were never intended to be ends in themselves for technological limitations and program restrictions limit their utility.

Automated tests and interpretive programs are still in their infancy in development. At present, the computer generated report is rarely individualized to a specific client. The interpretive program from which reports are composed deal with commonalities of targeted groups and provide summaries of "most likely" or "modal" correlates for an individual (Butcher, 1987b; Eyde & Kowal, 1986; Fowler & Butcher, 1986) and as such are very general. Hofer (1985) notes that although demographic variables aid the computer

in selecting the most appropriate base rates and norms, it is virtually impossible to include every relevant characteristic or special circumstance of a client into a program. Thus, the computer remains "blind" to pertinent individual factors which may significantly impact the validity of interpretations (Hofer, 1985; Matarazzo, 1985). It is also impossible to program every possible score pattern or all possible interpretations of score patterns (McCullough & Wenck, 1984). Programs are only capable of interpreting profiles similar to those included in their algorithms, and thus, interpretations may be inaccurate, incomplete, or misleading (Ryabick, Olson & Kleim, 1984).

Few computer-based interpretation programs provide a selection of conceivable yet distinct interpretations for one test profile by the same author or a variety of authors, yet two identical profiles of two distinct individuals would rarely receive analogous interpretations if analyzed traditionally (Matarazzo, 1986). Although current programs may administer, score and interpret a number of different tests, only a minority to date are designed to integrate the results of a battery of tests. Basing interpretations, conclusions, and recommendations solely on one test alone or even on a number of tests viewed in isolation hardly constitutes a responsible professional assessment, yet is a very real danger. As noted in CBTI Guidelines (COPS & CPTA, 1986), it is the responsibility of the clinician to examine the interpretations in light of other relevant background information about the client, including history, referral information,

emotional factors, behavioral observations, and handicapping conditions. The fact remains that good clinicians surpass the computer in their increased flexibility in relating these important variables to test results.

Technology need not be discarded in favour of traditional procedure, however, for well developed interpretive programs summarize the best statistical interpretations or interpretive experience of experts in the field (Hofer, 1985). The computer stores research information, applies appropriate norms, furnishes "expert" interpretations of and/or empirical findings regarding particular score patterns, displays the frequency with which patterns are shown in the normative sample and provides base rate information, all of which aid the clinician in evaluating and integrating the information with other knowledge of the testee (Butcher, 1987c; Roid, 1985). Interpretive programs serve as a source of information rather than the final interpretation or diagnosis (Matarazzo, 1986; McCullough & Wenck, 1984; Meier & Geiger, 1986; Thomas, 1984; Walker & Myrick, 1985) providing the clinician with a collection of possible hypotheses to consider. Modification of the output from a "report" to a list format may lessen the likelihood of its being unquestioningly accepted and encourage the responsible and ethical integration of the report hypotheses into a report (Hofer, 1985; Ryabik et al, 1984; Walker & Myrick, 1987; Zachary & Pope, 1984).

1.3.5 User Issues

Misuse of psychological tests has always been of professional concern. The automation of assessment tools is felt to increase this risk by removing the "natural deterrent" of complicated scoring and interpretation procedures often found in conventional tools (Reynolds et al, 1985; Sampson, 1986). Indeed, one need only know the mechanics of computer operations to run a program (Schmidt, 1987) yet background professional knowledge is essential to evaluate the program itself, the validity of its administration and interpretations for any one client. Programs are clearly vulnerable to misuse when in uninformed hands.

The CBTI Guidelines define requisite user qualifications as: knowledge of psychological measurement; background in the history of the test/inventories used; experience in the use of the test and the ability to interpret it without computer aid; familiarity with research on the test; and knowledge of the areas of intended applications (COPS & CPTA, 1986). Professional standards and guidelines, however, do not specify the minimal training or level of competence required to be a qualified user. It is left to the discretion of practitioners to use the technology only when it falls within the bounds of their competencies. Thus, the stage is set for violations of ethical professional standards.

The highly visible marketing techniques and the ease of software use, however, make computerized assessment programs especially attractive to individuals lacking the requisite knowledge and expertise to appropriately use them (Eyde & Kowal,

1987; Zachary & Pope, 1984). Zachary and Pope (1984) classify misusers into two categories: the unqualified, "... who lack the appropriate training and background to use and interpret any psychological tests correctly"; and the unsophisticated, "who, while they may have a general background in measurement theory and testing, are unsophisticated or inadequately informed about a particular test...specialized content area" (p. 153).

Given the limitations of computer test software and the fundamental importance of the evaluation of its rationale, psychometric properties and output in light of any one client, the risk of its abuse by unsophisticated and unqualified users is readily apparent. Indeed, 12% of respondents in Jacob and Brantley's (1987) survey indicated that misuse of interpretive reports by unsophisticated users had occurred in their service area. Misusers may use poorly validated tests, use tests for individuals, settings or purposes other than those for which they were intended, may be unable to integrate actuarial and clinical data and may be insensitive to relevant situational variables such as distractions or handicaps. Misdiagnosis, misinterpretation and/or inappropriate recommendations may result (Jacob & Brantley, 1986, 1987, 1989; Meier & Geiger, 1986; Zachary & Pope, 1984). In addition, misusers may purchase and use a restricted selection of computerized tests, rather than matching the clients' needs to tests chosen from a broader collection (Matarazzo, 1985). The casual administration of the software because of its availability and convenience, not its relevance and applicability to clients

needs, is an unwarranted invasion of privacy [PPE IV-B.2 (NASP, 1985)] (Zachary & Pope, 1984). Most importantly, uninformed users may be unaware that the computerized test is but one part of a full psychological assessment (Matarazzo, 1986). The importance of limiting access of these materials to those qualified and competent to use them appropriately is critical to protect the integrity of professional assessment.

Test publishers and distributors attempt to implement security measures to avoid unauthorized access to conventional and computerized psychological test materials through routine screening of buyers. Eyde and Kowal (1987) note that major test software distributors in the United States usually require that users have professional membership in a psychological, psychiatric or comparable association bound by a code of ethics addressing delivery of services. The variability in backgrounds and training of these members, however, provides no guarantee of adequate training with regards to psychological testing (Zachary & Pope, 1984). The provision to software distributors of more adequate proof of qualifications beyond professional membership such as transcripts and references certifying their qualifications is essential (Eyde & Kowal, 1987), yet the lack of clear user competence standards make the determination of "qualified user" difficult indeed. The Joint Committee on Testing Practices, sponsored by the American Psychological Association, the American Education and Research Association and the National Council on Measurement and Education, is addressing this issue in a task

force to determine minimum requirements of the software test user, regardless of profession (Eyde & Kowal, 1987).

Limiting access of software to qualified users is critical to avoid unauthorized test use, yet securing the test itself is difficult and is a serious professional concern. The ease by which the disks may be duplicated increases the possibility of a growing population of misusers. Because computer-administered tests require payment for a metered number of test administrations, as does conventional testing, and copy protection is easy to break, the temptation to inexpensively duplicate programs is great (Duthie, 1984). In Jacob and Brantley (1987)'s survey, illegal software copying was the ethical-legal problem cited as occurring in their service area by the largest percentage of respondents (19%). Psychologists are responsible for maintaining test security yet the once a program is copied, control over its authorized use is lost (Duthie, 1984). The potential for its misuse inevitably increases.

Software copying has legal as well as ethical ramifications. Computer software is considered a "literary work" in federal statutes. Although both Canadian and American copyright statutes allow for the duplication of programs for archival or equipment compatibility purposes, further copies constitute an infringement upon the copyright of the test author (Copyright Act, R.S., c. C-30, (Supp) 1988, s.i. 5(1)(i),(m); Copyrights, 17 USCS Sec 117, 1980). Further copyright infringement results from individuals developing their own automated assessment programs using test

questions and normative data without publishers' authorization (Butcher, 1987b; Jacob & Brantley, 1989).

1.4 Training

The implementation of tighter buyer screening procedures by test publishers and tight control over software security are important steps to reduce the risk of software misuse in (and outside of) the profession. An informed and educated professional community is also important in preventing computer misapplication (Pollock & Maenpaa, 1990). Addressing this serious issue at the level of professional training is a vital step in decreasing the population of misusers. School psychologists should be sufficiently trained to use technology critically and effectively and communicate its limitations to their clients. Even if they choose not to use the technology, an awareness of its limitations is important, for the likelihood of encountering the products of these programs in the files of their clients is probably quite high. Troutman (1985) noted 41% of school psychologists responding to her survey owned their own computer, the majority (70.5%) receiving most training through personal study, and 32.5% through college courses. In general, training of professionals and graduate students has not incorporated topics related to computer applications in their curricula (Meier & Geiger, 1986), although many authors point to its importance (Genshaft, 1984; Lowe, 1987; Masden, 1986; Meier & Geiger, 1986; Merrell, 1985; Reschly, 1984; Ryabik et al, 1985; Sampson, 1986; Sampson & Loesch, 1986).

Copeland and Miller (1985) surveyed American professional school psychologists to investigate their perceptions of present and future graduate school training needs for prospective school psychologists. Indeed, courses and experience in computer programming and computer assessment were deemed important future training topics.

The scope of training foci delineated in literature as essential for professional preparation in appropriate and ethical use of computer applications is summarized below:

i - basic computer literacy (Meier & Geiger, 1986; Sampson & Loesch, 1986)
ii - hands on experience with technology (Meier & Geiger, 1986)
iii - rationale for using computer application (Sampson, 1986; Sampson & Loesch, 1985)
iv - knowledge and experience with specific applications (Meier & Geiger, 1986; Sampson & Loesch, 1986; Sampson & Pyle, 1983)
v - direct supervised experiences with computerized instruments (Sampson & Loesch, 1985)
vi - knowledge of information sources - guidelines and reviews (Meier & Geiger, 1986)
vii - general test administration procedures (Masden, 1986; Ryabik, 1985; Sampson & Pyle, 1983)
viii - daily routine maintenance skills and recognition of equipment software problems and corrective steps (Masden, 1986)
ix - related ethical issues (Sampson & Loesch, 1985; Sampson & Pyle, 1983)
x - development of a skeptical and evaluative attitude towards the programs (Meier & Geiger, 1986)

Only one computer applications course has been described in the professional literature. Designed and implemented in a graduate clinical/counseling program at Pepperdine University (Lowe, 1987), the course incorporated many of the aforementioned training topics. Basic computer familiarity was considered an

integral course component. Specific training and hands on experience was provided not only with specific computer applications in psychology but in such "administrative" uses as word processing, data base management and graphics as well. Examination of the advantages and disadvantages of psychological technology, the related ethical, legal and professional issues and ways to successfully introduce technology into the workplace were also included. Given the gamut of applications available in psychology, Lowe (1987) stressed that much of the training could be incorporated directly into the curricula of existing program courses, reserving the "computer-literacy course" for addressing basic skills training and exploration of related issues.

Professionals in the field may have had little opportunity to achieve computer literacy and proficiency during the course of their employment (Sampson & Loesch, 1986) and as such are ill-prepared to responsibly evaluate and use technology in the provision of services. Indeed, 90% of OPA members responding to Pollock and Maenpaa's (1990) computer use survey desired additional information about computer applications in psychology, including kinds of programs available, performance of existing programs, ethical issues, how to use existing software and program development. Inservice and ongoing continuing education is critical to establish and maintain competency and broaden one's skill base. There is little doubt that training will become increasingly more important as rapid developments and innovative forms of testing that rely solely on computer administration and

scoring are devised (Meier & Geiger, 1986).

1.5 Purpose of the Current Study

Jacob and Brantley (1987)'s timely and important survey of school psychologists indicated high current and anticipated usage of computers and associated ethical-legal problems in the provision of school psychological services in the United States in 1985. Existing guidelines were deemed too general to be of use. Since their study was conducted, new CBTI Guidelines (COPS & CPTA, 1986) were published, but as of yet, their utility remains unassessed.

The present 1990 study replicated and expanded this survey using a Canadian sample of school psychologists. To what extent do school psychologists use computer applications? What is the prevalence of ethical-legal problems that have occurred in Canadian work settings? Have new ethical issues arisen? Are the existing guidelines, including the new CBTI Guidelines (COPS & CPTA, 1986) and the Canadian code of ethics for psychologists (CPA, 1988) available, consulted and found useful? In addition to these questions, in the absence of information regarding computer applications training needs, this study explored current levels of training in related topics and specific areas of need. The potential effects of demographic variables of age, gender, degree, years experience and caseload on current and anticipated computer use, level of training and training needs, and the occurrence of ethical-legal problems were examined.

CHAPTER TWO: METHOD

2.1 Materials

The questionnaire used in this study (Appendix A) was based on the survey developed by Jacob and Brantley (1987). Added questions and word changes made in the current survey are listed in Appendix B.

Demographic information about the respondents was elicited through multiple choice questions. Characteristics included province of residence, gender, age, current occupation(s), level of training in psychology, work setting, years of experience as a school psychologist, and caseload. Multiple choice questions were also used to assess current and anticipated use of computer applications in school psychology. These included: test administration, test scoring and interpretation, report writing, counseling, statistical analysis, data storage, word processing, accountability, program writing, database information services, and electronic communication networks. An "other" category was included for additional applications specified by the respondent. Availability to and degree of usage of computers was also assessed.

The second section of the questionnaire focussed on training in computer applications. Multiple choice questions addressed type of training and when during professional development it was received. Respondents were asked to indicate the specific areas in

which training was received and areas in which they desired training. The list of training areas included was generated from the literature in computer applications.

The final section of the survey evaluated the extent of, perceived likelihood of, and degree of professional concern related to about the occurrence of potential ethical-legal problems related to computer applications in school psychology. Twelve possible ethical-legal problems were delineated. Four questions addressed risks associated with computerized record keeping including obsolete data misuse, loss of records, unauthorized record access and use of computerized records without consent. Five questions examined computerized test-administration and interpretation issues including inadequate consideration of adverse test performance factors, indiscriminant test administration, inadequate software evaluation, unsophisticated users and report misuse. One question dealt with inadequate test development by the user and the final questions addressed copyright violations. Problems identified were either included in Jacob and Brantley (1987)'s survey, had been identified through open-ended questions in their study, or had been mentioned in the computer-applications literature.

Respondents were asked to indicate whether or not each problem had occurred in their service area and whether they felt there was a strong likelihood of it occurring (or recurring) in the future. In addition, the respondents' level of concern regarding the professional risks involved with each problem was

also elicited on a 4 point scale (blank = no opinion, 0 = no concern, 1 = somewhat concerned, 2 = very concerned). Open ended questions were included to allow respondents to describe any addition ethical-legal problems that have arisen regarding computers, and the ways in which any problems have been resolved in their service area.

Finally, respondents were asked to indicate whether they had access to, and had consulted various professional documents for guidance in using computer-applications. The document list included: Guidelines for computer-based tests and interpretations (COPS & CPTA, 1986), Canadian code of ethics for psychologists, (CPA, 1988), Ethical principles of psychologists (APA, 1977; 1981), Standards for educational and psychological tests (APA, AERA & NCME, 1985), Standards for the providers of psychological services (APA, 1985), and "Principles of professional ethics" (NASP, 1985). The utility of these documents for guidance in computer-application use was assessed through an open-ended question.

2.2 Subjects and Procedure

All members of the Canadian Association of School Psychologists (CASP) listed in the 1990 membership directory as residing in Canada were selected for participation in the survey. An introductory letter explaining the survey's purpose, perceived usefulness to the school psychology field, and the voluntary nature of the survey, was sent along with a questionnaire to each

member in the summer of 1990 (Appendix C). A self-addressed stamped envelope was included to promote a higher return rate (Dillman, 1978). Two weeks after the initial mailing, each member was sent a reminder letter (Appendix C). The letter provided the member with a telephone number by which to request (collect) another questionnaire and envelope in the event the first mailing had not arrived or had inadvertently been misplaced.

From the 224 questionnaires mailed, a total of 158 were returned complete, yielding a return rate of 71%. Eleven (5%) were undelivered and returned to the investigators by the post office. For analyses purposes, only questionnaires received from currently practicing consultants and psychologists were used (N=146).

The number and distribution of school psychologists in the sample by province, the number returning the questionnaire and the return rate by province are shown in Table 1 in Appendix D. The overall distribution of returns by province closely approximated that of the Canadian CASP membership.

2.3 Data Analyses

Descriptive statistics were computed using the SPSS-X (SPSS Inc., 1988) FREQUENCY procedures on demographic variables, computer access, frequency of use and ownership, computer training sources and timing, general areas of computer training received and desired, current and anticipated use of specific computer applications and desire for training, past occurrence and anticipated future occurrence of ethical-legal problems, level of

concern regarding professional risks of such problems, and access to and consultation of professional documents. The Kruskal Wallis One Way Analysis of Variance (KWANOVA) (SPSS Inc., 1988) was employed to determine the association between the background characteristics of gender, age, level of psychological training, years of experience and caseload on the number of assessment and other (administrative and professional) computer applications currently used, anticipated to be used and desired for training, the number of areas in which training had been received and was currently wanted, and the number of ethical-legal problems reported to have occurred and anticipated to occur. The age categories of "less than 30 years" and 30-39 years were collapsed together due to the small sample number in the former group. Respondents whose degree was B.A. or "Other" (n=5) were not included in the analyses directly addressing degree effects because of inadequate sample size. A .05 level of significance was used for all comparisons.

CHAPTER THREE: RESULTS

3.1 Demographic Characteristics of the Sample

The present sample consisted of 62 males (43%) and 84 females (57%). Characteristics of the sample are presented in Table 2. The majority of respondents were from Ontario and Western Canada, held Masters degrees, were 30 years of age or older, worked in urban locations and carried a caseload of over 2,001 students. Respondents' years of experience as school consultants or psychologists were evenly distributed from five years or under to over twenty one years.

3.2 Use of Computers

Results of the survey indicated an overwhelming majority (95%) of respondents had access to computers. Those who did not have access to computers reported they would use one if access were available. Computers were owned primarily by schools/employers and by the respondents themselves as shown in Table 3. Most respondents reported their training came through personal study, with inservice and university or college courses reported by one third. Most reported training was received following the completion of their degrees.

Frequency of computer use is presented in Table 3. Seventy nine percent of respondents used a computer at least occasionally in their work, 38% used computers several times weekly, while 23%

use computers daily. Eight respondents spontaneously commented on the questionnaire that the lack of or insufficient number of computers and access time in the work setting were significant difficulties and frustrations.

Results of the survey indicated high current and anticipated use of computer applications by school psychologists, as shown in Table 4. Overall, three-quarters of the respondents reported currently using one or more of the listed applications in their work; 58% used one or more assessment applications while 71% used one or more administrative and professional applications. Heaviest current use was reported for word processing (61%), data storage/record keeping (47%), psychological report writing (36%) and statistical analysis (34%).

Many respondents not currently using computers in their work anticipated doing so in the future — 43% anticipated using applications related to assessment and administrative/professional purposes. Applications with highest current and anticipated use included word processing (77%), data storage/record keeping (66%), psychological report writing (57%), test scoring and verification (53%), statistical analysis (48%) and database information services (41%). Lowest current and anticipated use was reported for writing programs (18%), computer-assisted counseling and therapy (7%) and other unspecified applications (2%). No respondents currently used counseling/therapy applications.

No significant associations were noted between the background characteristics of gender, age, psychological degree, years of

experience, or caseload and the number of assessment and administrative/professional applications currently used and anticipated to be used.

3.3 Training

More than two thirds of all respondents indicated receiving some training in computer skills, while 88% desired training. A significant difference in the number of areas in which training had been received was evident between groups holding doctorates and masters degrees. Those with Ph.D.'s reported having received training in more general areas than respondents with Masters degrees ($X^2_{(1)} = 6.2640$, $p < .01$). Other background characteristics of age, gender, years experience and caseload were not significantly related to the number of areas in which training was received.

Overall, most training obtained by respondents included the areas of basic computer literacy skills, hands on experience with technology and common operational procedures of software packages, as shown in Table 5. The majority of respondents reported having no training in the critical evaluation of software, limitations of software, informational sources for software reviews and professional guidelines, and related ethical issues. These were areas in which most respondents (47% or greater) desired training, while one third of the sample wanted hands on experience with the technology and instruction in common operational procedures of software packages. A significant difference was found between

males and females with respect to the number of areas in which training was desired, with females desiring training in more areas than males ($X^2_{(1)}= 4.5977$, $p<.02$). Age, degree, years of experience and caseload were not significantly associated with the number of training areas desired.

Over half the respondents (57%) indicated a desire for training in at least one computer application: over one third wanted specific training in one or more assessment applications, while half the respondents desired training in one or more administrative and professional applications. The percentage of respondents desiring training for each application is listed in Table 4. Respondents' level of training in psychology had a significant effect on the number of specific assessment applications in which training was desired, with respondents holding Masters degrees desiring training in more assessment applications than those holding Ph.D.'s ($X^2_{(1)}= 4.3423$, $p<.04$). No significant association was obtained between respondents' gender, age, years of experience and caseload on the number of assessment or administrative/ professional applications in which training was desired.

3.4 Ethical-Legal Problems

Thirty-nine percent of respondents reported that one or more of the twelve ethical-legal problems associated with computer use in school psychology listed in the questionnaire had occurred in their service area. As indicated in Table 6, the problem cited by

the largest percentage of respondents was misuse of computerized test interpretation programs by unsophisticated users (20%), followed by use of scoring and interpretation programs without their critical evaluation for accuracy, reliability and validity (19%), use of computer-generated reports by schools or unqualified persons (17%), and illegal copying of software (14%). Respondents indicated that remaining problems listed on the survey had also occurred in some service areas but to a much lesser degree (less than 7%). Gender and level of psychological training effects were noted on the number of ethical-legal problems reported. Males reported significantly more occurrences of ethical-legal problems ($X^2_{(1)}$=4.6422, p<.03) in comparison with females, as did respondents holding Ph.D.'s ($X^2_{(1)}$ = 3.8520, p<.05) in comparison with those holding Masters degrees. No differences were noted with respect to age, years of experience and caseload and the number of ethical-legal problems reported as having occurred.

The majority of respondents (77%) felt there was a strong likelihood of one or more problems occurring in their service areas in the future. For each problem listed, at least one-third of respondents anticipated it would probably occur in the future. The problems anticipated by the most respondents to occur in the future were: unauthorized access to computerized records (47%); misuse of computerized interpretation programs by unsophisticated users (46%); failure to ensure results are unaffected by anxiety, computer familiarity or equipment malfunction (43%); use of scoring and interpretation software without critically evaluating

accuracy, reliability and validity (43%); storage of nonessential or outdated information (42%); use of computerized reports by unqualified persons (41%) and illegal copying of software (41%). No significant differences in the number of anticipated problems were found in groups differing in age, gender, degree, years of experience or caseload.

Respondents were also asked to rate their level of concern regarding the professional risk involved with each problem. For each problem detailed, 60% or more of respondents indicated they were somewhat concerned or very concerned about the risks involved (see Table 6), with the exception of computerization of existing tests without test producer's permission (46%). Those problems which concerned the greatest percentage of respondents were: use of interpretive programs by unsophisticated users (86%), use of scoring and interpretive programs without critical evaluation of accuracy, reliability and validity (83%) and use of computer-generated reports by unqualified users (81%). Comments reiterating concerns regarding overreliance on interpretations without their critical evaluation for accuracy and validity in light of other information known about the client were spontaneously written on the questionnaire by fourteen respondents.

Respondents were asked to note any additional ethical-legal problems arising from computer use in their service area which were not detailed in the survey and any steps taken to resolve such problems. Ethical-legal problems identified included: computer viruses affecting program and data integrity; use of

outdated programs; confidentiality violation risks of report storage on shared hard disks; indiscriminant distribution of a computer generated report; key entry errors; and accessibility of on-screen data by casual observers. Strategies implemented to resolve problems related to computer-use included: the establishment of committees in student services to address ethical and research issues through policy development; inservice training prior to use of specific applications; restriction of computer access to authorized personnel; use of passwords and encryption procedures for authorized access to computer files; deletion of report files once hard paper copies were generated; filing of hard copies to avoid data loss; and use of virus detection programs to screen home-use disks.

3.5 Use and Helpfulness of Existing Guidelines

Respondents were asked to indicate whether the six professional documents listed in the questionnaire were available in their service area and if they had consulted them for guidance in computer use. Almost one-third (29%) of respondents failed to indicate consistently the accessibility of each of the six documents to them. Results from those who answered this question indicated that 62% had consulted one or more of the documents. As shown in Table 7, 53% had consulted The Canadian code of ethics for psychologists (CPA, 1988), 40% had consulted Ethical principles of psychologists (APA, 1977; 1981), and 33% had consulted Standards for educational and psychological tests (APA,

AERA & NCME, 1985). Only 15% had consulted the CBTI Guidelines (COPS & CPTA, 1986), the majority of respondents reporting no access to this document (51%). Overall, at least half of respondents answering this question indicated they had access to these documents, the exception being the CBTI Guidelines (COPS & CPTA, 1986), to which only 24% indicated access.

Ten percent of the sample (n=15) indicated the documents were generally helpful for sensitizing psychologists to potential ethical problems. Only three respondents (2%) specifically indicated any one document to be of use: the CBTI Guidelines (COPS & CPTA, 1986) was the document mentioned.

3.6 Summary of Results

Results of the current survey indicate respondents reported high current and anticipated use of computer applications especially in word processing, data storage/record keeping, psychological report writing, test scoring and verification, statistical analysis, and database information services. Computer-assisted counseling was the application least used and anticipated to be used in the future. Although many respondents indicated having some degree of training in computers, the majority (88%) desired further training, particularly in topics related to computer applications. Over half of the respondents wanted training in a specific application.

A high occurrence of ethical-legal problems (39%) occurring in the work setting was reported by respondents. All problems

listed had occurred to some extent and a high percentage of respondents (77%) felt there was a strong likelihood of one or more of the problems occurring in the future. High professional concern regarding these problems was expressed. Many respondents had consulted one or more professional documents for guidance in computer use (62%), yet only 15% had consulted the CBTI Guidelines (COPS & CPTA, 1986). Two percent of respondents found these guidelines useful.

CHAPTER FOUR: DISCUSSION

This survey represents the first national study investigating the extent of computer use among Canadian school psychologists, the range and extent of ethical-legal problems associated with computer applications occurring in their service areas and practitioners' current level of and desired training in computers. A comparison of the results obtained in the current survey with those from a similar survey conducted in 1985 by Jacob and Brantley (1987) is warranted to determine whether Canadian school psychologists use computers to the same extent, report similar levels of ethical-legal problem occurrences and share similar professional concerns with their American counterparts.

4.1 Limitations of the Survey

This survey was based on a limited sample that may or may not be typical of Canadian school psychologists in general, as practitioners responding to the survey were restricted to the Canadian Association of School Psychologists. The membership of this recently formed organization was primarily based in Ontario and the Western provinces at the time of the study. In addition, it is likely that respondents not currently using computers are underrepresented in the survey, as they were probably less interested in the topic.

4.2 Extent of Computer Usage

Results of this survey indicated computers were available to virtually all practitioners, either in the home or work setting, and over three quarters of respondents used computers in some capacity at least occasionally in their work, a finding similar to that of Jacob and Brantley (1987)'s overall sample. Their sample, however, was composed of two groups: one of randomly selected members of the National Association of School Psychologists (NASP); and one composed of NASP members who received the newsletter of the Committee on Computers and Technological Applications in School Psychology (CTASP), a high computer interest group. The current sample is most comparable to the former group. Jacob and Brantley (1987) found half of this sample did not use computers at all which suggests that the present Canadian sample reported substantially more computer use in 1990 than did the American sample in 1985.

Overall current and anticipated use of applications was highest for administrative applications of word processing and record keeping and for assessment applications of test scoring and verification and psychological report writing. Computer use, therefore, was not restricted primarily to administrative tasks or research. There is clearly a positive interest and trend toward the incorporation of computer technology into the work setting, particularly for the most time consuming of professional responsibilities -- test scoring, report writing and typing, and record-keeping. Less interest or more resistance to computer-

administered counseling was evident and not surprising given that this is the most controversial and least well developed computer application in the field (Reynolds et al, 1985).

4.3 Training

Many respondents indicated receiving some degree of training in computers, primarily in the area of basic computer literacy. The finding that respondents with doctorates reported training in more computer areas than did those with masters degrees is to be expected, given the greater training requirements of the doctorate degree in general. It is important to note that low current training levels reported by an overwhelming majority of respondents were related to computer use in the field of psychology — the critical evaluation of software products, limitations of software, information sources for program reviews and guidelines, and related ethical issues. It is in these areas in which the majority of respondents desired future training, suggesting that practitioners were cognizant of the gaps in their education and would be open to further their training should such opportunities arise. Personal study was the most frequently cited training source yet was apparently inadequate to address all critical topics related to computer use in the profession. Formal training opportunties for practitioners and those in training in these areas are essential and evidently welcomed.

Of interest is the finding that females in the sample desired training in a significantly greater number of general training

areas than did males. It is uncertain why this result was obtained given that males and females did not differ in the number of general computer topics in which they had training. Females perhaps judged their training as less adequate than did males, thus seeing themselves as requiring further training. In addition, respondents with Masters degrees desired training in more assessment applications than did those with doctorates. From the present questionnaire, it cannot be determined if those with Masters degrees received less training in specific applications than did those with doctorates which may account for this finding. Future surveys should evaluate training received in specific applications to address this question.

4.4 Occurrence of Ethical-Legal Problems

That the occurrence of the ethical-legal problems delineated in the questionnaire is very real and of serious concern is clearly demonstrated by the survey results. Every ethical-legal problem listed was reported to have occurred to some degree in service areas. Problems related to computerized assessment applications and copyright violations were those most frequently cited: misuse of interpretive programs by unsophisticated users, misuse of computer-generated reports by unqualified users, use of computerized test scoring and interpretation programs without their critical evaluation and illegal copying of software. These four problems were identical to the those most frequently cited as having occurred in Jacob and Brantley (1987)'s sample surveyed in

1985. It is unknown, however, whether the problems currently denoted as having occurred in Canadian school psychological services were also prevalent in 1985 in this country. Thus it cannot be determined if the occurrence of ethical-legal problems has escalated since the previous study, as predicted by Jacob and Brantley (1987). Further surveys are required in both Canada in the United States to determine trends in problem occurrence over time. The findings do suggest, however, that these are widespread problems in the field which warrant specific attention.

Substantial percentages of respondents in the two surveys anticipated a strong likelihood of ethical-legal problems occurring in their service area in the future. At least one third of the both samples anticipated that each problem associated with computerized record keeping, test administration, scoring and interpretation, and copyright violations would probably occur. Concerns related to the professional risks associated with all ethical-legal problems of computer-applications were quite high among Canadian practitioners.

Associations between the number of ethical-legal problems reported as having occurred and the background characteristics of gender and degree were obtained in this survey. Males reported significantly more ethical-legal problem occurrences than did females. Similarly, those with doctorates reported significantly more problem incidents than those with Masters degrees. It may be that those with doctorates were more greatly exposed to general ethical considerations and issues in their professional

preparation as compared to those with Masters degrees, and as such, were more aware of and attuned to their implications with respect to computer applications. Examination of the distribution of degrees among sexes indicated that more males in the sample held doctorates than did females (45% versus 28%), which may account for the gender difference in the number of reported problems.

4.5 Access To and Use of Guidelines

Given the high percentage of respondents anticipating the occurrence of ethical-legal problems in the future, and the high level of professional concern regarding involved risks, it is pertinent to examine the accessibility, consultation and usefulness of existing professional standards and guidelines with regard to computer use. Unfortunately, this section of the questionnaire was poorly answered, with almost one third of the sample failing to indicate availability of every document listed. It is likely that either respondents were unsure of the documents' availability in their work area and thus chose to leave the questions blank for particular documents, or they were reluctant to admit that the documents were not available to them or that they did not consult them. Provision of an explicit "Uncertain of accessibility" option for each guideline on the questionnaire may alleviate this difficulty in future surveys.

Data from those answering the questions indicated that the majority of the sample had consulted one or more documents. The

use of and perceived utility of the guidelines which specifically addressed computer use in psychological tests, the CBTI Guidelines (COPS & CPTA, 1986) however, was reportedly very low. The finding that only 2% of respondents specifically indicated that this document was useful for guidance in computer use is not indicative of its perceived utility because only 15% of respondents had actually consulted it. For over half of the respondents, these guidelines were reported as unavailable for consultation. Interestingly, the documents most frequently consulted, namely The Canadian code of ethics for psychologists (CPA, 1988) and Ethical principles of Psychologists (APA, 1977, 1981) and Standards for educational and psychological tests (APA, AERA, & NCME, 1985), were those which address computer use vaguely and indirectly, if at all. Not surprisingly, no respondents specifically mentioned them as useful guidance sources for computer use.

Reynolds et al (1985) remarked that the impact of new professional guidelines are rarely felt immediately because of the typical lag between their implementation and application by the scientific community. The availability alone, however, of the CBTI Guidelines (COPS & CPTA, 1986) in the work settings of the Canadian respondents at the time of the study clearly impacted on the extent of their application. Considering that this document has been in circulation since 1986 and has been reprinted as an appendix in at least one book on computer applications (Butcher, 1987a), the reasons for its inaccessibility are unclear. Because

the status of current training in computers among respondents was seriously deficient, especially in such areas as sources of program reviews, guidelines and related ethical issues, it is most likely that many Canadian practitioners were unaware of this document's existence. Further research into the utility of these guidelines once their availability is widespread is essential to critically evaluate their comprehensiveness and utility to the profession and to address their shortcomings.

4.6 Implications

This survey has demonstrated that computer technology has indeed been incorporated into many Canadian service areas. A positive trend toward using computers for administrative, professional development, research and assessment purposes has definitely emerged and their use is anticipated to rise. The ethical-legal concerns related to automated services that were voiced in the 1980's and substantiated in Jacob and Brantley (1987)'s study are also a reality in this country in the 1990's and are of serious professional concern. Professional guidelines specifically addressing these concerns are not yet readily available or are unknown to many Canadian practitioners.

Both theoretical and practical information regarding computer technology must be disseminated among the professional community if formal guidelines are to be of benefit (Pollock & Maenpaa, 1990). As of yet, however, professional training has not kept pace with technological advances and their implementation in the

work setting. Results from the present study indicate significant inadequacies in current training practices in the areas of basic computer literacy, operational procedures, critical software evaluation, information sources for review and guidance and associated ethical issues. An overwhelming number of respondents anticipated future use of many computer applications in their practice and expressed a desire for training in many general computer topics and specific applications. As Schmidt (1987) comments, it is unlikely that psychologists who behave unethically do so intentionally but rather out of ignorance. It is of vital importance, then, that these training needs be addressed for the positive potential of computer applications in the provision of services cannot be realized without full awareness of their advantages, limitations and possible abuses. As one respondent expressed:

> "My responses to Ethical and Legal Issues (Part II) reflect a hope and [an] expectation that people will behave ethically. As someone once said, you plan for the worst scenario with the hope that it rarely happens."

To this end, training at the graduate school level through core curriculum courses and workshops, and at the post-graduate level through inservice and continuing education is not only warranted but imperative. Ongoing educational opportunities are essential to ensure school psychologists remain up to date with new technological developments, issues and guidelines.

Computer technology has great potential to revolutionize the provision of school psychological services. Only with the

institution of comprehensive training, safeguards, guidelines and procedures to avoid the problems and pitfalls of the technology can these applications realize their full potential.

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Legal Documents

Copyright Act, Revised Statutes, c. C-30, (Supp) 1988, s.i. 5(1)(i),(m).

Copyrights, 17 United States Code Service, Section 117, 1980.

APPENDIX A

SURVEY OF COMPUTER USE, TRAINING, AND ETHICAL CONCERNS AMONG SCHOOL PSYCHOLOGISTS*

1. The province you live in: _____

2. You are:
___ Female
___ Male

3. Your age is:
___ under 30
___ 30-39
___ 40-49
___ 50+

4. You are currently working as a:
(please check all that apply)
___ School psychologist/psychoeducational consultant
___ Psychologist in other setting (specify)_____
___ Private Practitioner
___ Administrator/Pupil Personnel Services
___ University Instructor
___ Other (please specify) _____

5. Level of training in in psychology:
___Doctorate
___Masters
___Bachelors
___Other

6. Work setting: ___Urban ___Rural

7a) If you are working as a school psychologist, please indicate your years of experience:

___ 1-5
___ 6-10
___ 11-15
___ 16-20
___ 21+

7b) If you are currently working in a school system, for how many students are you responsible?

___ less than 500
___ 500-1,000
___ 1,001-1,499
___ 1,500-2,000
___ 2,001+

8. Are you a member of the Canadian Association of School Psychologists? ___Yes ___No

9. Your use or anticipated use of computers for your work, both at the office and home use, and applications in which you would find training desirable are (leave blank if none):

Current Use	Anticipated Use	Desire training	CHECK ALL THAT APPLY
___	___	___	Administering questionnaires or tests
___	___	___	Test scoring &/or verification
___	___	___	Test interpretation
___	___	___	Psychological report writing
___	___	___	Computer assisted counseling/therapy (including interviews)
___	___	___	Statistical analysis
___	___	___	Data storage/record keeping
___	___	___	Word processing
___	___	___	Office/service accountability
___	___	___	Writing programs
___	___	___	Database information services (eg. ERIC, PSYCLIT)
___	___	___	Electronic communication networks (eg. electronic mail, bulletin boards)
___	___	___	Other (specify) _____

10a) Do you have access to computers?
___Yes
___No

10b) If no, would you use a computer if you did have access to one?
___Yes
___No

10c) If yes, how much do you use computers?
CHECK ALL THAT APPLY
___None at present
___Once a week or less
___Several times weekly
___Daily

*Survey based on a questionnaire developed by S. Jacob, Central Michigan University and J. Brantley, University of North Carolina. Cited in School Psychology Review, 16, 69-77.

11. The computer(s) you use belong(s) to:

CHECK ALL THAT APPLY
___You
___School/Employer
___Colleague/Friend
___University/College

12a) The training you received in computers came through:

CHECK ALL THAT APPLY
___ University or college courses
___ Workshops
___ Inservice training
___ Personal study
___ Other (please specify) _____

12b) At which point in your professional development did you receive this training?

CHECK ALL THAT APPLY
___ As part of a degree/diploma
___ Post degree/diploma

12c) Please indicate in which areas you have and/or would like to receive specific training:

	Have training	Desire training
Basic computer literacy	____	____
Hands on experience with the technology	____	____
Common operational procedures of software packages	____	____
Critical evaluation of software products (eg. accuracy, validity, utility)	____	____
Limitations of software	____	____
Information sources (reviews, guidelines)	____	____
Related ethical issues	____	____

PART II ETHICAL AND LEGAL ISSUES

Consider the following ethical/legal problems raised by various computer applications in school psychology:

Check the column below if this problem has already occurred in your service area.	Check the column below if you feel there is a strong likelihood that this problem may occur.	Rate the level of your concern about professional risks involved in these computer applications: blank = no opinion, 0 = not a concern, 1 = somewhat concerned, 2 = very concerned	
_____	_____	_____	Computer storage of data increases the amount of non-essential and out-dated information kept on individual children and the risk of invasion of privacy.
_____	_____	_____	Psychologists may fail to maintain adequate backup copies of records to assure that information about a child is not lost in the event of equipment malfunction.

Has occurred	Is likely to occur	Level of concern	
_____	_____	_____	Computerized record-keeping increases the risk of unauthorized access to psychological records and violations of confidentiality of children's records.
_____	_____	_____	Psychologists may use computerized records for research purposes without obtaining informed consent.
_____	_____	_____	Psychologists may use test scoring and interpretation software without critically evaluating claims for accuracy, reliability, and validity, resulting in potential disservice to children.
_____	_____	_____	Psychologists may fail to insure that test results are not adversely affected by computer anxiety, lack of computer-test taking skills or equipment malfunction.
_____	_____	_____	Computerized test interpretation programs may be misused by unsophisticated users (eg. program falls outside limits of user's competence), resulting in potential disservice to children.
_____	_____	_____	Computer-generated psychological reports may be misused by schools or unqualified persons resulting in potential disservice to children.
_____	_____	_____	Psychologists may computerize existing tests without establishing new norms and psychometric information.
_____	_____	_____	Psychologists may computerize existing tests without test producers' permission, thereby infringing on producers' copyright.
_____	_____	_____	Psychologists may indiscriminantly administer tests which are unnecessary for decision making, due to the availability and ease of administration of computerized tests.
_____	_____	_____	Unethical and illegal copying of software in violation of copyright laws.

ADD BELOW ANY OTHER PROBLEMS WITH THE USE OF COMPUTERS IN YOUR SERVICE AREA WHICH HAVE NOT BEEN MENTIONED.

_____

_____

IF YOU KNOW OF ETHICAL/LEGAL COMPUTER PROBLEMS THAT HAVE BEEN SUCCESSFULLY RESOLVED, PLEASE STATE THE PROBLEM(S) AND TELL HOW THEY WERE RESOLVED:

_____

_____

Which of the following documents have you consulted for guidance in computer use?	Don't have access to a copy.	Have access but have not consulted it.	Have access and have consulted it.
Guidelines for Computer-Based Tests and Interpretations (American Psychological Association, 1986)	____	____	____
Canadian Code of Ethics for Psychologists (Canadian Psychological Association, 1986)	____	____	____
Ethical Principles of Psychologists (American Psychological Association, 1977, 1981)	____	____	____
Standards for Educational and Psychological Tests (American Psychological Association, American Educational Research Association & National Council on Measurement in Education, 1985)	____	____	____
Standards for the Providers of Psychological Services (APA, 1977)	____	____	____
Principles of Professional Ethics (National Association of School Psychologists, 1985)	____	____	____

If any of these documents have helped or guided you in computer use, please explain how:

_____

_____

_____

****

PLEASE RETURN THIS SURVEY TO:

Dr. Kent Henderson/Julie L'Heureux
Department of Applied Psychology
Ontario Institute for Studies in Education
252 Bloor Street West
Toronto, Ontario
M5S 1V6

If you have any questions concerning this questionnaire, please feel free to contact us at (416) 923-6641 ext.2577.

APPENDIX B

Item and Wording Changes to
Jacob and Brantley (1987) Questionnaire

Question 1*: "Province" inserted for "state"

Question 4: Addition: "(please check all that apply)"
Addition: /psychoeducational consultant

Question 5: New item added

Question 6: New item added

Question 8: New item added

Question 9: Addition: "(including interviews)" beside computer assisted counseling/therapy
Addition: "Record keeping" beside Data storage
Addition: "Database information services (eg. ERIC, PSYCHLIT)"
Addition: "Electronic communication networks (eg. electronic mail, bulletin boards)"

Question 10a: New question added

Question 10b: New question added

Question 12b: New question added

Question 12c: New question added

Part II Ethical and Legal Issues:

Word changes: "children" inserted for "pupil"
"(eg. program falls outside limits of user's competence)" inserted after words "unsophisticated user"

Item additions: Psychologists may fail to maintain adequate backup copies of records to assure that information about a child is not lost in the event of equipment malfunction.

Psychologists may fail to insure that test results are not adversely affected by computer anxiety, lack of computer-test taking skills or equipment malfunction.

*Question numbers refer to current questionnaire

Psychologists may computerize existing tests without establishing new norms and psychometric information.

Psychologists may computerize existing tests without test producers' permission, thereby infringing on producers' copyright.

Psychologists may indiscriminantly administer tests for decision making, due to the availability and ease of administration of computerized tests.

Item additions under Documents section:

Guidelines for computer-based tests and interpretations (APA, 1986)
Canadian code of ethics for psychologists (CPA, 1988)
Standards for the providers of psychological services (APA, 1977)

APPENDIX C

Letters to Participants

July 17, 1990

Member's name
Member's address

Dear Member's name:

Rapid advances in technology have led to the development of a number of computer applications which may impact significantly on the field of school psychology. To what extent do school psychologists use computer applications? Have any associated ethical-legal problems occurred or are any anticipated to occur in the future? How useful are existing professional guidelines and standards regarding computer use? Is training desired by professionals? These are the questions we are asking Canadian school psychologists in order to assess current professional needs and concerns regarding computer applications.

Your name was selected from the membership directory of the Canadian Association of School Psychologists. Because only a small sample is being surveyed, it is very important that each questionnaire be completed and returned. Participation in this study is completely voluntary and will require about 5 minutes of your time. If you would like to participate, please complete the enclosed questionnaire, and return it in the pre-addressed stamped envelope provided. We would appreciate receiving your responses by August 17, 1990 but will welcome, most certainly, any returns after this date.

You may receive a summary of results by writing "copy of results requested" on the back of the return envelope, and printing your name and address below it. Please do not sign the questionnaire in order to ensure anonymity.

Your responses and comments on this survey are very important for assessing current professional concerns and needs regarding computer applications. We would be most happy to answer any questions you might have concerning this study and can be reached in the Department of Applied Psychology at (416) 923-6641, ext. 257.

Thank you for your valuable assistance with this project.
Sincerely,

Kent Henderson, Ph.D.
Chairperson,
School Psychology Program

Julie L'Heureux, M.A.
Graduate Student
School Psychology Program

July 31, 1990

Member's name
Member's address

Dear Member's name:

Two weeks ago, a survey concerning the use of computer applications in school psychology was mailed to you. Your name was drawn from the membership directory of the Canadian Association of School Psychologists.

If you have already completed and returned the survey to us, please accept our sincere thanks. If you have not, and you would like to participate, please do so today. Because the survey has been sent to a small sample of school psychologists, it is very important that your responses be included in the study.

If by some chance you did not receive the questionnaire or it has been misplaced, please contact us and we will get another one in the mail to you as soon as possible. You may call Dr. Kent Henderson or Seeta Parker in the Department of Applied Psychology at (416) 923-6641, ext. 2731 or if you prefer, you may call Julie L'Heureux collect at (416) 614-1976, after August 8th.

Thank you again for your valuable assistance with this project.

Sincerely,

Kent Henderson, Ph.D.
Chairperson,
School Psychology Program

Julie L'Heureux, B.A.
Graduate Student
School Psychology Program

APPENDIX D

Tables

Table 1

Distribution and Response Rate of Sample

Province	Number Sent	% of CASP Members	Number Returned	% Return	Number of Usable Questionnaires	% of Sample
British Columbia	47	21	27	54	26	18
Alberta	34	15	27	79	25	17
Saskatchewan	13	6	8	62	7	5
Manitoba	28	13	17	60	16	11
Ontario	80	26	70	88	64	44
Quebec	6	2	2	33	2	1
New Brunswick	5	2	4	80	3	2
Nova Scotia	7	3	2	29	2	1
Newfoundland	2	1	0	0	0	0
Prince Edward Island	1	.5	1	100	1	1
Northwest Territories	1	.5	0	0	0	0

Table 2

Characteristics of Respondents

Variable	Total n	Total %
Gender:		
Male	84	57
Female	62	43
Age (years):		
<30	5	3
30-39	40	27
40-49	68	47
50+	33	23
Occupation:		
School psychologist/ Psychoeducational consultant	123	84
Psychologist - other	7	5
Private practitioner	21	14
Administrator	27	19
Employment location:		
Urban	99	68
Rural	34	24
Both	12	8
Highest level of psychology training:		
Ph.D.	50	34
M.A.	90	62
B.A. or other	5	4
Years of experience as school consultant/ psychologist:		
1-5	29	20
6-10	26	18
11-15	23	16
16-20	23	16
21+	25	17
Not applicable or Missing	20	13
Caseload:		
< 500	9	6
500-1,000	7	5
1,001-1,499	14	10
1,500-2,000	22	15
2,001+	70	48
Not applicable or Missing	24	16

Table 3

Frequency of Computer Use and Ownership and Training Source and Time of Training in Percentages

Frequency of Use	
None at present	14
Once a week or less	17
Several times weekly	38
Daily	23
Missing Data	8
Ownership of Computer	
Self	53
School/Employer	66
Colleague/Friend	4
University/Colleges	12
Training Source	
University or college courses	29
Workshops	23
Inservice	36
Personal study	66
Other	7
Time of Training	
As part of degree/diploma	30
Post degree/diploma	53

Table 4

Current and Anticipated Use and Desire for Training in Computer Applications in Percentages

Computer Application	Current Use	Anticipated Use	Desire Training
Assessment:			
Administering questionnaires or tests	8	20	14
Test scoring &/or verification	28	25	21
Test interpretation	21	18	20
Psychological report writing	36	21	16
Computer assisted counseling/therapy	0	7	11
Administrative:			
Data storage/record keeping	47	19	19
Word processing	61	16	14
Office/service accountability	22	10	5
Professional:			
Statistical analysis	34	14	20
Writing programs	12	6	17
Database information services	22	19	22
Electronic communication networks	25	14	18
Other	2	0	1

Table 5

Percentage of Respondents Having and Desiring Training in Computer Skills

Area of Training	Have Training	Desire Training
Basic computer literacy	64	23
Hands on experience with the technology	47	38
Common operational procedures of software packages	43	37
Critical evaluation of software products (eg. accuracy, validity, utility)	10	56
Limitations of software	10	47
Information sources (reviews, guidelines)	10	50
Related ethical issues	11	47

Table 6

Percentage of Respondents Reporting Past and Potential Ethical-Legal Problems and Concern

Ethical-legal problem	Has Occurred	Potential Problem	Somewhat or Very Concerned
1. Computer storage of data increases the amount of non-essential and out-dated information kept on individual children and the risk of invasion of privacy.	7	42	69
2. Psychologists may fail to maintain adequate backup of copies of records to assure that information about a child is not lost in the event of equipment failure.	5	36	62
3. Computerized record-keeping increases the risk of unauthorized access to psychological records and violations of confidentiality of children's records.	3	47	77
4. Psychologists may use computerized records for research purposes without informed consent.	3	38	61
5. Psychologists may use test scoring and interpretation software without critically evaluating claims for accuracy, reliability, and validity, resulting in potential disservice to children.	19	43	83
6. Psychologists may fail to insure that test results are not adversely affected by computer anxiety, lack of computer-test taking skills or equipment malfunction.	2	43	67

Table 6 (continued)

Percentage of Respondents Reporting Past and Potential Ethical-Legal Problems and Concern

Ethical-legal problem	Has Occurred	Potential Problem	Somewhat or Very Concerned
7. Computerized test interpretation programs may be misused by unsophisticated users (eg. program falls outside limits of user's competence), resulting in potential disservice to children.	20	46	86
8. Computer-generated psychological reports may be misused by schools or unqualified persons resulting in potential disservice to children.	17	41	81
9. Psychologists may computerize existing tests without establishing new norms and psychometric information.	6	38	64
10. Psychologists may computerized existing tests without test producers' permission, thereby infringing on producers' copyright.	3	33	46
11. Psychologists may indiscriminantly administer tests which are unnecessary for decision making, due to the availability and ease of administration of computerized tests.	7	36	61
12. Unethical and illegal copying of software in violation of copyright laws.	14	41	60

Table 7

Accessibility and Consultation of Professional Documents in Percentages

Document	No Access	Access but not Consulted	Access and Consulted	Question Unanswered
Guidelines for computer-based tests and interpretations (COPS & CPTA, 1986)	51	9	15	25
Canadian code of ethics for psychologists (CPA, 1988)	10	25	52	12
Ethical principles of psychologists (APA, 1977; 1981)	19	22	40	19
Standards for educational and psychological tests (APA, AERA, & NCME, 1985)	25	21	33	21
Standards for the providers of psychological services (APA, 1977)	28	24	29	19
"Principles of professional ethics" (NASP, 1985)	29	23	32	17

END

22|10|91

FIN