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# A DSM-III-R Study Of Computer Addiction Among IOWA Computer Users

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A DSM-III-R STUDY OF COMPUTER ADDICTION AMONG IOWA COMPUTER USERS

by

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St. Louis Region

A PROPOSAL PAPER PRESENTED TO NOVA UNIVERSITY

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## CHAPTER ONE: INTRODUCTION

## THE PROBLEM

Computer use is expanding rapidly throughout the country (Becker & Sterling, 1987, pp. 289-311). The Atlantic Institute Poll of 1985 found that 37 percent of Americans have had hands-on experience with a computer or word processor. Based on a U.S. population of approximately 200 million, the Atlantic Institute Poll figures suggested that there may be over 70 million computer users in this country. Millions of computer users may be affected by a little known phenomenon called computer addiction. Though not specified as a distinct diagnostic entity in the Diagnostic Statistical Manual of Mental Disorders, Third Edition, Revised (American Psychiatric Association, 1987, p. 169), this under-researched form of addiction may be similar to other addictions such as alcoholism and gambling in meeting the key DSM-III-R criteria for addiction: (a) a pathological pattern of use, and (b) impairment in social, psychological, physical, or occupational functioning. If the statistics are similar to those for alcoholics (American Psychiatric Association, 1987, p. 174), ten per cent of all adult "users" (See DEFINITIONS OF TERMS) are expected to meet the criteria for computer addiction,

meaning that approximately seven million Americans may be suffering from computer addiction with the prospect for millions more to soon join their ranks, based on projected use patterns (The World Almanac 1988). Computers are in the home, the school, the workplace, and virtually everywhere. The proliferation of computer use among the young may be further evidence of the magnitude of the problem. Newspaper articles and TV coverage (Soper & Miller, 1983, pp. 40-43) have alerted us to the obsession our children exhibit for computer video games. Is computer addiction chronic? Does the course of the disorder become progressively worse with abuse over time? Does "tolerance" develop? Are higher "doses" of the computer experience required for the affected person to achieve the desired effect? Peele (1985, p. 97), an addiction expert, suggested that people do become addicted to experiences. There is also the issue of transference from one addiction to another, a commonly recognized phenomenon among treatment providers. Could this mean that there may be "recovering" alcoholics who have transferred their addiction to computer dependency? The potential magnitude or scope of the problem and the dearth of research provide the most convincing rationale for this investigation. Further, until computer addiction has been diagnostically substantiated, and its signs and symptoms described,

education, treatment, and prevention cannot occur. Preliminary research is needed to provide a conceptual framework on which to base controlled experiments. The primary purpose of this dissertation study was to investigate whether the phenomenon called computer addiction legitimately meets DSM-III-R criteria for abuse and/or dependency and to develop a reliable and valid questionnaire to accomplish this purpose.

## BACKGROUND

Popular media and observations stimulated an awareness that some children appeared to become addicted to computer video games (eg. the Pac-Man craze). This observation raised the question of whether individuals could become addicted to the use of keyboard computers. The researcher began to note what appeared to be pathological patterns of computer use among colleagues, students, and instructors. Some of these persons either had suffered or were suffering from another addiction such as alcoholism. As both a computer user and a psychologist in the treatment of addictions, this researcher's interest in the potential problem of computer addiction was picqued. From a preliminary review of the literature, a few articles were found on the topic of computer addiction. These articles were largely an anecdotal account of observations of behaviors indicative of computer addiction. The similarities between alcoholics and computer hackers were noted. There were also some literature sources on transference from one addiction to another, cross-dependency between drugs of the same class, and dual-addiction. There seemed enough background to warrant further research.



## PURPOSE

The purpose behind this dissertation study was to investigate whether computer addiction meets DSM-III-R criteria for abuse and/or dependency via the development and use of a reliable and valid questionnaire to survey the Iowa population. It was also intended to obtain baseline rates of incidence of computer use, abuse, and dependency present in the Iowa population. Finally, another aim was to alert treatment providers, educators, computer users, and researchers to the potential problem of computer addiction, and possible future need for treatment, prevention, and research.

## SIGNIFICANCE

This study of computer addiction is important because of the potential scope of the problem involving millions of computer users. Popular media and documented observations indicate that serious signs and symptoms may be associated with the phenomenon of computer addiction. This study is important within the context of work as a psychologist treating addicted Iowans. If computer addiction was found to exist in Iowa, it would be reasonable to speculate that there may be an even greater computer addiction problem in populated areas of heavy computer use. If computer addiction is a problem, then the rapid growth in computer

use is cause for concern. This concern increases with the knowledge that there is a dearth of research literature available on the topic of computer addiction. If computer addiction was found to be a legitimate diagnostic entity by the current study, then the need for further research, education, treatment, and prevention would be paramount.

#### ASSUMPTIONS & LIMITATIONS

My assumptions for this research study are delineated and defended as follows:

(1) There are enough observations to warrant this study of computer addiction. (Ingber, 1981, pp. 88-114; Soper & Miller, 1983, pp. 40-43).

(2) It is likely that the phenomenon of computer addiction exists (Ingber, 1981, pp. 88-114). Some limitations are inherent in this research study because of compromising for ethical/legal reasons, finances, dispersion of the population, and other theoretical and pragmatic considerations.

Limitations will be delineated and defended as follows:

(1) There is a dearth of literature substantiating the problem (Lepper & Gurtner, 1989, p. 175). Lepper and Gurtner stated that good persuasive and systematic research that adequately addresses the questions and hypotheses

generated by the debate over the use of computers in education is sorely lacking. They attribute this dearth at least partly to an attitude of disdain for evaluative or systematic research within some parts of the computer community.

(2) Lack of knowledge about the phenomenon being investigated limits theoretical predictions (Huck, Cormier & Bounds, 1974, p. 18).

(3) In descriptive research studies such as this one, description precludes theoretical formulations in terms of investigative priority (Isaac & Michael, 1981, p. 46).

(4) Ethical/legal considerations must be taken into account, discouraging the use of invasive experimental procedures (Best & Kahn, 1986, pp. 41-45).

(5) Limited resources (eg. Time, money) place practical constraints on the parameters of this dissertation study.

(6) The scope of this study is geographically limited to Iowa.

## MAJOR ISSUES AND RESEARCH QUESTIONS

Because the topic of computer addiction is novel and under-researched, the primary issue was to determine via descriptive research whether computer use or dependency could be legitimately diagnosed. It was important to document the similarities and/or differences that might exist between computer addictions and other addictions. The author planned to address the following research questions in attempting to describe the characteristics of computer addiction:

- (a) Does computer addiction meet DSM-III-R criteria for abuse and/or dependency?
- (b) What features does computer addiction have in common with other addictions?
- (c) What features differ from other forms of substance abuse?
- (d) Does tolerance occur?
- (e) Are there any signs of withdrawal?
- (f) Does computer abuse or dependency contribute to social, psychological, vocational, or physical impairment?
- (g) What percentage of Iowa computer users meet the criteria for abuse and dependency?

Questions that may later be addressed in experimental research involve issues of dual-addiction, crossdependency, and transference from one addiction to another.

## DEFINITIONS OF TERMS RELATED TO ADDICTION AND COMPUTERS

CHRONIC - A descriptive term for a disease or condition that is characterized by slowly progressing symptoms and that continues for a long time (O'Brien & Cohen, 1984, p. 62).

ABUSE - A form of computer addiction less severe than computer dependency. Involves a pathological pattern of computer use that substantially meets DSM-III-R criteria for substance abuse.

ADDICTION - A pathological pattern of computer use often characterized by increased use, causing problems for the user. Has characteristics common to other addictions (Ingber, 1981, pp. 88-114).

DEPENDENCY - A form of computer addiction more severe than computer abuse. Exceeds computer abuse in that compulsive use may continue in spite of related physical problems or withdrawal symptoms. Substantially meets the DSM-III-R criteria for substance dependency.

CROSS-ADDICTION - Originally meant that addiction between drugs in the same group can be mutual or interchangeable (O'Brien & Cohen, 1984, pp. 77-78). Through use and research findings, the term has come to include the interchangeability of drug and nondrug addictions.

CROSS-DEPENDENCY - Synonymous with cross-addiction.

DSM-III-R - Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised of the Washington, DC, American Psychiatric Association, 1987. The national standard used for diagnostic purposes.

DUAL-ADDICTION - The same person may suffer from two different addictions simultaneously. Similar to cross-addiction or cross-dependency. A person with polyaddiction may suffer from many addictions.

HACKER - The term used to refer to someone who was interested in computers and adept at using them. Now, the term has come to refer to a compulsive computer addict (Ingber, 1981, pp. 88-114).

LOG-ON or LOG-IN - To give the computer terminal a special code which works like a key in a lock. You must have the right code to use the computer. Usually, it is used only with big computers or terminals (Wall & Wall, 1984, p. 48).

ON-LINE - A word meaning that a computer interface is connected to its line and can send and receive data (Wall & Wall, 1984, p. 54).

PATHOLOGICAL - harmful or disease-causing.

PROGRESSIVE - The evolution of addiction that occurs over time. A chronic pattern wherein the symptoms increase, or become worse.

PSYCHOACTIVE - Influencing one's mood or behavior.

**SUBSTANCE ABUSE** - A general term to describe the abuse of drugs or other substances. Less serious than dependency, but involves a pathological pattern of use. A diagnostic category with specific DSM-III-R criteria.

**SUBSTANCE DEPENDENCY** - More serious than substance abuse. May involve pathological compulsive pattern of use with associated physical problems or withdrawal symptoms. A DSM-III-R diagnosis.

**TOLERANCE** - Acquired resistance to effects of the addictive entity that occurs after repeated use. A person must increase the dosage to obtain the original effects (O'Brien & Cohen, 1984, p. 255).

**TRANSFERENCE** - The process of trading one addiction for another (eg. Alcohol for gambling).

**USER** - One who consumes or takes regularly something such as liquor or drugs, according to WEBSTER'S NEW COLLEGIATE DICTIONARY (1973).

**WITHDRAWAL** - A set of serious symptoms that occurs when use of the addictive substance is stopped or greatly reduced. Like a "rebound" effect. May include physical and emotional symptoms (O'Brien & Cohen, 1984, pp. 269-271).

## CHAPTER TWO: REVIEW OF THE LITERATURE

This chapter consists of review of the literature to develop the logical base for this dissertation study about computer addiction. First, it was important to find that persons could become addicted to non-drug experiences. Next, a similarity between alcoholics and computer hackers was suggested. The literature subsequently documented the ideas of addiction to more than one drug or non-drug experience. Similarities in drug and non-drug addictions were noted. One of the studies involved a person who was reportedly both an alcoholic and a computer addict. Finally, anecdotal literature about computer addicts provided evidence for the existence of a phenomenon called computer addiction. The review of the literature showed that the potential scope of computer use, the absence of hard research data, and the lack of a diagnostic measurement instrument for computer abuse and dependency were important grounds for conducting this study. Peele (1985, p. 98), an addictions expert, has said that people can become addicted to a nondrug experience. Hypothetically, such an experience could include computers. It also plausible that persons who suffer from other addictions could become addicted to computers. The idea that the same individuals become addicted to many



things is documented in the literature (Peele & Brodsky 1975, O'Donnel 1969, Kalant 1982, Smith 1981, Gilbert 1981, Vaillant 1983). Falk, Dews and Schuster (1983, p. 92) said that the immediate effects on the individual or the immediate environment are common among all the objects of excessive involvement or addiction. It is unlikely that most computer users would deny the prompt effects of the computer on the person and the environment. Was there any documentation in the literature related to computer addiction? Although the dearth of research on computer addiction became obvious through the literature search, enough literature was found to document the problem and to develop the study. Weintraub (1987), for example, alluded to student hackers as being like alcoholics. In the following discussion, this researcher will provide further evidence of the probability of dual or multiple addictions, discuss similarities and differences between computer addiction and other addictions, describe the incidence, elements, potential treatment, and implications of computer addiction, and will discuss the methods of studying this phenomenon.

Symposia proceedings on double diagnosis and polyaddictions were reported in the JOURNAL OF CLINICAL PSYCHIATRY (1984, 45(12-2), p. 44). It was noted in this article that cross-addiction or the replacement of one type of abuse with another is common, even though experts often focus on each substance separately. Kreek and Stimmel (1984) maintain that the simultaneous use of narcotics and alcohol has always been of great concern. Rice (1982) reported dual-addiction as a common finding in case histories of children abusing alcohol. Hughes and Brewin (1979) noted that in 1977 Alcoholics Anonymous (AA) conducted a survey, and, at that time, found a growing number of its members addicted to alcohol and one or more psychoactive prescription drugs. The Central Office of Alcoholics Anonymous periodically sends survey forms to each district representative, who collects data from members of A.A. meetings in each district. The data is then mailed back to the Central Office at Grand Central Station in New York for compilation of statistics. Roszell, Calsyn and Chaney (1986) found problem drinking severity positively related to the number of random urinalyses indicating illicit drug use. Experts have pointed to the cross-addiction between alcohol and tranquilizers as a serious health hazard (Wiseman, Spencer-Peet, Wood & Marjot, 1986; Meyer, 1986). Cross-addiction or cross-dependency between alcohol and

other drugs has been well-documented in the literature. However, what about cross-addiction as it relates to other forms of addiction?

Cross-addiction also occurs with gambling and substance abuse. Ramirez, McCormick, Russo and Taber (1983) found a high rate of alcohol and other drug abuse in severe pathological gamblers and their families. Russo, Taber, McCormick & Ramirez (1984) found that forty-five per cent of gambler patients have serious alcohol problems. They also noted that the progression of the two disorders was similar, Alcoholics Anonymous and Gamblers Anonymous were alike, and that alcohol treatment could easily be adapted to gambling. Lesieur, Blume and Zoppa (1986, pp. 33-38) conducted an interview study of gamblers and their families, and found a correlation between gambling and substance abuse. The link between gambling and substance abuse shows that cross-addiction between a non-drug activity and drugs can occur. This fact lends credibility to the idea that cross-addiction can occur with computer addiction, also a non-drug activity. However, the evidence on cross-addiction does not end with gambling and substance abuse. Jones, Cheshire and Moorhouse (1985, pp. 377-380) examined the relationship between alcoholism and eating disorders in 27 cases, and found that sometimes alcoholism developed after the eating disorder, while in other cases

the eating disorder came after the alcoholism. Therefore, cross-addiction between alcohol and yet another non-drug activity was confirmed. Casner (1986, p. 17) studied the clinical data from 35 eating disordered women in treatment, and found that the family system dynamics of persons with eating disorders were markedly similar to the alcoholic family system. The environment for developing the two disorders may be similar with respect to the families. Beary, Lacey and Merry (1986, pp. 685-689) compared age-matched patients with controls using a semi-structured interview, to find that eating disorders were predictive of increased alcohol over time. The cross-addictive relationship between alcohol and eating disorders was evident from the literature. The review of the literature to this point has described cross-addiction between alcohol and other drugs, and between alcohol and non-drug activities such as gambling and eating. The dynamics within addictive families appeared to be similar. Obviously, eating disorders differed from the other addictions in that the goal of total abstinence is not realistic, given the necessity for survival. Probably the strongest evidence for cross-addiction between computers and another addiction comes from the case study of a 31-year-old, white, male computer addict who was suffering from increased alcohol intake along with his computer

addiction (Dryden, 1986). Even though the possibility that computer addiction could develop as a cross-addiction has been established, more documentation of computer addiction as a distinct entity is needed.

The best documentation of computer addiction found was an article by Ingber (1981, pp. 88-114). Ingber compared computer hackers to being like gamblers in pursuing a compulsion that consumes their lives and becomes the focus of their existence. It was noted that, like other types of addicts, computer hackers have their own language and subculture. Some of the computer addiction problems described by Ingber included abandonment of friends, forgetting to eat, days without sleep, paranoia, changes in attitudes and emotions, impairment of vocational functioning, interference with school, and interference with other leisure time activities. Ingber gathered information by talking to computer hackers, computer teachers, and various experts. One expert told of a hacker who had to be carried off his chair, fed, and put to bed. These types of problems are sufficient to meet DSM-III-R criteria for dependency. Davidson and Walley (1984, pp. 37-51) contended that the advent of the computer has caused reactions such as patterns of headlong involvement and overuse comparable to addiction. They included case examples of computer addiction involving staff members.

Soper and Miller (1983, pp. 40-43) warned of computer video games as an emerging addiction among students, discussed the factors contributing to the appeal of video games, and called for empirical validation because of the inherent potential for abuse. Lepper and Gurtner (1989, p. 172) stated that some critics of computers in the school fear that computer domination may have pernicious effects on the child's emotional, social, and moral development. Kiesler and Finholt (1988, pp. 1004-1115) provided comprehensive documentation warning of a computer-related health epidemic known as repetitive strain injury (RSI), which is so prevalent in Australia that it threatens the workers' compensation system. Horton (1984) noted that soon after computerization came to her company, workers began to complain of severe headaches, muscle strain, and eye troubles. An increase in birth defects was reported. Even though these problems were related to video display terminals (VDTs), Horton said that not enough has been done to correct the problem. These physical problems related to computer use are an important sign of computer addiction because one DSM-III-R criterion of dependency is continued use in spite of related physical problems.

What is there about computers that is so enticing to potential addicts? Some advantages of computers are that they aren't demanding, won't insult the user, follow

instructions, are interesting and malleable, and are easier than the pressures of a peer group (Ingber, 1981). Soper and Miller (1983) said that computer games are appealing because they provide rewards for increased play skill, are a means of releasing hostility, involve interpersonal competition, include seductive packaging, are placed in attractive locations, and provide multisensual, sentientlike stimulation. Perhaps some of the factors suggested by Soper and Miller account for the hacker's preoccupation with constantly developing ever more intricate games, as noted by Ingber.

The potential scope of computer addiction, and rapid growth in computer use are grounds for concern. Ingber (1981) said that extreme cases of computer addiction are rare, although modified versions are common in thousands of universities, high schools, and elementary schools across the country. At the time of her article (1981), Ingber estimated that there were 300,000 computer programmers, and that 1.2 million would be needed by 1990. She also estimated that one out of three homes would have computers or terminals within five to ten years. The 1985 Atlantic Institute Poll of 9000 adults in the U.S., Europe, and Japan found that 37 percent of Americans have had hands-on experience with computers or word processors. The World Almanac for 1988 reported that there were a million personal

computers for instructional use in elementary and secondary schools by 1985. The World Almanac also projected that by 1990 over sixty percent of professional, managerial, and technical workers would have desk-top personal computers. The more recent data supports Ingber's estimates of growth in computer use. Ingber noted that it might be absurd to label all hackers as deviant, but would be naive to disregard the hacker phenomenon as meaningless. Ingber advised that the increasing role of computers in our lives may lead to a relationship with the computer as subject as that of the hacker. Ingber also suggested that hacker computer games may be preparation for the future, if play is really the basis for all human activity, as psychiatrists have indicated. Ingber concluded that perhaps the hackers of today are the "harbingers of the future."

Most of the computer studies to date have been based on interview or observational data (Ingber, 1981; Davidson & Walley, 1984; Dryden, 1986). Many of the studies on other addictions used interview or case history data and DSM-III criteria (Beary, Lacey, & Merry, 1986; Casner, 1986; Leisieur, Blume, & Zoppa, 1986; Jones, Cheshire & Moorhouse, 1985; Kutcher, Whitehouse & Freeman, 1985).



Lepper and Gurtner (1989, p. 175) found a paucity of good, persuasive research on educational computing, and noted that 72% of the studies employed nonrandom assignment of subjects.

Computer science teachers have become aware of computer addiction, and are on the lookout for potential hackers, and cases of computer addiction that are already severe (Ingber, 1981). Some suggestions for treatment have already been made. Davidson and Walley (1984) think that interventions for computer addiction should include performance management skills, social skills, assertiveness training, relaxation and stress management, and comprehensive behavioral programs. Dryden (1986) used eclectic psychotherapy based on rational-emotive therapy, alliance theory, and modulation of the challenge presented by the therapeutic context to treat a computer addict with an alcohol problem.

CHAPTER THREE: DESIGN PROCEDURES AND METHOD  
HYPOTHESES AND VARIABLES

Descriptive research was the appropriate research strategy given the type of topic, novelty of the topic, and the dearth of relevant literature available (Isaac & Michael, 1981, p. 46). Therefore, this dissertation was a descriptive research study, not an experiment. As such, the purpose was to describe the characteristics of computer addiction. The basic research question was whether the phenomenon called computer addiction legitimately meets diagnostic criteria for abuse and/or dependency. If so, there may then be sufficient cause to test the following hypotheses:

(a) As computer use increases, the incidence and severity of symptoms increase.

(b) As computer use increases, so does tolerance.

(c) When DSM-III-R criteria for dependency are met, withdrawal signs will be evidenced. Because this is descriptive research, and not an experiment, there will be no treatment of the variables, or identification of independent or dependent variables. If this diagnostic study proves fruitful, controlled experiments should follow. Then, variables such as computer time, tolerance, transference, etc. will be identified, controlled, and manipulated in an attempt to further understand the relationships between the variables related to addiction.

## DEFINITIONS OF TERMS RELATED TO RESEARCH AND STATISTICS

CLUSTER SAMPLING - A variation of the simple random sample that is appropriate when the population of interest is limited, when a list of the members of the population does not exist, or when the geographic distribution of the subjects is widely scattered (Best & Kahn, 1986, p. 15).

CONSTRUCT VALIDITY - Refers to the process of confirming or substantiating a hypothetical abstract variable via research or experimental treatments (Nunnally, 1978, pp. 94-105).

CONTENT VALIDITY - Depends on the adequacy of sampling of a specified domain of content. The purpose is to directly measure performance on a test that must stand by itself as an adequate measure, because the test itself is the criterion for performance (Nunnally, 1978, pp. 91-94).

CRITERION-RELATED VALIDITY - Important when the purpose is to use an instrument to estimate some important form of behavior that is external to the measuring device itself, the latter being referred to as the criterion (Nunnally, 1978, p. 88).

DESCRIPTIVE RESEARCH - Attempts to describe things the way they are, rather than testing a hypothesis for cause-effect relationship. For example, the data might be used to confirm the existence of a difference, rather than trying to determine the cause for the difference (Huck, Cormier & Bounds, 1974, p. 18).

EXPERIMENTAL RESEARCH - A systematic investigation to determine whether a cause-and-effect relationship exists between the treatment variable and the data (Huck, Cormier & Bounds, 1974, p. 224).

EXTERNAL VALIDITY - Representativeness or generalizability (Huck, Cormier & Bounds, 1974, p. 224).

INTERNAL VALIDITY - The degree to which a cause-and-effect relationship can be inferred (Huck, Cormier & Bounds, 1974, p. 224).

PREDICTIVE VALIDITY - A form of criterion-related validity that uses an instrument to predict future criterion behavior (Nunnally, 1978, pp. 87-91).

RELIABILITY - Reliability refers to the accuracy of measurement by a test (Isaac & Michael, 1981, p. 125).

REPRESENTATIVENESS - generalizability. Depends on whether the sample is characteristic of the population being investigated.

STANDARD ERROR OF MEASUREMENT (SEM) - A reliability coefficient that establishes confidence limits for obtained scores. Helpful in estimating the error variance surrounding a test score (Nunnally, 1978, pp. 218-219).

VALIDITY - Addresses the question of whether an instrument measures what it is supposed to measure (Best & Kahn, 1986, p. 155).

VARIABLES - Attributes, behaviors, or constructs that are controlled or measured in scientific research because of potential influence on outcomes (Isaac & Michael, 1981, p. 44).

#### RE-STATEMENT OF RESEARCH QUESTIONS

This investigator planned to address the following research questions in an attempt to describe the characteristics of computer addiction:

(a) Does computer addiction meet DSM-III-R criteria for abuse and/or dependency? The answer to this question is important in determining the direction of future research, and whether education and treatment should be seriously considered.

(b) What features does computer addiction have in common with other addictions? This question is important for construct validation and to determine congruency with DSM-III-R criteria.

(c) What features differ from other forms of substance abuse? This question may help with diagnostic differentiation, and helps define parameters for construct validation.

(d) Does tolerance occur? A DSM-III-R symptom that occurs with some addictions and not with others, tolerance should be addressed in the questionnaire.

(e) Are there any signs of withdrawal? Like tolerance, withdrawal does not occur with every type of addiction, and will need to be included in the survey questions.

(f) Does computer abuse or dependency contribute to social, psychological, vocational, or physical impairment? This question is an important DSM-III-R measure of pathology that is a common criterion across several DSM-III-R diagnoses for abuse or dependency. The answer to this question may also be viewed as a critical determinant of addiction by the medical community.

(g) What percentage of Iowa computer users meet the criteria for abuse and dependency? Gathering data on computer use and addiction in Iowa is important because distribution of computers and rates of computer use in Iowa may differ from national norms, or more heavily populated and industrial sections of the country.

Also, statistics on computer addiction simply do not exist, and therefore such data needs to be collected. A database of information on computer addiction may be necessary before construct validation can continue. Questions that may be addressed in later experimental research involve issues of dual-addiction, cross-dependency, and transference from one addiction to another.

#### DISCUSSION OF POPULATION

Cluster sampling was used to select a representative sample of Iowans for this study. Iowa's population is small and scattered, compared to many other states. This author's work as a psychologist providing substance abuse treatment for Iowans influenced the decision to limit the sample to Iowa. Finances, time, and resources were also considered in the decision to limit the sample to Iowa. A representative sample should also include a distribution of variables such as sex, age, race, vocation, education, and computer use as they naturally occur in the environment and population. This baseline data about the incidence of computer use, abuse, dependency may later help researchers speculate about the rates of computer abuse and dependency nationally, and in other geographic areas. The rates of incidence obtained from this study can be compared with other studies, perhaps leading to some generalizations or conclusions about population parameters.

## GENERAL DESIGN &amp; PROCEDURES

The steps followed in conducting this study included review of the literature, careful design of a questionnaire to measure computer addiction, administration and readministration of the questionnaire using cluster sampling until the questionnaire has been refined to a reliable and valid instrument, and analysis of results using DSM-III-R criteria for unspecified substance abuse and dependency. The main purpose of this investigation was to determine whether computer abuse or dependency is a legitimate diagnostic entity worthy of further study and possibly educational and treatment interventions. It is important to note that the development of a reliable and valid questionnaire on computer addiction was a major task essential to obtaining meaningful data.

## SAMPLING

The sampling procedure consisted of the following steps:

- (a) Six counties were randomly selected from an atlas containing all the counties in Iowa.
- (b) Six towns or cities were randomly selected from all the municipalities listed in the atlas for the six counties.
- (c) Ten letters were randomly selected from the alphabet.



(d) Ten individuals whose last names begin with one of the ten letters were selected alphabetically from the phone directories of the six municipalities until ten persons (each with a different first letter for the last name) were selected from the six towns or cities.

This type of sampling is known as area or cluster sampling (Best & Kahn, 1986) and is used when a list of members of the population is unavailable, or when the geographic distribution of the subjects is widely scattered. It was assumed that cluster sampling with randomization would yield a representative sample of Iowans (Best & Kahn, 1986, pp. 15-16). The numbers used in this sampling procedure would yield a total sample size of sixty. According to Best and Kahn (p. 178) a fifty percent return rate is adequate. This sampling technique will help estimate the proportion of the Iowa population who use computers, and the subpopulation of users who abuse or are dependent on computers. Such information is important when one considers that national data on computer use may not accurately represent computer use in Iowa where the population and number of computers may differ from other parts of the country. When compared with the population size, the sample is relatively small. A return rate less than fifty percent would yield a sample size less than

thirty, which is considered a small sample (Isaac & Michael, 1981, p. 96). Isaac and Michael suggested that small samples have the following advantages:

- (a) They are economical.
- (b) They permit an early estimate of sampling error.
- (c) The researcher can stay closer to the data than is true with larger samples.
- (d) They are quick and convenient to work with because of ease in calculations.
- (e) They are large enough to test the hypothesis, yet small enough to overlook weak treatment effects.

#### SURVEY AND DATA GATHERING TECHNIQUES

A survey approach using a questionnaire was the most appropriate tool for gathering data, given the ethical/legal considerations (eg. Privacy, minimal risk research), the diagnostic nature of the study, and the purpose of descriptive research (Best & Kahn, 1986, pp. 175-176). Characteristics for a good questionnaire (Best & Kahn, 1986, pp. 175-176) were adhered to in developing the questionnaire for this DSM-III-R survey. A good questionnaire should be short, interesting, clear, complete, objective, logically arranged, useful, and easy to score and interpret. Questions were derived from the DSM-III-R criteria for psychoactive substance dependence,

and were balanced so that an equal number of questions were assigned to each criterion. Responses meeting a diagnostic criterion were assigned a value of 1, while responses that do not meet a criterion were assigned a value of 0. Values were summed to yield a total score for each individual. The questionnaire included instructions, a section for population demographics, and a 20-40 item true/false format. Because the DSM-III-R requires a minimum of four criteria be met to warrant a diagnosis of dependency, and because each criterion is represented twice in the survey questions, a minimum score of eight will indicate that a sufficient number of criteria have been met to confidently diagnosis dependency. Because only two criteria must be met to diagnose abuse, a score less than eight but equal to or greater than four will suggest a diagnosis of computer abuse that falls short of dependency.

The main function of the survey was to gather user information for comparison against DSM-III-R criteria for unspecified substance abuse or dependency. It was assumed that the DSM-III-R was the proper instrument for evaluation in this diagnostic study of computer abuse and dependency (Ben-Tovim, 1988, pp. 1000-1002; Brett, Spitzer & Williams, 1988, pp. 1232-1235; Volkmar, Bregman, Cohen & Cicchetti, 1988, pp. 1404-1408). In a typical clinical setting, a one-on-one diagnostic interview is conducted with the patient to determine diagnoses based on DSM-III-R

criteria. When the sample size is larger than one, a survey format may substitute for face-to-face diagnostic interviews. For example, Ben-Tovim (1988) used a self-report questionnaire to obtain information for comparison between DSM-III and DSM-III-R criteria. Although the main purpose of this dissertation was to investigate whether computer addiction meets accepted DSM-III-R diagnostic criteria, a major related task was to develop a reliable and valid questionnaire to gather the essential data for comparison with DSM-III-R criteria. The literature has already established the existence of a phenomenon called computer addiction, but it is not likely to be accepted as a legitimate or serious addiction by the medical community unless congruency with DSM-III-R criteria can be shown. So far this evidence is lacking in the literature. The survey form is included in the appendix of this paper. After the sample was selected and the questionnaire developed, the questionnaires were mailed to the individuals selected. A brief cover letter of explanation accompanied each questionnaire, along with a stamped envelope addressed to the author. Telephone calls were made to encourage completion of the questionnaire for each person who had not responded within one week of mailing.

## RELIABILITY &amp; VALIDITY

A reliable and valid DSM-III-R instrument for measuring computer abuse and dependency was developed as part of this dissertation study. The Kuder-Richardson Formula 20 (KR-20), a measure of internal consistency for instruments using dichotomous items, was used to estimate the reliability of the questionnaire, yielding a reliability coefficient of .76. Nunnally (1978, p. 234) recommended KR-20 over the retest method because of the error inherent in the latter method. Isaac and Michael (1981, p. 125) stated that usually the retest method of estimating reliability was not theoretically desirable. Kerlinger (1973, p. 443) indicated that the accuracy definition of reliability (internal consistency) implied the stability definition (retest). Best and Kahn (1986, p. 178) said that rarely do questionnaire designers deal consciously with the reliability or validity of their instruments, perhaps because they are short-time information-gathering devices that are limited in purpose. However, it was this researcher's intent to address the reliability and validity of the questionnaire.

Content validity was addressed by using the DSM-III-R criteria for unspecified psychoactive substance dependency to develop a sensible and representative set of survey items, as suggested by Nunnally (p. 92). Three "competent"

judges (experts in the content field) were used to judge the content of the items as suggested by Kerlinger (p. 459). Judges were instructed to use a 10-point likert scale to judge the degree of fit between the item content and the DSM-III-R criteria for unspecified psychoactive substance dependency, allowing only for language differences that substitute computer use for psychoactive substances. The independent judgements were then correlated to yield a validity coefficient of .75. Judges were asked to suggest revision for items that have a low degree of fit with the DSM-III-R criteria. Nunnally (p. 110) said that sometimes one must rely on content validity when there is no sensible or reliable criterion available to substantiate criterion-related or predictive validity. Such was the case with this study of computer abuse. The novelty of the concept of computer abuse or dependency, along with the dearth of research, made identification of a sensible criterion untenable at this time.

Construct validation is a continuous process with the DSM-III-R as historically described in the introduction to the revised third edition. The American Psychiatric Association (1987) appointed a work group of experts to recommend revisions based on validity and reliability issues such as reliability of diagnostic categories, consistency with research bearing on validity of diagnostic categories, clinical and educational utility,

responsiveness to critiques by clinicians and researchers, compatibility with coding systems, consensus and clarity with respect to the terminology used, suitability for describing subjects in research studies, and acceptability to clinicians and researchers of varying theoretical orientations. It is important to note that construct validation of any hypothetical construct may require many studies of the domain of observables before that construct is outlined (Nunnally, p. 99). It was likely that the range of observables for computer abuse or dependency will exceed both the basic DSM-III-R criteria used, and the scope of any one study, this study included. When sufficient evidence has been found to support computer abuse or dependency as a diagnostic entity, further research of this phenomenon will be needed to define its parameters.

#### ANALYSIS & PRESENTATION OF RESULTS

The Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised (American Psychiatric Association, 1987, p. 169) provides the nationally accepted criteria for psychoactive substance abuse, which were used to evaluate survey results from this computer abuse study. All the questionnaire data received was used.

Recent diagnostic studies appear to favor the DSM-III-R over the older DSM-III for reliability and validity of results (Ben-Tovim, 1988, pp. 1000-1002; Brett, Spitzer & Williams, 1988, pp. 1232-1235; Volkmar, Bregman, Cohen & Cicchetti, 1988, pp. 1404-1408). The term "substance" will be used in this context to refer to the computer use experience. As indicated previously, Peele has established that persons can become addicted to experiences.

The diagnostic criteria follow:

A. A maladaptive pattern of psychoactive substance use indicated by at least one of the following:

(1) continued use despite knowledge of having persistent or recurrent social, occupational, psychological, or physical problem that is caused or exacerbated by use of the psychoactive substance, or

(2) recurrent use in situations in which use is physically hazardous.

B. Some symptoms of the disturbance have persisted for at least one month, or have occurred repeatedly over a longer period of time.

C. Does not meet the criteria for psychoactive substance dependence. Dependence denotes a more serious form or progression of the disorder than abuse.



Dependency includes all the criteria for diagnosing abuse, plus other criteria. DSM-III-R criteria (American Psychiatric Association, 1987, 167-168) for psychoactive substance dependence is paraphrased as follows:

A. At least three of the following:

(1) Substance taken in larger amounts, or over longer time than intended,

(2) persistent desire or one or more unsuccessful efforts to control use,

(3) a lot of time spent in procuring the substance, taking the substance, or recovering from its effects,

(4) frequent use or withdrawal symptoms when expected to fulfill major role obligations at home, school, or work, or when substance use is physically hazardous,

(5) important social, occupational, or recreational activities given up or reduced because of substance use,

(6) continued substance use despite knowledge of having a persistent or recurrent social, psychological, or physical problem that is caused or exacerbated by use of the substance,

(7) marked tolerance: need for markedly increased amounts of the substance to achieve the desired effect, or markedly diminished effect with continued use of the same amount,

(8) substance often taken to relieve or avoid withdrawal symptoms.

B. Some symptoms of the disturbance have persisted for at least one month, or have occurred repeatedly over time.

Computer users who did not meet the DSM-III-R criteria did not receive a diagnosis of computer abuse or computer dependency, providing differentiation between heavy users and abusers. Minimum survey scores were required to differentiate between diagnoses of abuse and dependency. Descriptive statistics including measures of central tendency, variance, and percentages of persons who meet diagnostic criteria are presented in tabular form in the appendix.

#### SUMMARY

The problem of computer addiction was introduced. The background, purpose, and significance of the study were discussed. Assumptions and limitations were delineated. Major issues, research questions, variables, and hypotheses were addressed as appropriate. Terms were defined. A review of the relevant literature was documented. Procedures and method were discussed in detail, including population, sampling, data gathering, instrumentation, evaluation of results, and validity and reliability.

## CHAPTER FOUR: RESULTS

A reliable and valid DSM-III-R instrument for measuring computer abuse and dependency was developed as part of this dissertation study. The Kuder-Richardson formula 20 (K-R 20) yielded a reliability coefficient of .76, and multiple correlation between three independent expert judges yielded a validity coefficient of .75. Two of the five computer users who responded to the survey earned scores above the minimum score required to diagnose abuse, based on DSM-III-R criteria accepted by the medical community. For the two computer abusers, a pathological pattern of use was evidenced, affecting social functioning. Therefore, it was found that substance abuse criteria were applicable to the phenomenon called computer addiction, indicating that computer abuse has features common to other addictions. This finding does not mean that there are not significant differences between computer addiction and other addictions. That question will require further research. Because substance abuse criteria has been applied to a variety of substances, and has now been expanded to include computers, there is support for the possibility of cross-dependency, dual-addiction, and tranference between computer addiction

and other addictions (Dryden, 1986, pp. 309-327). Although two computer users scored in the abuse range, none reached the minimum score required to diagnose dependency (SEE TABLE 2). Therefore, though some questions about the specific nature of computer addiction remain unanswered (eg. withdrawal, tolerance), progress was made towards the measurement and diagnosis of computer addiction. The growing population of computer users is cause for treating the computer addiction problem seriously, irrespective of the novelty of the phenomenon (Ingber, 1981, p. 90).

The survey response rate was lower than expected with respect to the response rate (20.4%) prior to phone followup. Phone followup was used to contact those persons who did not respond to the survey within one week. The purpose of the telephone contact was to collect survey data. The Post Office returned 11.33% of the surveys, marking them as undeliverable. The surveys may have been undeliverable because persons moved without leaving a forwarding address, or because the Post Office did not make an aggressive attempt to deliver the mail, or for some other plausible, but unknown, reason.

Although such a finding might have been expected with any large mailing, it was not anticipated. Subsequent large mailings would also likely yield some undeliverable mail. However, when the telephone followup is included, the 71.4% response rate exceeds the 50% return rate considered adequate (Best & Kahn, 1986, p. 178).

Demographic data was sparse because of the small number of survey forms returned, and because phone followup was used only for very limited information, and to encourage survey completion. Ethical and financial considerations prevented further intrusion via telephone. Demographic data provided some unexpected information. The mean age for computer users (40.2 years) was younger than that for non-users (64.8 years). There was also a higher ratio of females to males among users (3:2) compared to non-users (1:8). Refer to TABLE 1 for a summary of demographic data obtained.

## TABULAR PRESENTATION OF RESULTS

TABLE 1: Statistical Survey Data\* Comparing Computer Users and Non-users

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	COMPUTER USERS (n=5)	NON-USERS (n=9)
Age Range:	27-65 years	39-89 years
Mean Age:	40.2 years	64.8 years
Number of Males:	2	8
Number of Females:	3	1
Level of Education:	H.S. (Mo=3)	H.S. (Mo=3)

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\* Unless specified as a range, average, or percent, the numbers in the table represent raw data. The data was derived only from returned surveys, and not from telephone followup.

\*\*\*\*\*

TABLE 2: Computer User Survey Data

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Mean Age for First Hands-on Computer Experience: 35.8 years  
-----

Average Daily Hours of Computer Use:  
at work 1.5  
at home 0  
elsewhere 0  
-----

Type of Computer Used:  
mainframe 2  
personal computer 4  
other 0  
-----

Primary Purpose of Computer Use:  
programming 1  
home applications 0  
work applications 5  
education 0  
games 0  
other 0  
-----

Type of Computer Access:  
own 1 borrow 0 rent 0 other 4  
-----

Mean Survey Score\*\*: 3                      Range of Survey Scores: 0-7  
-----

\*\* A survey score of four or greater is required to diagnose computer abuse.

## CHAPTER FIVE: DISCUSSION

This investigation was expected to yield information about the etiology of computer addiction. More information was expected about progression, patterns of use, and other signs and symptoms of the DSM-III-R. The development of a reliable and valid survey for measuring computer use and addiction was also an important aim of this study. Instrument development and information about computer addiction fell short of expectations because cluster sampling of the Iowa population resulted in a small sample and limited information. Therefore, larger samples limited to computer users are likely to provide more information about computer addiction, and contribute to increased reliability and validity of an instrument for measuring computer use and addiction in the future. The use of the DSM-III-R may also have limited the amount and type of information obtained. The use of diagnostic systems and instruments that go beyond the parameters of the DSM-III-R are suggested. Although the non-experimental design, subjectivity of the DSM-III-R, cluster sampling of Iowans, limited resources for research, and ethical and legal considerations limited the study, it is important to note that the limited background and theoretical base available on computer addiction were instrumental in the methodological decisions made.



The results, though limited by size, showed some indication of computer addiction. It is also important to note that the survey form developed is of sufficient reliability and validity to show promise for further refinement and use.

Because the Atlantic Institute Poll of 1985 finding that 37% of Americans had used computers was used as a frame of reference, the rate of respondents (8.2%) using computers was lower than expected, giving rise to new directions for future research, and implications for sampling methods. Future researchers should consider sex differences among computer users, focus on the younger computer users, consider computer-assisted presentation of survey items, and investigate computer games as a possible major source of addiction. Because cluster sampling of Iowans yielded a small sample of computer users, future sampling might better be limited to group(s) of computer users for test validation purposes and to obtain more data on the precise symptoms of computer addiction. Because only five of the sixty surveys (8.33.%) identified Iowa computer users, a larger cluster sample would be required to yield enough computer users for types of statistical analyses that rely on large samples. Perhaps the number of computer users in Iowa is lower than the national average because of the nature of the Iowa population, which is scattered, smaller, and largely rural when compared to

heavily concentrated industrialized areas on the east and west coast. It is possible that computer addiction may be found in those areas, and may not have reached Iowa. There are other plausible explanations for the small number of computer users found. Though a larger number of computer users was expected, readers are reminded that the small number of computer users gives rise to some positive new directions for computer addiction research, such as investigating sex differences, computer games, younger population of computer users, denial as a characteristic of addiction, and instrument validation.

One plausible explanation for the small number of computer users is that the survey was directed towards head-of-household, which would be unlikely to tap the number of young computer users. Some supporting evidence comes from three respondents (6.1%) who provided unsolicited information that younger family members were computer users. The investigator followed the suggestion of the dissertation advisor to direct the survey to head-of-household. Although the rationale for such directions would be to reduce error variance by controlling the consistency of who responds to the survey, it would appear that future instructions could be modified to include any computer user in the family without sacrificing the principle of randomization. However, the greatest

concern has to do with denial, a characteristic of addiction (See APPENDIX D). For example, if one were to conduct any kind of survey of alcoholism among the general population, one would expect to discover varying degrees of denial, unless the questions were so subtle that respondents could not discern the purpose. One implication is that the survey may have resulted in a number of false negatives, meaning that there may still be a significant number of hidden computer addicts in the Iowa population.

The nature of computer addiction with its diagnostic features, its similarities and differences to other forms of addiction, remains undetermined from this survey. Questions about withdrawal, tolerance, and social, physical, psychological, and vocational implications of computer addiction remain unanswered. However, ever some interesting findings were noted. Two of the five computer users who responded earned survey scores in the abuse range, which could be alarming if this proportion holds true for the population of computer users at large. It is also interesting to note that the sample of computer users was younger than the sample of non-users, which could imply that computer use and/or addiction may be a relatively new phenomenon. Keeping in mind the small sample size, it may be noteworthy that there was a larger proportion of females than males among computer users than was found

among non-users, possibly indicating that sex may be a significant variable in computer use and/or abuse, particularly since both respondents earning scores in the abuse range were females. Could this mean that females are more likely to respond to surveys than males, or that females are more honest in responding to survey questions, or what? Obviously, more exploratory research among a large sample of computer users is needed to answer many of these key questions. Larger sample sizes decrease measurement error, and are preferred when there are a variety of uncontrolled variables, or when the sample is to be divided into subsamples. The reader is encouraged to refer to APPENDIX E for a detailed discussion of types of sampling and sample size. Specific ways to increase the sample size of computer users by unobstrusive methods are introduced to prospective researchers in APPENDIX F.

Given the results of this survey, it is premature to worry about treatment, education, or prevention. One useful product of this research was the development of an instrument for measuring computer addiction. Coefficients for reliability (.76) and validity (.75) were in the moderate range for the survey instrument. Subjectivity on the part of the judges may have contributed to a slightly elevated validity coefficient, given that a general rule of thumb is that validity is limited to the reliability

coefficient squared. It is also well-known that the reliability of an instrument can usually be increased by increasing the number of items in the test. It may be reasonable to consider increasing this survey instrument by ten items in order to increase reliability without making the test too long. In the future it may also be extremely helpful to refine the instrument so that presence and degree of denial can be ascertained. Exploratory research is needed to define the symptoms and parameters of computer addiction, particularly because the results were incongruent with prior computer addiction studies, and because the Iowa population does not appear to fit the national norms for computer use. Future computer addiction researchers should consider

- (a) surveying computer user groups, and
- (b) computer centers in schools to get a larger sample of computer users,
- (c) surveying a young population with a focus on computer games to better understand the development of computer addiction,
- (d) refining the survey instrument to account for the denial factor,
- (e) approaching personnel offices of high-tech companies to gain their cooperation so large samples of employees can be surveyed for signs of computer addiction,

(f) using computerized survey presentation and recording so more accurate data can be obtained unobstrusively, and

(g) using collateral reports supplemented by observations to unobstrusively obtain data about computer use. Such information could include game rental records, records of computer directory size, amount of time spent on-line, size and complexity of programs developed by computer users, customer profiles and sales records from computer companies. An extended discussion of these research options can be found in APPENDIX F. In conclusion, more exploratory research is needed before we become concerned with prevention, education, or treatment because neither this study nor earlier studies have adequately defined the nature and parameters of computer addiction, and because computer addiction may still be one of the most serious problems society will have to face. Hopefully, this study will generate sufficient serious interest to challenge investigators to explore the phenomenon of computer addiction.

## REFERENCE NOTE

1. Fornshell, G. Personal communication, March, 1990.

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APPENDICES A-F

APPENDIX A: COVER LETTER

Dear Respondent:

The purpose of the enclosed questionnaire is to gather information about computer use for my doctoral dissertation. Participants will receive a summary of the results when the study has been completed. The person answering the questionnaire should be the head of the household. Your identity will be kept confidential. I will deeply appreciate your cooperation in completing the questionnaire and returning it in the stamped, addressed envelope provided. Even if you have not used a computer, please indicate this fact in the space provided on the questionnaire and return it.

Sincerely,

Randy Young,

Licensed Psychologist

APPENDIX B: COMPUTER USER SURVEY

INSTRUCTIONS FOR THOSE PERSONS WHO HAVE NOT USED A  
COMPUTER: NOTE: If you have not used a computer, place an  
(x) on the blank following this sentence. \_\_\_\_\_

If you have not used a computer, complete ONLY Section I  
and return the questionnaire in the stamped, addressed  
envelope provided.

INSTRUCTIONS FOR COMPUTER USERS: This questionnaire  
consists of three sections. Sections I & II require  
filling in blanks with correct responses. Section III  
consists of True (T) or False (F) items that require  
placing an (x) on the line to the right of the correct  
response. There is a response option for "does not apply"  
(NA).

Example: This survey is interesting. NA\_\_\_ T\_x\_ F\_\_\_

## SECTION I:

Name \_\_\_\_\_ Race \_\_\_\_\_ Birthdate \_\_\_\_\_  
Sex \_\_\_\_\_ Highest degree held \_\_\_\_\_  
Job Title \_\_\_\_\_

## SECTION II:

Average daily hours of computer use:

at work? \_\_\_\_\_ at home? \_\_\_\_\_ elsewhere? \_\_\_\_\_

Age at the time of first hands-on Computer experience:

\_\_\_\_\_ years old

PLEASE PLACE AN (x) ON THE BLANK TO THE RIGHT OF YOUR  
CORRECT CHOICE(S):

Type of computer used:

mainframe? \_\_\_\_\_ personal computer? \_\_\_\_\_ other? \_\_\_\_\_

Primary purpose of computer use:

programming \_\_\_\_\_ home applications \_\_\_\_\_

work applications \_\_\_\_\_ education \_\_\_\_\_ games \_\_\_\_\_ other \_\_\_\_\_

Type of computer access:

own your computer? \_\_\_\_\_ borrow? \_\_\_\_\_ rent? \_\_\_\_\_ other? \_\_\_\_\_

COMMENTS:

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SECTION III:

1. I have spent a great deal of time doing computer-related activities such as operating a computer, or buying computer equipment. NA \_\_\_ T \_\_\_ F \_\_\_

2. It is rare that I spend more time using the computer than intended. NA \_\_\_ T \_\_\_ F \_\_\_

3. I have found that computer use helps me decrease or avoid feeling anxious, depressed, or irritable. NA \_\_\_ T \_\_\_ F \_\_\_

4. I have not allowed my computer use to interfere with major responsibilities at home, work, or school. NA \_\_\_ T \_\_\_ F \_\_\_

5. I have spent very little time doing computer-related activities such as operating a computer, or buying computer equipment. NA\_\_\_ T\_\_\_ F\_\_\_
6. Attempts to cut down my computer use have been unsuccessful. NA\_\_\_ T\_\_\_ F\_\_\_
7. I have found that it takes no more computer use now than it has in the past to get me feeling the way I like to feel. NA\_\_\_ T\_\_\_ F\_\_\_
8. I have reduced or given up social, recreational, or occupational activities because of computer use. NA\_\_\_ T\_\_\_ F\_\_\_
9. Sometimes I have used the computer longer than intended. NA\_\_\_ T\_\_\_ F\_\_\_
10. I have not had computer-related problems of a social, mental, emotional, or occupational nature that have lasted longer than one month. NA\_\_\_ T\_\_\_ F\_\_\_
11. When deprived of computer use, I have felt anxious, depressed, or irritable. NA\_\_\_ T\_\_\_ F\_\_\_
12. I have had an ongoing desire for computer use. NA\_\_\_ T\_\_\_ F\_\_\_



13. My computer use has interfered with the fulfillment of major responsibilities at work, school, or home.

NA \_\_\_ T \_\_\_ F \_\_\_

14. I find that it now takes more time than it used to take for me to get the desired feeling from my computer use.

NA \_\_\_ T \_\_\_ F \_\_\_

15. Sometimes I have returned to computer use to reduce or avoid negative feelings.

NA \_\_\_ T \_\_\_ F \_\_\_

16. I have continued my computer use in spite of mental, social, emotional, or physical problems like family arguments, upset feelings, or headaches that may be related to my computer use.

NA \_\_\_ T \_\_\_ F \_\_\_

17. I have not allowed my computer use to interfere with time spent for recreation, work, or socializing.

NA \_\_\_ T \_\_\_ F \_\_\_

18. I have experienced no changes in mood (eg. anxiety, depression, irritability) when deprived of computer use.

NA \_\_\_ T \_\_\_ F \_\_\_

19. There have been times when I have stopped my computer use because of related social, emotional, mental, or physical problems such as marital complaints, depression, or muscle strain. NA\_\_\_ T\_\_\_ F\_\_\_

20. I have experienced some of the computer-related problems indicated in this questionnaire for one month or longer. NA\_\_\_ T\_\_\_ F\_\_\_

APPENDIX C: RESUME

RANDY M. YOUNG

609 West Nishna

Clarinda, Iowa 51632

(712) 542-5839

OBJECTIVE

A challenging and rewarding position using my broad skills and experience as a Psychologist/Administrator.

EDUCATION

Present: Third-year doctoral student in Training and Learning program at Nova University.

1986: Completed ten semester hours in Industrial/Organizational Psychology graduate program at University of Nebraska at Omaha before decision to transfer to Nova.

1979: Earned M.S. in Counseling Psychology from Northwest Missouri State University.

1977: Earned B.A. in Psychology from Northwest Missouri State University.

1975: Earned A.A. in Human Services/Psychology from Iowa Western Community College.

## EXPERIENCE

PSYCHOLOGIST/ADMINISTRATOR: Clarinda Treatment Complex, 1980- to present. Psychologist responsible for administration of the Alcohol and Drug Treatment Unit since 1980. Responsible for administration, psychometrics, psychotherapy, program evaluation and development, supervision of program personnel, and special projects. Appointed Chief of Psychology Department in 1988. Responsible for delivery of all psychological services, supervision of all psychologists, all psychological research on campus, and quality assurance activities for psychology. Also responsible for supervision of psychology graduate students involved in on-campus practicums. Served as President of the Clinical Staff for two years, with primary responsibility for clinical privileging within the organization. Complete job description available on request.

SOCIAL WORKER: Clarinda Treatment Complex, 1977-1979. Responsible for group and individual therapies, social histories, casework, planning and placement. Worked with psychiatric and substance abuse inpatients. Also worked with adolescents in a token economy setting. Appointed Administrative Director of the Alcohol and Drug Treatment Unit in 1979.

MENTAL HEALTH WORKER: Clarinda Treatment Complex, 1973-1977. Responsible for direct nursing care including administration of prescribed medications, observation, and supervision of patients. Worked with psychiatric patients, substance abuse patients, and adolescents in a token economy.

PART-TIME COLLEGE INSTRUCTOR: Iowa Western Community College, 1980-1988. Taught courses in psychology and substance abuse education.

PART-TIME OUTPATIENT THERAPIST: Waubonsie Mental Health Services, 1982-1983.

LICENSED PSYCHOLOGIST SUPERVISOR: Waubonsie Mental Health Services, 1988-Present. Part-time as needed. Supervision of non-licensed psychologists. Reviews psychological reports for court.

## AWARDS AND HONORS

Elected President of the Clinical Staff 1982-1984.

Appointed Employee of the Month.

Listed in Who's Who in the Midwest 19th edition.

Graduated from Iowa Western and Northwest Missouri State with highest honors.

Winner of the "I Dare You" award for qualities of leadership, 1971.

Sixth grade citizenship award.

## PROFESSIONAL QUALIFICATIONS AND AFFILIATIONS

Licensed psychologist in Iowa, No. 00499.

Member of Society of Psychologists in Addictive Behaviors.

Membership in American Psychological Association, and Division of Measurement and Evaluation.

Chair of ADTU Advisory Board.

Chair of Psychology Department.

Member of Standards Review Committee.

Member of Board of Directors for Southwest Iowa Family Systems Project, 1978-1980.

## SPECIAL PROJECTS AND ACTIVITIES

Currently working on needs assessment and program development for a new women's substance abuse treatment program at the Clarinda Treatment Complex.

Twice in the Spring of 1988 I was invited as a guest on the KMA radio talk show to discuss and answer questions about substance abuse.

In 1987 I assisted with the grantwriting and development of THE OTHER WAY (TOW) program for substance abusers in prison. The TOW program is currently operating successfully in the prison facility on the Clarinda campus.

In 1982 I was given primary responsibility for the needs assessment, development, implementation, and administration of a new Quarterway program for males in the chronic stage of chemical dependency. The program is still operating successfully today.

While a graduate student at the University of Nebraska at Omaha, I developed a new assertiveness scale for a test construction project.

In 1984 I conducted a caffeine research project using the substance abuse inpatient population at the Clarinda Treatment Complex.

In the mid 1980's I conducted a series of workshops on stress management for Iowa Western Community College and Southwestern Community College.

Throughout my undergraduate and graduate education at Northwest Missouri State University, University of Nebraska at Omaha, and Nova University, I took coursework in experimental psychology, program evaluation, measurement and design, and research and statistics. Required modules of expertise at Nova University helped me in the area of applying research to my work. For example, in one study I compared computer tutorial methods of substance abuse education to more traditional methods.

#### PERSONAL DATA

I was born August 6, 1952. I'm married and have twin sons born on Valentine's day. I enjoy spending time with my family, reading, computers, outdoor sports, and travel vacations.

#### REFERENCES

References are readily available on request.

## APPENDIX D: DENIAL

The concept of denial is worthy of discussion because of its likely influence on the results of this computer addiction study. Denial is defined as "an addicted person's refusal or inability to admit the existence of a drinking or drug problem (O'Brien & Cohen, 1984, p. 80)." O'Brien and Cohen also stated that denial is useful in distinguishing alcoholics from social drinkers. Perhaps denial accounts for the small number of computer users who responded to the survey. Perhaps denial should be measured?

Kinney and Leaton (1983, p. 189) explained that the function of denial for the alcoholic is to defend oneself against anxiety that facing reality would bring. They suggested that denial can serve the useful function of warding off anxiety until the strength to face the problem has been gained. Peele (1985, p. 99) also discussed the pain and tension-reduction aspect of chemical dependency. Donovan and Marlatt (1988, p. 407) stated that the accuracy of self-report measures for heroin users and alcoholics has been biased when the consequences for lying were positive. Donovan and Marlatt suggested some measures designed to improve the validity of self-report instruments. Readers are encouraged to refer to APPENDIX G for further discussion on unobstrusive methods for removing or

minimizing the effects of denial from survey results. The discussion so far has related denial to alcohol and other drugs. Does denial extend beyond chemical addiction? McCabe (1978, p. 14) stated that denial is found in the family of the alcoholic, just as it is with the alcoholic. Donovan and Marlatt (p. 25) said that the conceptual framework of chemical dependence can probably be generalized to many other addictions. Part of the challenge for future researchers will be to see how well the concepts of alcohol and drug addiction can be applied to computer addiction.



## APPENDIX E: TYPES OF SAMPLING AND SAMPLE SIZE

Cluster or area sampling was used for this study because part of the aim was to find out the percent of computer users and addicts in the Iowa population, and to make demographic comparisons. However, the small number of computer users identified by the study leads us to new directions for sampling. A relatively simple way to increase the number of computer users would be to limit the study to computer users, rather than surveying the population at large. Such an approach would also increase the probability of identifying computer addicts. It should be noted that the number of computer users must be measured before one measures the use of computers. Refer to APPENDIX G for a discussion of alternative methods for studying computer user populations.

Another alternative approach to sampling could consist of simply increasing the sample size regardless of the specific sampling procedure used. Isaac and Michael (1981, pp. 190-191) stated that large samples are preferable because they function to decrease sampling error. Isaac and Michael also advocated use of a large sample when the study involves a wide range of uncontrolled variables, when the sample is to be divided into subsamples, or when the differences in results are expected to be small. Best and Kahn (1986, p. 17) echoed the above statements, and also

suggested that survey-type studies and those with mailed questionnaires use larger samples. However, Best and Kahn also acknowledged subject availability and cost factors as legitimate considerations in sample size, as was the case with the current study. See APPENDIX G for discussion on specific methods for increasing sample size for computer user studies.

The researcher who investigates computer addiction can choose from a variety of sampling methods that include probability sampling, nonprobability sampling, quota sampling, purposive sampling, accidental sampling, stratified sampling, and systematic sampling. Kerlinger (1973, pp. 129-130) discussed the various types of samples. Probability sampling involves some form of random sampling. Random sampling (Isaac & Michael, 1981, p. 132) is a method of selecting a sample from the population so that each member of that population has an equal chance of being selected. Kerlinger stated that nonprobability sampling does not use random sampling, and lacks the virtues of random sampling. Kerlinger defined quota sampling as a form of nonprobability sampling that involves selection based on knowledge of the strata of the population such as sex, race, or some other characteristic. Purposive sampling is another form of nonprobability sampling that relies on judgement and

deliberate effort to obtain a representative sample by including typical groups or areas. Kerlinger identified "accidental" sampling as the weakest form of sampling. Accidental sampling consists of using whatever samples are available.

Probability sampling comes in a variety of forms (Kerlinger, 1973, p. 130). For stratified sampling, the population is divided into strata or subgroups from which random samples are selected. A systematic sample involves the selection of each  $n$ th term from a list, such as a telephone directory. Probability sampling involving some form of random sampling is the method that I recommend for future investigation of computer addiction. Best and Kahn (1986, p. 12) advocated randomization to obtain a representative sample, and to permit generalization beyond the sample. They also noted that randomization makes it possible to estimate sampling error. Kerlinger (pp. 118-127) discussed randomization at length, and recommended random sampling largely because of representativeness, meaning that the sample is likely to approximate the characteristics of the population. Unlike the current study, computer addiction research discussed in the REVIEW OF THE LITERATURE section of this paper did not use randomization. Again, future researchers in the area of computer addiction are advised to use some form of random sampling.

## APPENDIX F: FUTURE COMPUTER ADDICTION RESEARCH, LARGER SAMPLES AND UNOBSTRUSIVE METHODS

Because of the resultant small number of computer users identified by the current study, and because of unanswered questions about the nature of computer addiction (eg. tolerance, withdrawal), larger samples and unobstrusive methods are recommended for future research in the area of computer addiction. Unanticipated variables such as denial (See APPENDIX E) may partly account for the small number of computer users who responded to the survey. Perhaps the survey was too obstrusive for computer addicts because of the denial that is characteristic of addiction. Computer users who are not addicts would not be expected to view the questions as obstrusive. Therefore, obstrusiveness may depend on the person's frame of reference. Because these problems must be considered by future computer addiction researchers because of probable influence on the results, some ways to obtain larger samples via unobstrusive methods will be suggested in the following discussion.

There are a variety of ways that the sample size of computer user surveys can be increased. Obtaining cooperation with a state, regional, or national computer user group(s) could yield hundreds of respondents. Some

high-tech corporations might also cooperate with a computer user study if management can be convinced that there are implications for productivity. University settings often support large numbers of computer users, and might support the study of computer addiction in the spirit of research and the search for knowledge. Universities that have counseling centers might also be motivated to be among the first to identify and treat computer addiction. Perhaps grant monies could be sought to defray expenses.

There are a variety of unobtrusive methods for minimizing or measuring the effects of denial and other self-report biases that could influence results. Because it is computer use that is being investigated, computer administration of the questionnaire would be natural for that particular environment, and therefore, less obtrusive. It is also possible that computer users are accustomed or conditioned to respond to messages they receive after logging on to a system. Incentives for completing the on-line questionnaire might include free computer time. Of course the ethical considerations for administering the survey via the very medium to which the individual may be addicted would need to be addressed.

There are a variety of advantages to using a computerized survey. In an unpublished article, Sbordone (See REFERENCES) discussed the advantages of computer

assistance in cognitive rehabilitation. Some advantages mentioned include flexibility, the opportunity to control factors such as duration of stimuli presentation, display constancy, randomly generated stimuli, and immediate feedback. Sbordone also stated that the computer can free human time for other important tasks such as monitoring the subject's performance. Bracy, Lynch, Sbordone, and Berrol (1985, pp. 10-23) said that computers tend to be more kind and tolerant than staff members in responding to the user. Other advantages cited are that the computer can save money by administering repetitive tedious tasks, and by automatically collecting and tabulating data. Bracy (p. 15) told colleagues that that some things are more precisely presented by the computer, and that measurements taken by computer are controlled better than measurements taken by humans. Because many of the advantages of computer-assisted presentation can be applied to a computer user survey, investigators are encouraged to consider such an approach for future computer use research.

The results of the survey left unanswered questions. How is computer addiction like other addictions? How does it differ? How does one differentiate between computer abuse and dependency? Does tolerance develop? Are there withdrawal symptoms? What is the exact nature of computer use and abuse? Larger samples and survey questions that

are less obstrusive to the computer addict may help increase the amount of information received so that such questions can be addressed. The small number of computer users identified by the survey may be partly attributed to the structure and content of the survey, which was based on the DSM-III-R. The DSM-III-R survey did not take into account denial or other self-report biases. The survey instrument may also have been too obstrusive and too narrow in its criteria to identify more subtle parameters associated with addiction. Future researchers may need to develop less obstrusive instruments, or instruments that measure denial or that minimize self-report biases. Donovan and Marlatt (1988, pp. 24-25) advocated that dependence be viewed as a syndrome requiring multidimensional criteria for assessment. They stated that the conceptual framework of alcohol and drug dependence can be generalized to a wide variety of addictions. Donovan and Marlatt also proposed that the DSM-III be revised to remove the distinction between abuse and dependency. Perhaps this view of addiction as a syndrome can be applied to computer addiction, and can possibly be used to develop an unobstrusive measure for computer addiction. Donovan and Marlatt (pp. 407-408) discussed the problems of accuracy when using self-report surveys with alcoholics and drug addicts (See APPENDIX E). They suggested the use of

collateral reports and records to improve accuracy. For example, medical records, hospital admissions, urinalysis, and arrest reports can be used to check the accuracy of some self-reports. Donovan and Marlatt also cautioned that truthful reporting cannot be expected when there is a threat of punishment. Denial, as discussed in APPENDIX B, is common across a variety of addictions, and may be a significant factor in computer addiction. If this is true, then threat of punishment for truthfulness may be a characteristic of computer addiction, as has been found with alcoholism. Some support for this idea comes from a statement made to me by G. Fornshell, Director of the Computer-based Learning Center at Nova University, who said that a computer addiction study could not be conducted at Nova because a staff member with computer addiction might be identified. Fornshell further stated that this finding could lead to negative consequences for the Center, which relies on computers as its primary medium of operation. However, there is some promise of developing an instrument that will reduce self-report bias by reducing or eliminating threat of punishment. Skinner (1982) developed the Drug Abuse Screening Test (DAST), a 25-item instrument based on self-report when no punishment for truthfulness is involved. The computer addiction researcher may do well to consider adapting such an instrument as a model for measuring computer addiction.



The use of records or collateral information can also be applied to computer addiction research. For example, on-line activities of computer users could be recorded. Such records could include amount of time on-line, size of directory, number and complexity of computer programs developed, time spent playing computer games, or time spent designing computer games. This record-keeping approach could be extended to children's use of computer games. For example, records of frequency of computer game rentals could be examined. The frequency of use of computer games in arcades could be ascertained by counting the amount of money in machines, and could be supplemented by observation and behavior records. Sales records and customer profiles from companies selling computer games are also examples of non-obstrusive means of gathering information about computer users.

The discussion of ways of obtaining larger samples of computer users and unobstrusive methods for obtaining data was intended to interest the prospective computer addiction researcher. As with many scientific endeavors, this computer addiction survey raised many more questions. The future addiction researcher is challenged to explore some of the new directions discussed. The final decision on the specific method to employ for future research in computer addiction will rest with the investigator, as it should.

I certify that I have read and am willing to sponsor this dissertation submitted by RANDY YOUNG. In my opinion, it conforms to acceptable standards and is fully adequate in scope and quality as a dissertation for the degree of Doctor of Science at Nova University.

DEC 2, 1990  
(date)

Barry A. Centine  
NAME OF ADVISOR  
Dissertation Advisor

I certify that I have read this dissertation and in my opinion it conforms to acceptable standards for a dissertation for the degree of Doctor of Science at Nova University.

Dec 2 1990  
(date)

[Signature]  
NAME OF ADVISOR  
Local Committee Member

This dissertation was submitted to the Central Staff of the Center for Computer and Information Sciences of Nova University and is acceptable as partial fulfillment of the requirements for the degree of Doctor of Science.

Dec 2 1990  
(date)

George K. Fournelle  
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Central Staff Committee Member