COMPUTERS AND HUMAN INTERACTION

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ABSTRACT

This project addresses computers and human interaction in junior and senior high schools. The focus of the study is people-- their attitudes and opinions regarding the impact of computers on human interaction, people's effect on computer implementation, and how computers can be used. Since these attitudes of individuals are important, it is the intent of this project to identify, gather, and compare the attitudes of students, teachers, parents, and senior administration. The implications of this study are to allow for personal use and for the development of strategies to implement and use computers in the school. The study itself consists of three components: a survey of the before mentioned individuals, a written response component in which respondents could elaborate on their responses, and an interview process with four survey respondents.

The survey component comprises a questionnaire to determine attitudes regarding computer impact on human interaction, attitudes regarding the influence people have on computer implementation, and computer use.

The written response aspect of the instrument is intended to give all respondents the option of expanding on or explaining their responses to specific survey statements.

The third portion of the study, the interview, is designed to produce rationale and greater insight into responses, providing additional information for comparison.

Eighty-five of the one-hundred and thirty surveys were returned. The differences in attitudes between the groups are statistically insignificant. In general, computers are not seen as having a negative impact on human interaction, it is suggested that if at all,

not seen as having a negative impact on human interaction, it is suggested that if at all, computers produce positive influences on interaction. Responses vary somewhat regarding implementation; fear, teacher training, and money are at the forefront. Attitudes are mixed regarding computer use. However, stronger attitudes do not support teacher replacement by computers.

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TABLE OF CONTENTS

LIST OF FIGURES

1. Preamble

Over the past several years, I have noticed a variety of reactions and behaviours by students, teachers and office personnel as they worked with the computers in the school in which I teach. Excitement, anxiety, indecision, frustration, fear, and anger were emotions displayed as each individual attempted some task that was supposed to be more easily, quickly, and completely accomplished with the help of computers. Thus my study was born, and along with that, the decision to administer a survey.

The purpose of this research is to add to the existing knowledge about computer use in the education of Junior and Senior High students. Specifically, my objective is to gather opinions concerning the impact computer use has on human interaction in schools. Related to this is my desire to research how students, teachers, parents, and significant others affect the implementation of computers in our schools, as well as how computers should be used in schools.

The issue of computer use in schools is not only dynamic but it is controversial. On one side there are computer enthusiasts who believe that computers are good and may even be the saviour of our educational system. On the other are humanists, who worry that computer use in schools will dehumanize education; that is, there might be a serious loss of the human relationships between those who learn and those who teach. Also to be considered are the factors of need, fear, anxiety, costs, politics and, of course, what is best for the education of our youth.

With the data supplied by this and other studies, school districts, educators and

parents may be better able to make decisions related to the implementation and use of computers in schools and their impact on human interaction.

The fundamental questions addressed in my research centre on the impact of computer use and implementation on human interaction in Jr/Sr high schools. Related questions focus on how teachers, parents, and students affect the implementation and use of computers in the Jr/Sr high Schools. And finally, how should computers be implemented and used in Jr/Sr High Schools?

What are the implications for this research? The attitudes identified in the research will enable policy and decision makers to better understand people's feeling toward computer integration and use. This will allow for the development of more effective strategies for use in classrooms, help integrate computers more smoothly, communicate with individuals involved and help relieve those feelings of anxiety. Most importantly, it may help the school with its transition through this major technological upgrade.

2. Introduction

Although uneasily accepted, computers have achieved a permanent and expected place in schools. Computer use can be found in business education courses right through to the practical applications of the office, such as student time-tabling.

In the work world, computers are a significant part of any business today. It is therefore imperative for students completing high school to possess the computer skills

necessary to find employment in the work world or to continue on to post secondary school.

Even though computers are a permanent fixture in Jr/Sr high schools, it seems that they have not had a significant impact on instructional pedagogy or methodology (Woodward & Mathinos, 1987). High school programs, other than business education courses, appear to have one of the lowest rates of computer use among schools in Alberta (Petruk, 1986). And, while a majority of the province's high school teachers can be considered "computer literate", there seems to be concern with the limited amount of use made of computers outside of the business education programs (ibid).

The computer does have the potential and capability to make Junior and Senior high school instruction more appealing to students. Access to the internet, computer CD-ROMS and simulations allow students to have experiences that they would not normally have, and may ultimately change their learning environment (Educational Technology Research and Development [ETRD], 1993). The more traditional computer "utilities" such as word processing, graphing and spread sheet programs, allow and encourage students to use the computer as a tool, similar to that of a calculator or a drill in shop class (Mayes, 1992; Business Education Forum [BEF], 1993).

Education authorities and documentation charge teachers to not only use computers as part of their teaching methodology, but to make students aware of the significant role computers will have in their future (Educational Technology, 1992).

Increased implementation of computers in all aspects of the school program seems unavoidable (Alberta Education, 1987). Currently, computers are not being fully

integrated into school programs (Woodward & Mathinos, 1987), due not to the shortcomings in the technology, but due rather to teachers themselves and teacher education (Educational Technology, 1992), and the linguistic barriers i.e. commands and messages. The inevitability of comparisons between people and machines, "machines personified, people mechanized", results in people seeming less powerful (ibid). School restructuring involving teachers becoming facilitators rather than dispensers of knowledge would provide for an improved environment in which computer use would thrive (ibid). Thus the focus of this project is the impact of computer use on human interaction in Jr/Sr high schools, and the impact human beings have on the implementation and actual use of computers in education.

Teachers' acceptance of computer technology seems to depend more upon its feasibility and practical application, rather than its potential. Acceptance by teachers of any innovation demands that it be seen to offer a practical solution to real classroom needs and problems (Butt & Olden, 1983). Teacher attitudes and anxieties towards the technology itself also seem to be a major factor. To deal with anxieties related to computers, fears must be addressed directly through increased support for people, increased user friendliness, increased availability of computers and the breakdown of linguistic barriers (Smith, 1988).

The human element has an impact on, and is impacted by, computer implementation and use in schools. The questions proposed in this project, do not address the mechanics of computer implementation and use in schools but concern the human factor which definitively determines the nature of computer implementation and

use. This study reflects a more qualitative approach to this study. It is not designed to be an experimental investigation into factors, variables, controls, or outcomes. The project does, however, attempt to provide a summative description of attitudes toward use. The study focuses on student and teacher attitudes and opinions, supported also by the viewpoints and beliefs of parents, administrators, students, teachers, and board members.

3. Review of Literature

With each year that passes, studies of computer application in schools increase. Since the early 1980's researchers have been studying the potential and real uses of computers in the classrooms of Alberta. In fact, researchers such as Petruk (1981) carry on annually with research relating to computer use throughout Alberta. Many surveys on this subject have been attempted (Taylor, 1980; Petruk, 1986). More specifically, quantitative and qualitative information has been gathered regarding specific subject areas as well by Powel (1992), Mayes (1992),
Mc Gains (1991), Gardener & Morrison & Jarman (1993). Studies compiled by Alberta Education (1983, 1987) have addressed the issues, needs, and directions for computer use in Alberta schools.

Proposed computer use in schools covers a wide area. Naturally there are many supporters; for example: in business education classes teaching accounting and word processing; in the back of the classroom playing many different educational games; in many Jr/Sr high math classrooms engaging in drill and practice; at teacher's desks

calculating marks and writing lesson plans; and in the office addressing record-keeping, school budgeting, student time-tabling and even building maintenance status and fire alarms (Petruk, 1986; Powell, 1992; Mayes, 1992). Some research also indicates that computer use in schools can act as a positive supplement to the more traditional forms and method of instruction presently practiced (Mayes, 1992; [BEF], 1993). Technologies used as tools are their most obvious and common application. For example, word processors, spreadsheets, desktop publishing and computer-assisted design programs all enhance the productivity of their uses (Jonassen, 1995). Research also supports the notion that computer use helps improve the performance of its users. Technologies as tools extend human functionality (ibid, 1995). Much of the data presented in many of these studies promotes the use of computers for teaching. There are, however, more progressive ideas that promote computer use as a form of instruction rather than an instrument of support. Some researchers believe that computers have the ability to "construct learning environments that go beyond textbooks and classrooms"; that is, computers play a role linked to emerging educational goals stressing the cognitive process (ETRD, 1993). Technologies, however, can do more than extend the capabilities of humans; they can amplify them; cognitive tools extend cognitive functioning during learning (Jonassen, 1995). Researchers such as Powell (1992), Mc Gains (1991), Lillard, (1985), expound over the positive impact of computer use in schools. Computers are here to stay and the suggested uses in not only education but throughout society are endless. Along with this will be varied attitudes as to their application in the educational environment. The question still remains as to how computers should be realized and

applied in Jr/Sr high schools, obtaining maximum results without destroying that "human factor" so important to student learning and the educational environment.

Studies suggest that even though the number of computers in schools continues to increase, their actual use as part of methodologies and curriculum is not increasing proportionally (Petruk, 1986). Some research even suggests that one of the main stumbling blocks are teachers themselves and teacher education (Educational Technology, 1992). American research also supports this belief that computer numbers in schools are high but actual educational use is very low (U.S. Congress, 1995). Faison (1996) suggests that there are many barriers to technology use, but the most disturbing fact is that many practicing teachers feel that they have not had adequate training to help them deal with this effectively. While they see the value of technology, they feel ill-prepared to use these resources in the instructional setting (ibid, 1996). Other studies indicate that this "professional rejection of computers" (Smith, 1988), this reluctance to embrace computers, results from lack of knowledge of linguistic barriers, commands and messages, a fear of comparisons between people and machines personified, people mechanized and teachers see themselves as less powerful (Smith, 1988). Still other research specifically focuses on teacher computer literacy and more pointedly, the literacy of teacher educators at the post secondary level. The catalyst for change is teacher education. The missing ingredient is a technologically literate cadre of college and university teacher educators (Faison, 1996). The solution is to design intensive training programs that will encourage and enable teacher educators to integrate technology into the courses they teach (ibid, 1996). Other studies suggest that teachers' attitudes towards

computer use are based more on practical rather than philosophical concerns. It seems that the acceptance or rejection of computers is a direct result of realities within the classroom (Butt & Olden, 1983); that computers must be perceived as a workable solution to a practical classroom problem. Some educators experience intense inner conflict because the new approaches required by technology sharply contrast with their beliefs about classroom management, curriculum, collaboration, and other educational issues (Dwyer et al., 1990). Even many preservice teacher candidates state that they "fear the unknown" when it comes to technology integration. All of this research thus supports the notion of teachers themselves being a major stumbling block in the implementation and use of technology in instructional applications, mainly a result of fear. Teachers tend to be conservative and computer use gains greater acceptance by teachers when used as a support for existing practices and methodologies. There are researchers who indicate that many teachers believe it is simply "easier to not use computers at all" (Woodward & Mathinos, 1987). Other data suggest that infrequent use of computers by teachers results from structural and organizational problems (machine accessibility, scheduling, supervision), lack of appropriate software and lack of teacher experience and training (Ross, 1991). For a vehicle to be able to carry the institution down the long road of change, the people who use the vehicle must be provided with training, technology access, and encouragement to use the technology in their day to day work (Kershaw, 1996).

The integration and utilization of computers in institutions depends greatly upon educational change itself, a process that is ongoing. However, examination suggests that

addressing the anxieties related to computer use and implementation is essential. Fears must be addressed directly through increased support for people, increased user friendliness, increased availability of computers and the breakdown of linguistic barriers (Smith, 1988). Other analysts claim that by simply placing computers in schools or giving technology to teachers will not result in realizing the promise of computers as an educational method. She states that no technology is neutral, that individuals must first look at the technology. "If educators open themselves to the computer as a metaphor and recognize the ways in which its discourse forms and conveys knowledge", they may be able to create animating ideas related to computer use (Educational Technology, 1992). Know your technology. However, other research again puts the emphasis on people; that is, people are still the primary roadblock for computer realization. Thus the focus should be on people. Kershaw (1996) states that if institutions are committed to using educational technology to transform significant portions of their learner services, these human dimensions need to be tackled early. This can be accomplished by focusing on the people -- the students, and the teaching, support and administrative staff - rather than on the technology (ibid, 1996). It has also been suggested that school restructuring involving teachers becoming facilitators rather than dispensers of knowledge would provide for an improved environment in which computers would thrive (Educational Technology, 1992). The most productive and meaningful uses of technology cannot occur in traditional educational institutions (Jonassen, 1995). That is because the most productive and meaningful uses of technology engage learners in knowledge construction, conversation, articulation, collaboration and reflection (ibid, 1995). Related to the concept of

restructuring would be the suggestion of using computers in non-instructional roles as a precursor and/or vehicle for computer implementation and use in an educational role (Kershaw, 1996). This suggestion focuses on the idea that systems and institutions themselves, are major factors which impede technological implementation and use. Other research addresses the role of administrators, more specifically principals, in the execution process. It has been suggested that principals must play a leadership role to introduce and incorporate new technologies in schools. Administrative attitude and leadership is important (Whitehead, 1993). And of course money. There have been many instances where research has addressed the lack of funding and suggests that it is also a major determiner for the integration and manipulation of computers in schools. Institutions must be prepared to reallocate scarce resources to support the teaching staff and students who are using the technology (Kershaw, 1996).

Teachers seem to be the key to these implementation issues. Teacher anxieties, attitudes and abilities, along with governmental financial limits and the educational system itself all have an impact. In order for this to occur, people must feel a need for it, which leads to planning and finally action. But ultimately, human concerns must be addressed before acceptance is given, which then determines the success or failure of technological integration into schools.

Computer utilization in schools will no doubt have an effect on people and the exchanges between those people. Many of the articles address the impact of teachers on implementation, they suggest that teachers are one of the primary resistors in computer realization. Teacher anxiety, feelings of powerlessness, linguistic barriers and

comparison between people and machines (Smith, 1988), all contribute to the somewhat negativism experienced and displayed by teachers. It is also suggested that computers have had a much more positive impact on students and others in the school system. Other articles recommend that computers can help "construct learning environments" (Educational Technology, 1993), which will no doubt have an impact on human interaction. One article goes as far as to say that computers do as good of a job as a teacher. "Interactive Videodisc systems consistently produced results comparable to that of a master teacher" (ECR, 1993). This depicts an impact on "human interaction" in schools by computers.

The literature indicates that there are many attitudes and opinions relating to the implementation and use of computers in schools. This supports my interests in determining these opinions. The literature also addresses the impact of people on computer realization. It proposes that teachers are the primary focus among other concerns. Thus my quest to obtain more information relating to this issue. Because the literature does not really address the question of computer use and its impact on human interaction in schools, I am going to focus a large portion of my survey on this research question.

4. Project Design

The intent of this project is not to provide a comprehensive analysis of computer use in junior and senior high schools in Alberta. It is intended to identify attitudes and

opinions relating to human interaction, computer implementation, and computer use in schools. From a review of literature, it seems that there are many opinions directed towards computer use and implementation, however, they do not address human interaction.

The project itself consists of three components. The first comprises a paper-and-pencil survey questionnaire completed by individuals directly involved with the school system. The second component of this project includes the opportunity for written response. This will enable respondents to expand or elaborate on survey responses. The third component comprises an interview with four selected volunteers from the survey sample who seem to typify the respondent groups. The interview technique used (directed but open-ended) was intended to provide a broader and deeper portrait of the rationale behind the survey responses.

The survey, in order to increase the probability of completion and return, is limited to as few questions as possible which can still give an accurate overview of respondent attitudes, thus allowing for group comparisons.

The survey, thus, is intended (within limitations imposed) to examine the attitudes of students, teachers, parents, and senior administration, and to compare these attitudes identifying general trends or opinions regarding human interaction, computer implementation and use.

As surveys of and interviews with students, parents, senior administration, and teachers fall under the purview of the "Human Subjects Research Committee", specific designs of the project include consideration of the demands for approval by that

committee. Once the survey instrument and interview format are finalized, approval of the H.S.R.C. will be obtained prior to formal contacts with specific jurisdictions, schools, and individuals.

5. Survey Design

Many studies have already been done on these technology related issues. However, very few of the studies have directly addressed computers and human interaction in schools. Most of the studies relate directly to computer use in education and a smaller portion deal with computer implementation. Even though much of the research reviewed does not relate directly to the main emphasis of my project, it does provide for a background necessary to continue. While these sources provide for the basis for the scheme of this study, the specific methodology and questions are designed to meet needs specific to my project.

The survey instrument has been developed to identify opinions of students, teachers, parents and school board members. Opportunities for written explanations and rationale for each question and one single open-ended question for each section are made available.

Relating responses from each of the three research components, that is, the opinion instrument, the written responses, and the one on one interviews, relationships between opinions of these sample groups and the rationale for the individual responses

may be identified.

The specifics of the survey construction are detailed below:

Part A - Demographic Profile

Question 1 - 3 address demographics. These demographics are necessary for comparisons of respondent groups in the survey. Specifically, these demographics deal with sex, age, position or association with school, computer ownership and use.

Part B - Impact on Human Interaction

Questions 1 - 10 address the impact of computer use on human interaction in schools. This section attempts to obtain opinions associated with human interaction. Does computer use train students to think better or to think like machines; reduce or increase interactions between students and teachers, between students; dehumanize schools; or create classroom atmospheres that are more or less social?

Part C - Impact of Humans on Computer Implementation

Questions 1 - 7 produce information relating the effect human beings have on the implementation of computers into schools. What are the main stumbling blocks to computer implementation in schools? Is the rate of integration too slow or too quick? What is the teacher impact on computer realization? Do the school systems have an impact on computer implementation? What impact does the availability of money have on computer execution?

Part - D Computer Use

Questions 1 - 7 address opinions relating to the use of computers in schools. How are computers to be utilized? Are they tools or a means of formal instruction? Must students learn to use computers? Should computers be used to replace teachers? An open-ended question in this section allows respondents to record any opinions they have relating to computer practice that are not addressed by the questions provided.

Part - E Written Response

This is really not a category itself but a component included in all segments of the survey instrument. Each question has an area for a written response. It allows the respondent to clarify any responses and add any other pertinent information.

The ideal population for this study would be all teachers including administrators and students of Junior and Senior High School students in Zone 6 Alberta. Due to the logistics related to such a large study, a smaller population will be used. These groups have been chosen because of my belief that the opinions of these individuals are significant and therefore important to my study. They all have a vested interest in education and computers have become a major part of the process of learning as well as a major cost in education.

The selective sample of 130 will include:

a) 75 full-time permanent teachers of four Junior and Senior High Schools employed by Palliser Regional Schools.

b) a selection of 30 grade 9 and 12 students who attend each of the four chosen schools.

c) 8 Palliser Regional School's Board of Education members, 5 current superintendents and associates.

d) 12 parents with children attending these institutions.

The sample has been reduced from original estimates to better meet project parameters. Upon completion of the conspectus, a small select and identified group of respondents will be personally interviewed to provide greater insight into study opinions in order that comparisons and perhaps explanations and clarifications of survey responses may be made.

This cross-sectional survey will help me obtain the following objectives: to discover attitudes regarding computer use on human interaction in schools, to determine the impact of human beings on computer implementation in Junior and Senior High Schools, thereby determining the influence computers have on the "human factor" in schools, and, to determine and expose the relationship between attitudes and computer use in schools. Again, attitudes and opinions of educational stakeholders are significant and therefore are vital to my research.

The analysis of all the data including demographics, attitude survey, and written responses, related to this instrument will be categorized and summarized. Then, a limited

statistical analysis will be performed which will produce a supply of descriptive statistics. It is important to note that my survey is intended to be descriptive only in terms of statistics. Once responses have been summarized and statistically analyzed, certain comparisons will be attempted. The four individual groups, students, parents, teachers, and school trustees, will be compared to each other. Again to keep within the confines of a project rather than a thesis, only four groupings will be used for correlation.

Each survey question will be categorized into one of two main groups, favourable or unfavourable. Questions in section B of the survey will be classified as either a positive or negative impact on human interaction. Section C questions will be divided into effecting or not effecting computer implementation. Questions in part D will not be classified; their primary purpose is to gather information on computer use only. Response choices for the majority of survey questions will be grouped in the following manner: strongly agree, agree, undecided, disagree and strongly disagree. These groupings will provide insights into attitudes specific to each survey question. For example, if the majority of respondents choose "strongly agree" for question #1 section B, this would indicate that most of the respondents feel that computer use in schools has a positive influence or impact on teacher-student interaction. The response choices (SA - SD) will help indicate the level of support for each of the categorized survey questions, either pro or con. This in turn will help to focus on subject and group attitudes relating to computers in schools.

The written responses will be addressed in a somewhat different manner. Once the summary has been completed, responses will be categorized. Universal trends and

attitudes will be exposed with some general comparisons and conclusions drawn from the information. This portion of the analysis will most certainly be more subjective than the above mentioned procedures.

And finally, interviews will be conducted once completed surveys have been collected. A select group of four previously identified individuals will be questioned for the purpose of identifying rationales for their responses, thus providing a platform for further comparison with survey responses and trends. The questions used for the interview process are open-ended and very simple. Such questions as "why?", "What do you mean?", and "can you explain that?" are used. The purpose is to determine rationale for responses without leading the interviewee.

By using this limited amount of statistical information tendencies may be exposed which describe general opinions associated with the survey questions. I am trying to establish a sense of positive or negative attitude regarding the impact of computer use on human interaction, and establish attitudes regarding the roadblocks of the implementation of computers in schools. Again, the survey is to provide descriptive information only, identifying attitudes and hopefully some explanation and rationale for those attitudes.

The Superintendent of the county will be contacted by phone or in person to obtain permission to administer the survey in the Palliser Regional School Division.

Survey packages will be constructed and sent to each of the schools. The survey will be coded so that variables may be summarized, and if possible, compared. The principal will be asked to administer it during a staff meeting or request that it be returned in a prescribed amount of time. Student surveys will be given to students during school

time by the principal or designate, parent surveys will be distributed by the principal and returned by mail. Hopefully, this will help to improve both the completion and return percentage of the survey. This would facilitate any follow-up or second contact. A similar package will be sent to the office of Palliser Regional Schools. Also included will be cover and thank-you letters. Second contacts to each of the schools will be accomplished using a fax. Thank-you notes will be sent out. Upon completion of the survey, four previously identified individuals will be interviewed as a follow-up.

6. Interview Design

From an analysis of the survey results, opinions of the impact of computer use on human interaction, impact of human beings on computer implementation, and computer use may be identified. Four individuals will be selected to provide further information concerning their responses to the survey. Interviews with these persons should provide insight and perspective not available from the survey data alone. The results obtained from interviews will be response specific (address each survey question) which will provide improved comparisons. Very simple and yet open-ended questions such as "why?" and "what did you mean?" will be used. The interview data is not intended to provide new information, but rather to identify subtleties that do not surface in an attitude scale. The benefit of this process, lies in its flexibility and open-endedness. Since the primary purpose of the survey is to gather opinions, the interview process itself is

predisposed to gathering greater insight into respondent opinions.

7. Description of Data

Of the 130 survey instruments distributed to RI Baker, Kate Andrews, Coalhurst and Picture Butte, Junior and/or Senior high schools, 85 were completed, a 65% return rate. Return percentages were 60% for teachers, 90% for students, 38% for trustees, 50% for parents, and 80% for senior administration.

Survey Results

When analyzing the survey results, numerical distinctions were used to determine support for, or against survey statements. A mean score above or below three is assigned a "strong" response, 3.0 - 3.9 are classified as "undecided". Responses of above five and below two are assigned a "very strong" rating. For example, a mean of 3.6 is classed as undecided, a 4.7 is a agree, and a 1.0 is a strong disagree.

Student survey results from the attitude scale survey do not display any "very strong" opposition or support for any statements given. Section B relating to computer use and human interaction does however provide an identifiable trend (fig 1). Using the mean as a basis for comparison only one section item, statement 7 concerning computers and the creation of a classroom atmosphere that is more social, produces an undecided response (fig 1). All other responses in this section generate a trend of disagreement for

each statement. Students do not believe that computers increase personal interaction between students and teachers; computers do not strengthen classroom routines and discipline, nor do they isolate students from each other. Students also disagree with the view that computers dehumanize schools or that they produce anti-social behaviour in students. Also, students do not regard computer use as a threat to human interaction and socialization in schools. Finally, students do not feel that the benefits of computers outweigh the potential loss of interpersonal communication. By and large, student attitudes do not see the computer having a negative impact on human interaction. The results show an unwavering opposition to statements relating computers to anti-social behaviour and they do not see them as improving or hindering classroom activities.

Section C, addressing the impact of human beings on computer implementation (fig 2), provides only two areas in which the students' opinions are clear. They are undecided regarding the influence of parental attitude on computer implementation in schools, and, students do not know if teachers themselves slow computer introduction or what influence teacher training has. They are also uncertain about the impact the design of the school system itself has on implementation. In addition, they do not support the statement that fear of computers restricts integration
(fig 2 #2). One of the strongest responses made by students (fig 2 #6) to any portion of this survey is in this section. A very large number of student respondents believe that money is vital to the implementation of computers in schools. Basically, students see money as the main problem, and they dispute the suggestion that fear has an influence on integration.

Section D of the survey concentrates on computer use. Students strongly support (fig 3 #4) the use of computers in providing alternative forms of learning for the individual student. The majority do not endorse the replacement of teachers with computers but a small segment of the respondents do agree with this statement (fig 3 #3). The remaining statements in this section furnish an uncommitted reply from the group (fig 3). They are undecided regarding assertions that describe computers as tools for support, computers as a means to instruct students using a fresh and innovative process, and computers as an alternative form of learning for large groups. Generally, students maintain that computers are best used with the individual and their strongest opposition is to the replacement of teachers by computers.

When examining teacher responses, tendencies are recognized. Section B, addressing human interaction, produce specific reactions. All statements elicit disagreement from the teachers (fig 1), two of them stimulating significant opposition when compared to the others. These stronger critical attitudes are in response to computer use leading to antagonistic behaviour in students and computers being a hazard to human association and socialization. Teachers do not believe that computers increase interaction between students and teachers, nor do they bolster classroom routines or discipline. They also disagree with statements suggesting that computers isolate students or prevent them from developing interpersonal skills while at the same time they do not feel that computers provide a classroom climate that is more communicative. Finally, they do not support the statement that computer use compensates for the potential loss of human interaction. Attitudes would suggest that teachers see no significant impact of

computer use on classrooms or human interaction whether positive or negative.

Section C, referring to computer mobilization, produces a larger percentage of undecided responses (fig 2). Teachers do not perceive that they themselves are major hurdles to computer implementation. They feel quite strongly that money is the major determining factor in computer realization. In all other areas, those pertaining to parental attitude, fear, teacher training, and the makeup of the school system, teachers are undecided. Not surprisingly, stronger teacher opposition (fig 2 #3) is obvious towards the suggestion that they themselves are a major stumbling block to integration. Money (fig 2 #6) is perceived to be the number one influence.

Section D, regarding computer use (fig 3), exhibits stronger opinions than the previous two sections. Teachers do support the recommendation that computers can be used to teach students in new and better ways. They also believe that computers are best suited to providing alternative methods of guidance for individuals rather than large groups. The strongest response described by teachers
(fig 3 #3) in this survey is in opposition to the suggestion of teacher displacement by computers. They are undecided concerning the belief that computers are only tools and whether computers are an alternative for large group learning.

In section B (fig 1), parents are undecided regarding computer use and whether there is increased interaction between students and teachers. They also are uncertain concerning the impact on classroom control and routines. Parents do not believe that computers isolate students from each other, or prevent the formation of interpersonal skills. Stronger incongruity emerges involving suggestions that computers dehumanize

schools and cultivate anti-social behaviours in students. Parents do not believe that computers create a classroom that is more social; they also do not see computers as a threat to interaction and socialization. Finally, parents are undecided regarding the benefits of computers and potential losses of human interaction. The general direction in parental attitudes suggests that computers do not significantly impact human interaction, nor do they produce any forms of undesirable behaviours, nor are they a threat to students or teachers and their relationships within the school.

Section C of the parent survey produces only one undecided response. Their indecision (fig 2 #4) is in regard to teacher training and computer implementation. They do disagree with the suggestion that parent viewpoints and teachers themselves have any significant influence on the computer integration. Parents see fear as a critical influence on integration and they feel that the structure of the school system has a profound impact, especially as it relates to finance. The stronger attitudes (fig 2 #6,#2,#5) by far support the assumption that money has the greatest impact on computer implementation in schools followed by fear and the structure of the school system.

Parent responses in section D strongly support the use of computers as tools (fig 3 #1), as a means of support for the more established methods of teaching, and as a means of helping the individual student learn (fig 3 #4). They are undecided whether computers are helpful in promoting new methodologies of learning or whether they are beneficial in instructing large groups. The strongest parent responses (fig 3 #3) do not endorse the replacement of teachers with computers. Over all, they see the computer as a means of support in educating children and as an alternative to teachers.

The fourth group surveyed was senior administration and trustees. This group provide the fewest undecided responses, and they impart some of the strongest attitudes of any group. Section B (fig 1) produces only one undecided response, this addressed the issue of computer use and the interaction between students and teachers. They do not feel that classroom procedures and discipline are strengthened by computer use and they strongly disagree with the suggestion that computers segregate students. Strong opposition to the statement that computers prevent the development of interpersonal skills is apparent. As well, senior administration and trustees vigorously oppose the view that computers manufacture anti-social behaviour, that computers are a danger and that computers dehumanize schools. They also disagree with the assertion that computers make the classroom more social and with the statement that the benefits of computer use outweigh the potential loss of human interaction. Senior administration and trustees do not believe that computers adversely effect human interaction, nor do they feel that technology significantly influences routines, discipline or the social environment in the classroom. They proved to be the group with the strongest attitudes in this portion of the survey.

In section C (fig 2), the trend continues. Senior administration and trustees express definitive attitudes for a significant portion of the statements. Strongest opinions relate to school structure and implementation -- they do not believe that the school system hampers integration. Their responses suggest that the number one barrier to implementation is money. Trustees and administration do not feel that fear or educators themselves hamper integration. Undecided attitudes surface concerning parental

influence and teacher training.

Responses to section D of the survey (fig 3), computer use, promotes computers as a means to teach students in new and better ways, and are best used for individual students (fig 3 #1,#4). Fundamental opposition is shown in response to the replacing of teachers by computers. Senior administration and trustees are undecided when it comes to computers being used as tools and their effectiveness for large groups. Over all then, they support computers as new methodologies, as beneficial for individual students, and not to be substituted for teachers.

Written Comments

The second notable element of the survey is the opportunity for all respondents to rationalize their responses in writing. Therefore, each statement has a section for written response. Also, each of the major components of the survey have one final question which provides the opportunity for respondents to state in writing their explicit attitudes related to ideas covered in that specific section. Because of the small number of surveys collected in the study and the even smaller number of written comments, all written responses are included in this summary.

The written student responses in section B somewhat contradict the attitudes scale portion of the survey. For example, some students feel that computers may increase human interaction but they do not specify whom this might influence. They also feel that students will interact regardless of computers - "kids won't stop talking no matter what". That being said, other students feel that the only way in which computers will impact

interaction is if they are the only form of learning available to them. Written attitudes also address anti-social behaviour. Some students believe that there are many forms of anti-social behaviour present today and that there are many reasons for this behaviour. Others suggest that classroom routines are no more affected by computers than, for example, by desks or by textbooks. Yet others feel that computers may develop individuals who are more self-reliant. Responses vary somewhat, but no one suggests that computers have any significant influence either positive or negative on interaction. Student perspectives regarding the primary impact of computers on interaction state that excessive use of computers may impact or even threaten interaction, that there is the potential for both positive and negative influences. Students support the potential for sharing knowledge and cooperation as significant influences of computer use.

In section C, response rationale address fear, teachers, money, and the school system. Some students believe fear in general and more specifically fear within teachers themselves has an impact on implementation. They also feel that parent influence, that is, parents desiring their children to learn computers, is significant. As might be expected, a certain portion of students feel that teachers are afraid to break "old habits", and that lack of training for teachers most significantly hinders implementation. Money of course is essential. The most abundant and emotional responses surface here. Other students also blame the system itself -- "the system does not care". The majority feel that money and teacher training have the most notable influence on computer implementation followed closely by parent attitudes.

Student rationale in section D supports computer use to develop basic skills, to

enhance learning, and to help students with disabilities. Some students do not support computer use for large groups because they feel that in a large group situation, all students do not have equal opportunity. Others believe that computers should not become the primary method or source of education and computers should not be used to replace teachers. Certain students believe that the best use for computers in schools would be as tools or aids, and as a means for people to interact, especially those who are a great distances away from each other, via the internet and E-mail.

As with the students, some of the written responses given by teachers contradict trends established in the attitude scale portion of the survey. This is a result of comparing individual response to group trends. Individual written responses do address human interaction. Some feel interaction is enhanced; others feel that the impact of computers in the classroom is no different than that of television or even textbooks. The strongest attitudes suggest that computers would only have a significant impact either way on human interaction in schools if teachers allowed them to do so. There is additional support for increased interaction, not only the one-on-one relationship between student and teacher, but also interaction between individuals participating in group work. Certain teachers feel that the most important effect is the interaction that results as students help and teach each other about computers. Increased cooperation, self-help and learning are additional examples of beneficial interaction. Other teachers support the view that students who already exhibit poor social skills would be at greatest risk regarding the more negative influence of computers on interaction.

Written supplements in section C support trends established in the attitude scale.

Fear of change among teachers, lack of computer training for teachers and lack of resource money top the list. Naturally, teacher reaction to statements regarding teacher impact are numerous and strong. Many rationalize their responses by addressing computer availability and access. They see a very strong correlation between teacher use and computer availability. Related to this is the cost of computers. Money is a determining factor in computer availability. Access to and money for computers are also affected by the schools themselves; that is, a small number of teachers feel that the physical plants are not set up to provide adequate access for everyone. Some teachers question their own commitment to computers, their own attitudes and fears, as well as administrative reluctance regarding computer implementation. Other educators question computers themselves and voice an opinion that this technology is very much part of this entire issue. One teacher states that "computers demonstrated more down time because of repair than sick days for teachers".

Written responses in section D attack the suggestion that computers should be used to replace teachers. Teachers strongly support the notion of using computers as tools or partners to support them in the education of children. Others also feel that some students, the more motivated ones, would not really need a teacher and that a computer would be of great benefit. The best use for computers in the classroom would be to speed up activities, explore new concepts, and expand independent work. Out of the classroom they are advantageous and time-saving when used for housekeeping, report cards, attendance, etc. Strongest support is in the area of inter-school communication and projects. Also, some teachers feel that computers increase efficiency, for example in

calculating marks, writing papers, drafting and doing research.

There is very little in the way of written comments from the parent respondents of the survey. Many feel that because they are not actually part of the school community they cannot make comments. Written responses given do however support many of the tendencies established in the attitude scale component of the survey. Some parents feel that computers do not decrease human interaction; however, they believe that computers can reduce socialization and create learning environments that are more one on one, student and computer. Others suggest that students can assist each other and teachers can learn about technology and its uses from students.

In section C, money is the principal topic of discussion. A large number of parents feel that even if money is available it is not getting to the grass roots level, that is to the schools. Although parents see fear as a consequential factor in integration, they do not further elaborate as to what or to whom this fear is related.

All parents participating in the survey do not want to see teachers replaced by computers; they feel that this will indeed dehumanize schools. Written responses in section D also support the idea of computers as instruments for research, for increased efficiency, for science experimentation, for distance learning and communication with others affected by geography.

As is the case with parents, very little written response is given by senior administration and trustees. In section B, the majority of senior officials feel that the potential for interaction, student to student, sharing information, helping each other, all provide an opportunity for increased association between students. Others feel that group

work will also be affected.

Most senior officials i.e. administration, trustees focus on teacher training as the major stumbling block for computer implementation which is addressed in part C of the survey. Availability of computers is also important and reference is made to funding and its impact. There are stronger suggestions regarding money, that comparatively schools spend far less on technological improvement that do industry and business.

In section D, administrative use of computers by teachers is discussed, as well as the potential for increased communication, E-mail etc. Some administrators appear to believe that the most significant use of computers does relate to communication and information delivery.

Interviews

The interview process was designed to obtain additional rationale and greater insight into responses given by individuals to the survey. These people were informed in advance that they would be interviewed individually upon completion of the survey. One Junior High student, one Senior High student, a teacher and a senior administrator were asked to rationalize or explain their responses to each of the statements in the survey. The original statements in the survey itself were used as a guide for the interview process. An informal method of questioning was implemented. The attempt was to facilitate responses without creating bias and/or influencing responses. Questioning along the lines of "why?", "what do you mean?", and "could you explain that more?", were used to illicit explanation an rationale for responses.

Interview 1 - Junior High student

Section B

The student felt that:

1. Personal interaction is increased by asking questions of the teacher and turning to peers for assistance and guidance.
2. Classroom routine and discipline is increased because computers help enforce the rules.
3. Students will not be isolated because students turn to each other for help and because of limited computer numbers, students must work in groups.
4. Computers will not prevent the development of skills necessary for interaction because human interaction is still available with computer use.
5. Schools will not be dehumanized because of abundant opportunity for interaction.
6. Anti-social behaviour will not be developed because computers are predominately negative, even though there is some opportunity for isolation.
7. Classroom social atmosphere will be increased to some degree because students will talk to each other about computers or in spite of them.
8. Computers are not a threat to interaction because they do not prevent it.
9. The benefits of computer use are worth the cost of potential loss of interaction, if there is a loss.

Section C

The student felt that:

1. Many factors affect implementation, not predominantly parents (undecided).
2. Fear hampers implementation. Some people just don't want to use them. Teachers fall into this category.
3. Teachers are slowing implementation because they do not use them.
4. Teacher training is very important. Many kids know more about computers than teachers do.
5. Unfamiliarity with the school structure and lacking knowledge of system procedures made for an indefinite response.
6. Cost is the most important factor in implementation.

Section D

The student felt that:

1. Computers are tools because they help the student and teacher work better and become more efficient.
2. Textbooks are not as good. Computers can teach students in new and better ways, they provide interest; they motivate students.
3. Teachers should not be replaced; teachers are needed to answer a variety of questions. What about activity classes such as Physical Education and CAT?
4. Computers can help students learn in different ways, provide variety and improve the availability of resources for research.

5. Computers can benefit large groups as long as the members of the group are all learning the same thing.

Interview 2 - Senior High Student

Section B

The student stated that:

1. Computers increase interaction because students ask for help from the teacher and their peers.
2. Computers have no impact on routines, that is, no more of an impact than anything else. Some indecision was shown here.
3. Students can interact regardless of computers; therefore, they do not become isolated.
4. Computers do not prevent the development of interpersonal skills. Students interact regardless. There is opportunity for interaction within the software i.e. chat lines. Interpersonal skills can be learned in other situations.
5. As computers are just a tool, there is no reason for dehumanization.
6. Computers are tools; they will not develop anti-social behaviours.
7. As there are no computers in the classroom at this time, their impact cannot be assessed.
8. Computers are not a threat to interaction because they cannot stop human interaction.
9. Benefits of computers do not outweigh potential losses because there is no real

loss because of computers.

Section C

The student stated that:

1. Parental attitudes do have an impact but not necessarily on computers, potential to go either way.
2. Why would someone fear a computer?
3. Teachers are not slowing down implementation because they are using them in school and therefore are encouraging computer use.
4. Teacher training is not an issue. Because computers are user friendly, a lot of training is not necessary. Kids have knowledge and can help out.
5. The system structure has had minimal impact because computers are available.
6. Money is a significant factor regarding implementation.

Section D

The student stated that:

1. Computers are only tools. They are "no big deal", no different than a textbook.
2. Computers can be used to teach differently. Again "no big deal". They help students learn differently.
3. There is no need to replace teachers.
4. Computers are a nice alternative for individuals.
5. Computers just provide an alternative, and are not a threat.

Interview 3 - Teacher

Section B

The teacher stated that:

1. Interaction can be increased. Computers allow for more personal choice for students. Students will interact with teacher, as well as peers.
2. Computers do strengthen routines and can be incorporated into routines i.e. as rewards and earned break-time on the computer, as tools for behaviour modification, and as a method of evaluating the students' skills.
3. Students will not become isolated they can instruct each other. Because of the limited number of computers which necessitates sharing and some competition, students must interact.
4. Interpersonal skills are not prevented from being developed. Because of the small number of computers available to students, students must interact, they must learn to share and thus develop interpersonal skills.
5. The term "dehumanize" caused the interviewee not to answer. That is, the term "dehumanize" is too extreme, so rediculous, is not worth a response.
6. Anti-social behaviour will not develop because sharing computers will develop very social behaviours unless the teacher uses the computer as a method to isolate a child for behaviour problems.
7. A more social environment will develop because of sharing, interacting etc.
8. Computers are only a threat to interaction if the teacher does not know how to use computers appropriately; they are not a threat to kids.

9. Situations will occur whether the computer is there or not.

Section C

The teacher stated that:

1. Parents can have significant influence if they want, i.e. political pressure, money.
2. What fear? Who is afraid?
3. Some teachers may impact implementation. The real issue is time not each teacher's attitude.
4. Teacher training is an issue which directly relates to confidence in computer use.
5. What do you mean by school system structure? The bureaucracy of the system hampers decision-making. Accessibility to computers is an issue.
6. Availability of money is a major influence.

Section D

The teacher stated that:

1. Computers are more than tools; they are partners in education.
2. Computers should be used to support existing methodologies.
3. Replace teachers, ridiculous!
4. Computers are useful for individual learning but careful planning is required.
5. For larger groups, with careful planning, computers can provide complementary rather than alternative forms of earning.

Interview 4 - Senior Administrators

Section B

Senior administrators felt that:

1. Computers can increase or decrease interaction, depending on the teacher's skills and objectives. Is it any different than a book??
2. Computers have potential to strengthen routines, but is teacher dependent.
3. Computers will not isolate students. A computer can be a communication tool by opening up communication with people from great distances.
4. Computers will promote interpersonal skill development because they are a communication tool.
5. They will not dehumanize schools, because computers are communication tools.
6. No comment other than strongly disagree.
7. Computers have some potential to increase social atmosphere in the classroom. They are communication tools.
8. Computers are not a threat to interaction. They are communication tools.
9. An assumption resides in questions 3 through 9, that computers are communication tools. "Books can be highly isolatory, socially isolating piece of technology. Teachers still use books and through a few hundred years of practice, we find that teacher's implementation of books is a variable that makes a tremendous difference in interactions between students. It could be argued that the book is potentially more socially isolatory than a communication tool in the form of a computer."

Section C

Senior administrators felt that:

1. Parents have influence from a student's point of view. In the early years, in funding, parents had an effect.
2. Generally fear is not an issue, although true for some individuals.
3. No comment
4. Teachers are slowing down introduction, largely due to a need for teacher training.
5. School system structure is significant. It determines teacher release time for inservicing; it sets educational budgets for technologies. Support and training are significantly below levels of industry.

Section D

Senior administrators felt that:

1. Computers are more than tools. They will have an effect on the nature of our delivery of instruction.
2. Computers should be used to teach students in new and better ways but not at the expense of throwing out traditional, effective instruction.
3. No, "the teacher remains the decisive determinant of the effectiveness of instruction -- PERIOD." Although computers are extremely powerful tools and although we may see instruction delivered differently and some changes in efficiencies, the teacher remains a critical factor in preparing student for life beyond school.

4. The computer can be an alternate; it should remain as central as the book in our learning environments.

5. See # 4.

8. Discussion And Analysis

The four groups used in the study are compared to each other in order to identify differences between these groups to then draw some conclusions. Tables are being used to simplify the comparison. The mean scores for each group will be used for comparison; 1.0-1.9 -- strongly disagree, 2.0-2.9 -- agree, 3.0-3.9 -- undecided, 4.0-4.9 -- agree, and 5 -- strongly agree. Refer to appendix A on page 64 for survey questions.

Question # Part B	Students	Teachers	Parents	Senior Adm Trustee
# 1	2.77	2.533	3.33	3.14
# 2	2.926	2.889	3.33	2.71
# 3	2.519	2.689	2.33	1.57
# 4	2.704	2.6	2.17	1.49
# 5	2.704	2.556	2	1.57
# 6	2.185	2.289	1.33	1.14
# 7	3.074	2.667	2.5	2.71
# 8	2.333	2.422	2.17	1.14
# 9	2.926	2.968	3.33	2.86

Figure 1: Part B, Human Interaction

When comparing all groups, individual differences are present regarding computer influence on human interaction, but for the most part all groups tend to agree. They feel that human interaction is neither positively nor negatively affected by computers, that anti-social behaviours will not develop as a result of computer use and schools will most certainly not become dehumanized. However, members of the senior administration feel that computers will create a classroom atmosphere that is more gregarious, while the others view technology's impact as more innocuous. Strongest opinions demonstrated by all the groups attack the suggestion that computers will dehumanize schools and produce asocial habits. Even though there are group differences, all are of the opinion that computers will not necessarily benefit nor hinder human linguistic intercourse.

Question Part C	**Students**	**Teachers**	**Parents**	**Senior Adm Trustee**
# 1	3.444	3.289	2.5	3
# 2	2.815	3.289	4	2.71
# 3	3.222	2.089	2.5	2.71
# 4	3.556	3.933	3.83	3.86
# 5	3.407	3.622	4	2
# 6	4.444	4.667	5	4.14

Figure 2: Part C, Implementation

All groups agree that there are certain factors that impact computer

implementation. These include fear, parental attitudes, teachers themselves, specifically teacher training, and most vitally, money. However, there are identifiable differences in group opinions. Students for example, remain undecided regarding parental influence, teacher influence, and school system structure. However, they are the only group that discounts fear as a significant factor in computer implementation. Some interesting bipolar trends also surface. Teachers and senior administration (trustees) are at opposite ends of the spectrum regarding teacher impact and system structure on implementation. Teachers blame the system and trustees blame the teachers. This is something I would expect. Parents aline themselves with teachers on this issue. They also view fear as more significant to implementation and feel that their voice is not being heard. All other groups, with the exception of trustees, view parental attitudes as important. By far, money (all groups) and teacher training (teachers undecided) are thought of as most significant regarding computer implementation in schools.

Question Part C	**Students**	**Teachers**	**Parents**	**Senior Adm Trustee**
# 1	3.333	3.867	4.33	3
# 2	3.963	4.2	3.83	4
# 3	2.148	1.222	1	1.29
# 4	4.296	4.333	4.5	4
# 5	3.889	3.756	3.67	3.71

Figure 3: Part D, Computer Use

There are of course always individual differences but all groups promote the ideas of using computers both as vehicles of support and as new methods of teaching. They also perceive that computers are beneficial to individuals and large groups. As far as computers replacing teachers, there is a split. Parents and senior administrators are 100% against teacher replacement; students show strong support for educators but with some opposition; and trustees are split, some believing that teachers should be replaced at least to a certain extent, by computers. What is very surprising is that one or two teachers also support this viewpoint. Also, parents and teachers see computers as ancillary to education while senior administrators and students view computers as providing new and better methods for education children.

9. Conclusion

The outcomes of the attitude conspectus proved to be statistically insignificant. This is largely due to the small sample surveyed and a return rate of only 68%. This however does not hamper the recognition of comprehensive tendencies regarding computers and human interaction, computer implementation and computer use. Based on attitudes given, all groups feel that computers do not significantly influence human interaction in schools; that is, technology does not increase or decrease interaction between students themselves, teachers themselves and each other. The groups do not feel that computers will change the classroom atmosphere nor will they hinder interpersonal development. Their attitudes tend to support the positive effect of technology on human

interaction, or more accurately they view the computer's influence on human interaction as relatively benevolent. However, there is a small number of educators who are somewhat opposed to the suggestion that computers dehumanize schools. Teachers may be seeing or sensing something that others not present in schools to the extent that teachers are may not realize.

All groups tend to express similar attitudes associated with the implementation of computers and all groups view money as the most vital piece of the implementation puzzle. And to varying degrees, depending on the group, system structure, teacher training, parental attitude and fear all influence integration. There are variations in the magnitude of supportive opinions but they are negligible and do not change general impressions. Students are alone in suggesting that fear has no influence on implementation. This may be attributed to age differences and the fact that these students have grown up with computers. It is surprising that teachers, even though they feel that they themselves do not hamper implementation, are undecided with regards to teacher training and its impact on integration. It is also interesting that the senior administration and trustees do not feel that parental influence is significant, while the majority of other groups do. There are also opposing views between senior administration and other groups regarding the influence of the system structure. It would seem that opinions are significantly affected by the role represented by each group of respondents within the system.

Trends associated with computer use are similar. Again, even though group discrepancies in perspectives are identified, they are minimal. All groups believe that

computers have a use in the education of children, that they can be used in a support role or in a more prominent role. They see potential uses for individual learning and group situations. There is no real support for the suggestion that computers be used to replace teachers but some groups show more support for this idea than others. Parents and senior administration are 100% against this suggestion, while trustees as a group are undecided with individuals in each group supporting teacher replacement. Of course there are some students who enjoy the idea, which is to be expected. One very surprising development is that a very small number of teachers support replacement. This is totally unexpected -- teachers contemplating that they should be replaced by computers.

This research suggests that people perceive that computers do not have a significant negative impact on human relationships and interaction in schools. It also suggests that computers may have a limited positive influence on interaction. The research also indicates that a number of factors influence implementation, including parental attitude, teachers and teacher training, the structure of the school system and, even fear. In a landslide, money has the greatest influence. Group attitudes suggest that computers are useful for both support and enrichment, are useful for individual and groups and are of particular value for research and communication with people abroad. It also seems that teachers are safe and people do not see computers replacing teachers.

It is hoped that the information gathered regarding the attitudes and opinions of these groups will allow for the development of effective strategies for implementation and use by decision makers.

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APPENDIX 1

page

COMPUTER USE IN SCHOOLS

Thank-you for participating in this survey. It is the purpose of this survey to gather attitudes regarding the impact of computer use on human interaction in schools, what effect people have on the implementation of computers in schools and how computers can best be used in schools. **(You have the right not to participate in this survey without penalty or prejudice.)**

PART A

Subject Profile: Please answer each of the following questions by circling the appropriate information, and/or filling in the blanks.

1. Sex: female male

2. Category: Junior High Student Senior High Student
   Teacher Parent Administration
   Other _____ **If under 18 parent approval required. Parent Signature** _____

3. Do you own a computer? YES NO

PART B

Impact of computer use on human interaction in schools. Please circle the response that best describes your opinion. You are invited to add additional comments that may better describe your position on the question.
SA-strongly agree A-agree U-undecided D-disagree SD-strongly disagree

1 Using a computer in schools increases personal interaction between teachers and students.

SA A U D SD

comment_____
_____

2 Using a computer in the Jr/Sr high classroom strengthens classroom routines and discipline.

SA A U D SD

comment_____
_____

3 Using computers in schools will isolate students from other students.

SA A U D SD

comment_____
_____

4 Using computers in schools will prevent students from developing important interpersonal skills necessary for interactions with other people.

SA A U D SD

comment_____
_____

5 The instructional use of computers will dehumanize schools.

SA A U D SD

comment_____
_____

6 Computer use in schools will result in the development of anti-social behaviour in many of our students.

SA A U D SD

comment_____
_____

7 Using computers in the classroom will create a classroom atmosphere that is more

_____ U D SD

comment_____
_____

8 Computer use in schools is a real threat to the benefits of human interaction and socialization in schools.

SA A U D SD

comment_____
_____

9 The benefits of computers and computer use in schools outweigh the potential loss of human interaction in schools.

SA A U D SD

comment_____
_____

10 What is the most important effect of computer use on human interaction in schools?
_____
_____
_____
_____

Part C
What effect do people have on the implementation of computers in schools. Please circle the response that best describes your opinion. You are invited to add additional comments that may better describe your position on the question.
SA-strongly agree A-agree U-undecided D-disagree SD-strongly disagree

1 Parents attitudes toward computers have a significant influence on computer implementation in schools.

SA A U D SD

comment_____
_____

2 Fear of computers limits computer implementation in schools.

SA A U D SD

comment_____
_____

3 Teachers themselves are slowing down the introduction and use of computers in schools.

SA A U D SD

comment_____
_____

4 The lack of teacher training in computers and computer use slows down the implementation of computers.

SA A U D SD

comment_____
_____

5 The structure of the school system itself is hampering the implementation of computers in schools.

SA A U D SD

comment_____
_____

6 Money is a major influence on computer implementation in schools.

SA A U D SA

comment_____
_____

7 What has the greatest effect on computer implementation in our Jr/Sr high schools?

_____
_____
_____
_____

Part D

Computer use in schools. Please circle the response that best describes your opinion. You are invited to add additional comments that may better describe your position on the question.

SA-strongly agree A-agree U-undecided D-disagree SD-strongly disagree

1 Computers are only tools, to be used as aids for the more established methods of teaching and learning.

SA A U D SD

comment_____
_____

2 Computers should be used to teach students in new and better ways.

SA A U D SD

comment_____
_____

3 Computers should be used to replace teachers.

SA A U D SD

comment_____
_____

4 Computers in the classroom provide alternative forms of learning for individual students.

SA A U D SD

comment_____
_____

5 Computers in the classroom provide alternative forms of learning for a large group of students.

SA A U D SD

comment_____
_____

6 What other ways would you like to see computers being used?

_____
_____
_____
_____

Attention participants: If you so desire, you may make inquiries regarding the survey or study to Hank Heerze.

APPENDIX 2

Page

Student Survey Responses

Response	**SA**	**A**	**U**	**D**	**SD**	**NR**	**Total**	**Mean**
Scale	5	4	3	2	1	0		
Part B								
# 1	1	5	8	13			27	2.77
# 2		10	11	3		2	27	2.926
# 3		7	6	8	6		27	2.519
# 4	1	7	4	13	2		27	2.704
# 5	1	8	2	14	2		27	2.704
# 6		1	9	12	4	1	27	2.185
# 7		4	11	11	1		27	3.074
# 8	1	5	3	9	11		27	2.333
# 9	2	6	13	2	2	2	27	2.926
Part C								
# 1	1	15	6	5			27	3.444
# 2		11	4	10		2	27	2.815
# 3	3	10	5	8	1		27	3.222
# 4	3	12	9	3			27	3.556
# 5	3	9	11	4			27	3.407
# 6	16	11					27	4.444
Part D								
# 1	5	12	2	3	5		27	3.333
# 2	10	12	2	1	1		27	3.963
# 3	4	3	1	9	5	5	27	2.148
# 4	8	19					27	4.296
# 5	3	20	2	2			27	3.889

Teacher Survey Responses

Response	SA	A	U	D	SD	NR	Total	Mean
Scale	5	4	3	2	1	0		
Part B								
# 1		10	12	15	8		45	2.533
# 2		11	18	16			45	2.889
# 3	2	12	7	18	6		45	2.689
# 4	2	10	9	16	8		45	2.6
# 5	3	6	11	18	7		45	2.556
# 6		7	8	21	9		45	2.289
# 7	1	8	14	19	3		45	2.667
# 8	2	7	8	19	9		45	2.422
# 9	1	13	17	12	2		45	2.978
Part C								
# 1	2	24	7	9	3		45	3.289
# 2	5	21	5	10	4		45	3.289
# 3	1	11	7	22	4		45	2.089
# 4	11	26	2	6			45	3.933
# 5	7	23	6	9			45	3.622
# 6	30	15					45	4.667
Part D								
# 1	13	21	3	8			45	3.867
		25	10	4	1		45	4.2
		1	3	1	40		45	1.222
# 4	15	30					45	4.333
# 5	8	24	7	4	2		45	3.756

Parent Survey Responses

Response	SA	A	U	D	SD	NR	Total	Mean
Scale	5	4	3	2	1	0		
Part B								
# 1		4		2			6	3.33
# 2		4	1	1			6	3.33
# 3		1		5			6	2.33
# 4			1	5			6	2.17
# 5	1			2	3		6	2
# 6				2	4		6	1.33
# 7		1	1	4			6	2.5
# 8		1		4	1		6	2.17
# 9	3		1	2			6	3.33
Part C								
# 1		1	1	4			6	2.5
# 2	3	1	1	1			6	4
# 3			4	1	1		6	2.5
# 4		5	1				6	3.83
# 5	3	1	1	1			6	4
# 6	6						6	5
Part D								
# 1	4	1		1			6	4.33
		4		1			6	3.83
					6		6	1
# 4	3	3					6	4.5
# 5	2	2		2			6	3.67

Senior Administration/Trustee Survey Responses

Response	SA	A	U	D	SD	NR	Total	Mean
Scale	5	4	3	2	1	0		
Part B								
# 1		5		1		1	7	3.14
# 2		4	1			2	7	2.71
# 3			1	3	2	1	7	1.57
# 4				4	2	1	7	1.49
# 5		1		2	3	1	7	1.57
# 6				2	4	1	7	1.14
# 7		3	1	2		1	7	2.71
# 8				2	4	1	7	1.14
# 9	1	3		1	1	1	7	2.86
Part C								
# 1	1	3		2		1	7	3
# 2	1	3		1	1	1	7	2.71
# 3		3	1	2		1	7	2.71
# 4	3	3				1	7	3.86
# 5		2		3		1	7	2
# 6	5	1				1	7	4.14
Part D								
# 1	1	3		2		1	7	3
		2				1	7	4
		1			5	1	7	1.29
# 4	4	2				1	7	4
# 5	2	4				1	7	3.71