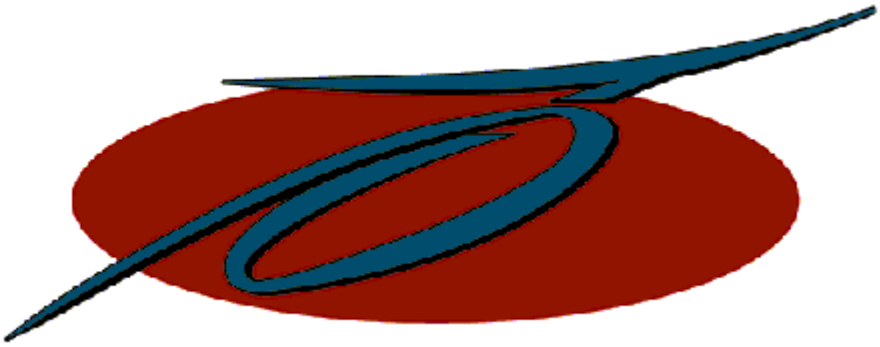

F u t u r E d

Linking The Literature: School Effectiveness and Virtual Schools

prepared for
The Society for the Advancement of Excellence in Education

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1. EXECUTIVE SUMMARY

This literature review is the first part of a study of virtual secondary schools in Canada. The study is sponsored by the Society for the Advancement of Excellence in Education (SAEE), with funding from the Max Bell Foundation; and undertaken by FuturEd. The study spans two years -- academic years 1998/99 and 1999/2000, and three provinces -- BC, Alberta and Ontario.

The purpose of the study is to examine the effectiveness of virtual schools and virtual schooling, especially as they compare to regular or conventional schools and schooling. The outcome of the study is to be benchmarks for the continued study of virtual schools and identification of issues for policy makers.

The literature that is reviewed falls into two broad categories: school effectiveness and virtual education. In each case, the context is examined to establish the current status or thinking. In the case of school effectiveness, the literature includes studies and reports relative to the growing demand for accountability for school effects.

In the case of virtual education, the review begins with the status of virtual schooling within the context of distance education and the uses of Information and Communications Technology (ICT), and concludes with all that is currently known about the effectiveness of learning technologies, education on the Internet, quality in distance education, and effectiveness of virtual schools.

Three key items are draw from this literature review are drawn:

1. the framework for gathering and analyzing effectiveness indicators developed by the OECD;
2. a comprehensive set of effectiveness indicators for secondary schools, including the perspective of both providers and consumers; and
3. a comprehensive set of quality indicators for technology-assisted distance education or virtual education.

2. INTRODUCTION

This literature review is placed within the context of a Canadian study undertaken in 1999 – 2000. This section introduces the terminology as it is being used and provides an overview of the study.

2.1. Introduction To The Literature Review

This literature review is the first step in *Researching Virtual Secondary Schools In Canada*, a study commissioned by the Society for the Advancement of Excellence in Education and the Max Bell Foundation, and undertaken by FuturEd. It is a study of the effectiveness and policy implications of virtual schools in a select number of Canadian secondary schools. Study outcomes are expected to provide guidance to Canadian educators and policy makers in assessing and expanding virtual schooling programs.

The purpose of this literature review is to examine and link current thinking in the following conceptual areas: school effectiveness and accountability, the effective uses of learning technologies, distance education, and learning via the Internet. The outcome of the literature review serves to guide the data gathering and analysis for this study.

The first phase of the virtual schools study is to synthesize the literature that focuses on performance indicators and measures of effectiveness in secondary schools and their applicability to virtual schools, together with a perspective of virtual schooling, virtual schools, distance education and the role that tele-computing plays in each. Key questions that have guided the literature inquiry process are the following.

1. What is a comprehensive set of success indicators for secondary schools, encompassing outcomes, processes and practices, and inputs or resources, that combine quality[1] indicators for both traditional and virtual schooling from the perspective of both providers[2] and consumers?[3]

2. From the comprehensive set, which indicators are practicable in terms of data gathering and relevant to the outcomes of the study? Do benchmarks exist for those indicators?

3. Using the indicators selected for this study, what benchmarks emerge from the research? How do the success indicators compare between traditional and virtual secondary schools?

2.2. Working Definitions

To ensure consistency in understanding, the following definitions will be used for this study.

A **virtual school** is one that offers the mandated provincial instructional program to students through electronic means (i.e., computer-mediated and on-line via the Internet). A virtual school is characterized by:

- a structured learning environment wherein the program is under the complete supervision of a teacher;
- electronic delivery to students who are at home or in a physical setting other than that of a teacher; and
- instruction that may be synchronous or asynchronous.

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[1] Both providers and consumers want education and training products and services that are effective and efficient. The term “quality” is used to encompass these concepts.

[2] Providers include but are not limited to teachers, administrators, support staff, policy makers and funders.

[3] Consumers are those individuals that make choices and by their decisions affect providers. In this case, consumers include, but are not limited to, actual students, parents, and society at large.

Virtual schooling meets the same criteria identified above, but the program is more limited in scope (i.e., not an entire program). It is an optional enhancement to a school's regular, face-to-face programming for access and choice purposes. Virtual schooling takes place at all levels (i.e., college, university, adult education, elementary and secondary schooling).

A **"regular" or conventional school** is characterized by face-to-face instruction; required attendance; group instruction, assignments and testing; and technology being used as an adjunct to instruction**.**

2.3. Overview Of The Study

This study includes virtual schools and schools that engage in virtual schooling. Because the virtual schooling phenomenon is very recent, conventional schools in some provinces (e.g., Ontario) have begun to adopt this form of delivery, on an experimental basis, to enhance access and choice. In other provinces (e.g., Alberta and British Columbia), virtual schools that deliver their total program through electronic means have been formed. For purposes of this study, a distinction is clearly made between virtual schools and virtual schooling.

The virtual schools study will examine and compare nine schools in three provinces (Alberta, BC and Ontario): four that are virtual schools, two that are engaged in virtual schooling, and three that use traditional approaches for comparison purposes. The study is designed to focus on student learning and the organizational, social, and financial implications of virtual schools.

The five study objectives are:

1. to determine and develop a comprehensive set of success or performance indicators for this study and for the continued study of virtual schools (i.e., to define, in an operational sense, "effectiveness" in virtual schools);

2. to acquire and describe baseline data and longitudinal data for those benchmarks (e.g., hard data on achievement gains for students from such existing data sources as the School Achievement Indicators Project and provincial examinations for both virtual and traditional schools);

3. to compare the effectiveness of on-line program approaches with more traditional approaches, from both the providers' and the consumers' points of view;

4. to determine and provide insights as to which teachers and students benefit the most from virtual teaching and learning and flag any potential negatives of virtual learning, including characteristics that are not conducive to positive outcomes, and other barriers to success; and

5. to provide key findings that will inform decisions made by provincial policymakers in the implementation of virtual schooling programs.

Data gathering processes will include primary data gathering (i.e., interviews with key individuals and stakeholder group satisfaction surveys where there is no existing or current satisfaction data available over an entire school-year cycle), and secondary data gathering (i.e., the baseline statistics from existing student achievement and school effectiveness reports).

Data analysis processes will include establishing performance indicators or measures; examining student achievement records; using thematic analytical techniques for qualitative data obtained through interviews and focus groups; and appropriate statistical analysis for quantitative data.

This study is de-limited in the following ways.

1. While secondary school typically includes grades seven through 12 or 13, this study is de-limited to grades 9–12 for practical data gathering purposes because formal testing occurs at these levels.

2. While many different courses are offered to students, this study focuses on core courses only--those that are required for secondary school completion diplomas (i.e., English, mathematics, social studies, and science)--for comparative purposes.

3. While three different provinces are included in this study, there is no intention to compare provinces. The comparisons drawn will be between "regular" and virtual schools in each province and between virtual schools across provinces.

4. Academic, social, emotional, and attitudinal learning outcomes can be positive and/or negative, intended and/or unintended, short-term and/or long-term, and different from various stakeholder perspectives. This study will provide all but long-term outcomes, given the timeframe of the study.

5. While secondary schools in Canada operate in either or both official languages, this study is limited to schools that operate in English, but not necessarily English only.

Virtual schools, as a distinct and separate form of instructional organization and delivery, are a relatively recent phenomenon characterized by extensive use of technology, most often through telecommunications using computers. As such, instruction is offered at a distance from students in either a real time or delayed time mode. These characteristics lend themselves to a set of assumptions on which the literature review and the consequent research are based.

1. Enhanced use of Information and Communications Technologies [ICT] (distributed learning networks through the use of computers) carries with it new or modified school organizational structures, instructional methodology especially in areas such as delivery, teacher-student contact, learning materials, student achievement, and issues associated with measuring quality and accountability.

2. Research findings and practice in distance education have strong applications to virtual schools.

3. Education reform is a slow process; however, demands for alternative delivery, enhanced choice in and access to programs, and overall satisfaction with the education system have served to hasten educational reform.

4. ICT has served to enhance student access to programs. Because of its relatively recent adoption, the effects of this technology on student learning and achievement need to be examined carefully.

5. In assessing the effectiveness of any innovation, values are as important as facts. Believing in something most often needs to be separated from the beliefs and ideas themselves that may be informed by facts.

6. The interactive, telecommunication environments of the virtual schools that characterize the instructional process are substantially different than in regular schools that rely, primarily, on teacher-directed instruction. Because they offer instruction at a distance, the normal definitions of school culture are difficult to apply. Hence, it is necessary to adapt effectiveness indicators as appropriate.

7. The quality of instruction offered by virtual schools must be at least as good as that in regular schools.

Given the recent advent of virtual schools, it is difficult to use pre-existing criteria and methods of assessing their effectiveness and efficiency. Therefore, it is necessary to utilize and adapt

existing criteria of school effectiveness and success to virtual schools, together with quality assurance in distance education and the use of ICT in education. In addition, it is necessary to acquire the most recent research data that describe the operations of virtual schools and schools that engage in virtual schooling--their intents, inputs, and processes--to develop commonalities that can be used to compare their outcomes to those of traditional schools.

3. CONTEXT: EDUCATION REFORM AND QUALITY ASSESSMENT

The context within which this study is set has two distinct foci: education accountability and reform on one hand, and the growth of technology-assisted distance education on the other. To begin, the study of school effectiveness has its roots in heightened demands for educational reform, accountability and improved quality.

3.1. School Reform

The literature on education reform is vast; too vast to be accommodated in this literature review. Suffice it to say, there is a demand for change and there is considerable evidence of change in how education is designed and delivered.

Sergiovanni[4] makes a strong case that teachers and administrators are trying to make schools better places of learning for their students but, unfortunately, the progress is slow. Cawelti[5] in a study on high school restructuring in the United States observed that while changes have occurred, the more traditional ways of doing things still dominate the scene.

This view has other supporters, most notably Schlechty[6] who argues, "[While] schools are better at doing what they were designed to do than ever in the past, unfortunately, what the schools were designed to do is no longer serving the needs of American society." Two other reasons are offered as to why the schools must change to adapt to the changing circumstances in society today.

First, Schlechty notes that ". . . schools were designed at a time when the schools, the libraries, the local newspaper, and the church were the primary sources of information in the community . . . [and] the community had relatively strong control over the level of access the young would have to the information available."[7] In today's environment, access to information is virtually unlimited; the television, the radio, and the Internet are sources of information "that students believe [are] more in touch with the realities of life than are the schools."[8]

Second, these very sources of information to which students have access confound and preclude the schools and the community in and from controlling the nature and types of information. As Schlechty notes, "With the advent of radio, television, the Internet, CD-ROMs, and interactive cable, the control that traditional institutions have over what children come to know is increasingly problematic."[9] Accordingly, educators are advised to think of schools in new ways.

In addition to increased accountability frameworks, one of these ways is to turn information technology to advantageous use in the teaching and learning process. Virtual schooling, virtual schools, and distance education exemplify the use of technology for enhancing choice and access to instruction and educational programs.

3.2. Demands For Accountability And Quality Assessment

The research on school effectiveness and its corollary, failure or ineffectiveness, places heavy emphasis on outcomes and processes--those things are necessary for outcomes to be achieved. A prevailing view in the literature is that if schools know what the key areas of effectiveness are,

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4 See Thomas J. Sergiovanni (1996): *Leadership for the Schoolhouse: How is it Different? How is it Important?*

5 See Gordon Cawelti (1994): *High School Restructuring: A National Study.*

6 See Philip Schlechty (1997): *Inventing Better Schools: An Action Plan for Educational Reform*, p. 14.

7 Ibid, p. 14.

8 Ibid, p. 14.

9 Ibid, p. 14.

appropriate diagnostic or measurement activities in these areas would provide an indication of strengths and areas needing improvement. In this fashion, and much like Barth suggests in his book, *Changing Schools from Within,* the staff members would develop plans to begin the process of school improvement.

However, as Bradley notes, "Terminology and movements such as *excellence, reform, or improvement* [italics in the original] have been dependent upon arbitrary measures such as norm-referenced test scores, attendance percentages, dropout rates, or similar methods that are controversial."[10] In his view, these measures or indicators are narrow instruments when considered in the broad scope of educational aims because they do not address the effects of demographic, psychological, and sociological factors that are beyond the control of the school system. Rather, Bradley suggests that client judgement needs to be added to the list of indicators in determining effectiveness, or success, or, and most importantly, overall quality. In this context, school effects are viewed as outcomes or results or particular areas of success.

Adding client judgement to the list and measuring the views of clients are seen as increasing the degree of control the schools and school systems have over quality and quality improvement efforts. Bradley makes a strong point about the need to determine and address the perceptions of the clients: "In enterprises that depend upon public support for their existence, perception is truth. In education, it is not just that the public must be supportive from a programmatic point of view, but it must also be supportive financially."[11] In short, Bradley argues that a much stronger system of education accountability is needed to provide assurance and reassurance to the public that the schools are meeting societal and economic demands. As he states, ". . . the new economic world order of increased competition has naturally increased the accountability demands on the schools. This accountability is taking shape in the form of technical improvements, parent choice, and other reforms that have, as a basic premise, improved quality."[12] Quality, as Bradley states, "Is determined by the client [and] is accomplished by continually meeting and exceeding client needs and expectations at a price they are willing to pay."[13]

Educators have long held that they are in the best position to judge quality in the schools because they have the training and the expertise to do so. As Education Week comments, "Educators often complain that the public doesn't understand how schools really are doing and that parents and taxpayers get a distorted view from the media."[14] The comment begs the question, "What is it that the public wants to know (i.e., what are the indicators of school effects) and how should this information be reported?" Accountability research and practice in the US and Australia provide instructive advice in this regard.

3.2.1.Accountability And School Effectiveness In The United States

In its 1999 edition of *Quality Counts,* Education Week[15] examines accountability practices of public schools in states and various school districts across the US. As part of its research in this area, Education Week looked in-depth at what users--parents, taxpayers, and educators--regarded as the top or major indicators of school effects, how these should be measured, and how the results should be reported. While much of the research was qualitative, it does nonetheless, represent findings that are indicative of the views of these groups and that are instructive to schools as they pay closer attention to the clients of the education system.

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10 See Leo H. Bradley, (1993) *Total Quality Management for Schools*, p. 3.

11 Ibid, p. 4.

12 Ibid, p. 5.

13 Ibid, p. 65.

14 See Education Week, Quality Counts '99: *Making Sense: Ten Top Recommendations for Reporting School Results to the Public*. Available at http://www.edweek.org.reports/qc99/opinion/aplus1.htm

15 See Education Week (December 1998): *Accountability for Public Schools: Developing School Report Cards*. Available at http://www.edweek.org/reports/qc99

In the focus groups, parents, taxpayers, and educators said that the most important indicators used in evaluating schools are teacher qualifications, safety, class size, and parental satisfaction as measured through surveys. Parent satisfaction was viewed as less important to parents and taxpayers in holding schools accountable than it was in evaluating the schools. Test scores, attendance, dropout, and graduation rates, and course offerings were rated highly, especially for middle and high schools. In general, standardized testing was viewed as an important, albeit incomplete, measure of school quality. Parents generally focused on performance of the schools, although to a lesser degree than do taxpayers. In this regard, the top four indicators for parents are school safety, teacher qualifications, class size, and course offerings.[16] From the taxpayers' points of view, the top four indicators for evaluating schools are teacher qualifications, school safety, course offerings, and test scores. [17]

Educators, on the other hand, put considerably more stock on input indicators than do the parents. The comprehensive focus group report notes that teachers hold a defensive or self-interested position on accountability and evaluating the schools. Educators want schools to be held accountable on the basis of how safe they are, how well qualified the staff is, and how well-funded the school is. Educators also favored student-to-student comparisons on performance standards rather than student-to-standards comparisons favored by parents. In this regard, reliance on standardized test scores was not viewed positively. Top indicator ratings for evaluating schools from the educators' points of view were class size, school safety, teacher qualifications, teacher salary, and per pupil spending.

For purposes of school accountability, parents assigned top priority to the following indicators: school safety; teacher qualifications; class size; graduation rates; and dropout rates. Taxpayers' priorities were very similar: school safety; teacher qualification; graduation rates; promotion rates; and dropout rates. Educators' views were similar to the other groups with the exception of an input indicator: school safety; class size; teacher qualifications; graduation rates; attendance rates; and per pupil spending. Educators do not favor comparisons of results between and among schools and the state as a whole. They tend to favor student-to-student comparisons rather than comparisons of student achievement to set standards. Parent and taxpayers favor the latter method over the former.

Overall, the school effects indicators identified by parents, taxpayers, and educators correspond closely to those that have emerged from other literature. A notable exception is the lack of mention of the teacher/pupil relationship and overall culture of the schools. Parents and taxpayers did identify that they want schools to be caring institutions but this concept was not expanded upon in the research report. Also, and notably, the leadership of the principal did not emerge as a key indicator for parents. However, parents did identify the school's mission as one area in which they had considerable interest. Given the degree of importance attached to the development of a mission statement in leader behavior, there is a connection between this research and other school effectiveness research, albeit not a relationship that can be characterized as direct.

3.2.2.The Australian Movement To Accountability

The Victorian Department of Education (VDE) in Australia has embarked upon the implementation of an accountability framework for its schools. Much like that identified by Education Week, the accountability framework consists of three basic components:[18]

1. a "Schools of the Future" direction in which schools have direct control over their budgets and the capacity to select and manage their own staff;

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[16] Ibid, p. 42.

[17] Ibid, p. 43.

[18] Victorian Department of Education (April 1998): *Building High Performance Schools: An Approach to School Improvement,* p. 3. Available at http://www.sofweb.vic.edu.au/ofreview

2. a "Curriculum and Standards Framework" wherein the broad curricula and standards of achievement for students at various year levels have been explicitly identified; and

3. a "Quality Assurance" direction in which schools develop a specific charter with the state government, produce an annual report, and participate in a formal review every three years. This aspect of the initiative enables schools to plan for, monitor, report on, and systematically review their success in improving performance and, in particular, raising standards of student learning.

In this context, schools are expected to manage for results, explicitly identify current levels of performance, and to develop achievable and manageable improvement plans. Ultimately, the accountability framework is designed "to assist schools in having information needed to link resources to performance targets, manage with a high level of participation, and report on and be accountable for performance."[19]

The Victorian Accountability Framework reflects a strong research base in that it draws heavily on effective schools findings. In addition, it is interesting to note that the "balanced scorecard" approach typically used in the private, business sector has been adapted to reflect the principle that student achievement is affected by processes and inputs in the schools. This direction is consistent with that advocated by Scheerens, Sergiovanni, Kovacs, Stoll and Fink, and Creemers (discussed later). Also, this approach represents an enhanced view of the importance of client satisfaction, a key element of the Total Quality Management principles advocated by Bradley.

Most importantly, the framework focuses on using results to make improvement to education. In this regard, schools are expected to report results annually to parents and, by so doing, develop plans and strategies that focus on those areas needing improvement. Unlike the American approach that provides for major sanctions against schools that do not measure up, the Victorian Accountability Framework places heavy emphasis on schools proceeding to make improvements because of a professional, moral, and social responsibility. Like the American drive to accountability, the Victorian model integrates both evaluation and accountability; the former undertaken through a review every three years and the latter through measuring and reporting on an annual basis followed by strategic planning activities.

Also, the Victorian framework does not place as high a value on school safety as does the American model, perhaps due in part to different cultural and societal values. However, and notwithstanding this difference, the Victorian model does measure accident rates of students; this is consistent with ensuring parents that schools are safe.

The accountability framework operates on five principles.

1. Client focus wherein schools are encouraged to focus on meeting the needs of their major clients -- the students and the parents. This is to be accomplished by a strong focus on the core purposes of schooling that are defined as high and improving standards of achievement for each student.

2. A performance orientation wherein accountability is seen as a process for strategic and continuous improvement rather than an exercise in compliance.

3. Ownership and transparency wherein accountability, the outcomes of the accountability process, and the targets for improvement are known and owned by the schools and the Department of Education.

4. Integration of the accountability mechanisms into the regular planning, policy, and operational activities of the schools and the Department of Education.

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[19] The Victorian Department of Education (1997): *Effective Schools and School Reviews: the Victorian Accountability Framework,* p. 3. Available at http://www.sofweb.vic.edu.au/ofreview

5. Commonality wherein all schools use the same framework and use of performance indicators to enable the schools to monitor their operations and to identify procedures and processes that need improvement.[20] However, "performance indicators do not tell the whole story of a school, its life, and its culture but they do flash warning lights when things are not working and, as often as not, they indicate where to start looking for what is going wrong,"[21]

The VDE outlined a rationale for the selection of indicators that it uses in the school accountability initiative.[22] The report notes that during the past 15-20 years, school effectiveness researchers have identified the characteristics of effective schools. While the results of research in different countries have varied in emphasis, there appears now to be general agreement in about five of these characteristics.

1. The quality of school leadership, with particular emphasis on leadership in the quality of instruction and the setting of academic goals.
2. A pervasive and broadly understood instructional focus. This is often interpreted to mean consistency of teaching approaches across the school.
3. An orderly and safe climate conducive to teaching and learning.
4. High expectations of achievement for all students and a pervasive belief that all students can learn.
5. Consistent and regular use of student achievement measures as measures of effectiveness of teaching programs.

Levine and Lazotte (1990) first generated the above list in the USA. The British experience, particularly in the work of David Reynolds and his colleagues, has added parent involvement in the learning achievements of their children to that list.[23]

Australian research findings on the relationship of school effects and student achievement demonstrate that policy and practice, both clearly within the purview of the schools and the school system, can have a profound effect upon reducing differences in student achievement. In the implementation of an early literacy initiative, for example, focus was put on the following research findings from the school effectiveness indictors: [24]

- Commitment by the whole school to a central set of beliefs and understandings about the importance of literacy and about the approaches to literacy adopted by the school.
- Effective leadership and coordination of teaching programs so that there is a common approach to teaching literacy in the schools.
- Effective links between the school, home, and community.
- High expectations and explicit targets for literacy achievement for each student.
- Quality classroom programs conducted by professional teams of teachers, consistent with the approach to literacy teaching adopted by the school.
- School and class organization specifically designed to support literacy learning, including grouping children according to their ability from time to time within a mixed ability classroom.

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[20] Ibid, p. 4.

[21] Ibid, p. 6.

[22] The Victorian Department of Education (December 1998): *Improving School Efficiency: Student and School Evaluation (School Efficiency Seminar)*, pp. 1-3. Available at http://www.sofweb.vic.edu.au/ofreview

[23] Ibid, p. 1.

[24] Ibid, pp. 10-11.

- Comprehensive monitoring and assessment of progress.
- Intervention and special assistance for those students who are in danger of falling behind.

However, schools need to focus on those areas that make the biggest differences in student learning. Through the use of extensive international research, the VDE constructed a set of indicators that reflected a balanced scorecard approach. In short, the indicators point to specific school effects (e.g., results or outcomes) rather than to an overall statement of effectiveness. Indicators have been developed in five key areas all of which have an effect upon overall student achievement (student achievement has been included as a separate indicator but needs to be considered in light of the others). [25]

1. Curriculum
   - Time allocations (time allocated in the curriculum to each of eight key learning areas).
   - Parent opinion (satisfaction with the academic rigor in the school's curriculum).
   - Participation.
2. Environment
   - Accidents (number of student accidents by location).
   - Parent opinion (including satisfaction with the quality of teaching in the school, the overall management of the school's environment,
   - Student attendance (average annual rate of student absence by year level).
   - Student opinion on the "Teachers and Teaching Scale" using a random and representative sample of students.
3. Accountability
   - Exit and destination data (destination of students leaving school post year 10, Year 11, and Year 12; proportion of students beginning at Year 7 who remain to complete Year 12).
   - Parent opinion (parent satisfaction with the quality of the school's reporting of student progress, overall school performance, the school's responsiveness to parents as its clients).
   - Enrolment.
4. Management
   - Staff opinion (staff satisfaction with morale, progress towards goals and priorities established in the school's charter, quality of work life, leadership support, and professional interaction).
   - Professional development (staff participation in professional development).
   - Staff attendance.
   - Implementation of statutory, policy, and other requirements.
5. Resources
   - Statement of annual financial results.
   - Total receipts and expenditure.

In the area of student achievement, the VDE has identified the following key indicators. [26]

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[25] The Victorian Department of Education (December 1998): *Improving School Efficiency: Student and School Evaluation*, pp. 15-16. Available at http://www.sofweb.vic.edu.au/ofreview

[26] Ibid, p. 15.

- Teachers' assessment of progress in English and mathematics using the standards outlined in the Curriculum and Standards Framework.
- Average study scores (all courses necessary for the Victorian Certificate of Education).
- Average study scores in English and Mathematics (Victorian Certificate of Education).
- Parent opinion of reasonable [student] progress against the standards set for special schools (i.e., special education).

Schools are expected to measure and report the results of the measures each year in their Annual Education Reports. Results are expected to be used to set priorities and performance targets. To the maximum extent possible, performance trends are to be used to provide parents and the public with a sense of overall improvement in the school in relation to targets that have been identified.

Implementing the accountability framework has provided the opportunity to determine some initial effects. A careful review of the three reports documenting the accountability framework in the state of Victoria has identified the following key lessons. [27]

- There has been a shift from provision oriented goals to goals directed towards improved outcomes.
- Schools are willing to set higher expectations and specific targets.
- Monitoring and assessment are important in providing a detailed, systematic, and on-going profile of the progress of all students. Words such as "evidence-based", data-driven", and "value added" now characterize professional conversations on school effects.
- There has been a shift in emphasis from multiple and broadly defined priorities to fewer, more clearly defined outcome-based priorities. Those areas receiving the most attention are literacy, numeracy, and information technology.
- Improvement requires a whole school approach with attention to classroom teaching programs, professional development opportunities for teachers, effective school and class organization, appropriate intervention and special assistance strategies, strong home/school/community links, and strong leadership and effective management.
- Beliefs and understandings about student learning and a supportive and healthy school culture and climate are central to any improvement efforts.
- Schools are beginning to identify their improvement needs and strategies through analysis of performance in the accountability framework.
- Standards in education are generally used to refer to the level of difficulty and challenge for students in the school curriculum and the skills and knowledge gained by the students as a result of their experience at school.
- High standards are thought to mean that young people are expected to study courses that challenge them and increase and extend their skills and knowledge.
- High standards also mean that young people graduating from schools have high levels of skills and knowledge, are able to function as fully participating members of society, and are well prepared for further study or work.

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[27] The Victorian Department of Education (April 1998): *Building High Performance Schools: An Approach to School Improvement*. Available at http://www.sofweb.vic.edu.au/ofreview

- Evaluation reviews have focussed on organizational competence in the areas of curriculum provision, the school environment, management, and resourcing.

- Tackling the trailing edge in student achievement through targeted intervention strategies to improve student learning is essential to achieving higher standards for all students.

- There are two fundamental questions that guide the accountability framework:
  1. Has this program made things better?
  2. Does what we do in this school improve the learning achievements of our students?

Perhaps the best summary of the framework appears in the report in which it is described. [28]

> The Victorian accountability framework is both integrated and comprehensive [using] innovative techniques such as staff and parent surveys as well as more common performance indicators such as test results. [As well], in its focus on the whole school, it recognizes a key finding of international research into school effectiveness--that effective schools take comprehensive and integrated approaches to improvements in performance.

3.2.3.International Quality Indicators For Education

Primary amid the literature of determining educational quality and accountability is the OECD's conceptual map for measuring the quality of schools. The OECD had identified the need for effectiveness indicators, and defines education indicators as "statistics that are useful for planning, management, and policy-making."[29] In the OECD's view, indicators need to be regarded as simple, global, lean, and defined at a high level of aggregation.

Traditionally, indicators typically focus on outcomes and often neglect the process indicators. On the other hand, educators have typically thought that the primary way of measuring the success of the education system was the magnitude of the inputs (e.g., spending per student, pupil/teacher ratio). In the belief that there is room for new and innovative types of education indicators, OECD suggests the adoption of indicators on educational programs and processes in which indicators on the functioning of schools are considered. Thinking in terms of process indicators of school functioning brings the use of the indicators to the level of the school and district office. Traditionally, the OECD has been involved in the development of indicators that can be used at the national level to compare different aspects of education for different countries.

In its project on International Indicators of Education Systems (INES), the OECD developed what Scheerens calls "an ideal set of indicators that can be used as a conceptual map rather than a model in linking context, inputs, processes, and outcomes."[30] The indicators identified in the "conceptual map" are based on the INES project from 1988-1991 on which consensus was reached on the selection and definition of these indicators. The OECD's conceptual map of education indicators is found in Figure 1.[31]

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[28] Victorian Department of Education (December 1998): *Improving School Efficiency: Student and School Evaluation*, p. 9. Available at http://www.sofweb.vic.edu.au/ofreview

[29] See Jaap Scheerens (1995): *Internationally Comparable Indicators of Educational Programmes and Processes: Identification, Measurement, and Interpretation* in Measuring the Quality of Schools, p. 19.

[30] Ibid, p. 20.

[31] Ibid, p. 20.

Figure 1: Ideal Set of International Indicators of Education

PART TWO
LITERATURE REVIEW

The conceptual map provides the method by which indicators can be developed for this study. Informed by the literature on successful schools and the material in distance learning and use of technology in that environment, it is possible to develop a comprehensive set of indicators that form the basis for inquiry. There is a variety of points of view that can be adopted in examining effectiveness (e.g., the human relations model, the internal process model, the open systems model, and the relational goal model advocated by Scheerens[32] and the goal attainment, process, and environmental approaches advocated by Sergiovanni[33] that are explored later in the literature review). For the purposes of this inquiry, aspects of each of the models can be integrated and used effectively.

Scheerens links key input and process variables (i.e., indicators) to educational outcomes. To complement the conceptual map, he suggests a series of process indicators that are useful in understanding what happens at the system and school levels and over which each can exercise a degree of control through policy, decision-making, and budget allocations. These include the following:

1. teacher-pupil ratio (system level).
2. between school variations in teaching staff (system level).
3. percentage of the labour force in education (system level).
4. hours of instruction per student (school level).
5. time on task (school).
6. topic coverage (school).
7. school leadership (school).

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[32] Ibid, pp. 22-26.

[33] See Thomas Sergiovanni (1991, 1995): T*he Principalship: A Reflective Practice Perspective*, pp. 81-88. Boston: Allyn and Bacon.

8. staff cooperation (school).
9. differential and integrated learning (school).
10. success oriented ethos among students (school).
11. locus of decision-making and school autonomy (system).
12. modes of decision-making (system).

The selection of process indicators is based on how indicators should work. As Scheerens notes, "Indicator sets are basically meant to serve as calculating models to prepare or justify certain policy changes. Ideally, sets of indicators must then be built on an existing knowledge base of causal relationships between the contexts, inputs, processes, and outputs of the system under consideration."[34] Generally, there is a view that the causal relationships among these key areas are empirically based but, unfortunately, this is not the case. In an analysis of the research, Scheerens identified a series of educational process variables and outcomes at the school and class levels to determine if there was an empirical, causal relationship.[35]

- Those process variables that had an empirical research confirmation include structured teaching[36] and effective learning time.[37]

- Those process variables having a reasonable empirical basis include opportunity to learn; pressure to achieve; high expectations; physical/material school characteristics (although this is viewed as having a marginal difference); and parental involvement.

- Those process variables having a doubtful empirical confirmation include pedagogical leadership; assessment; school climate; organizational/structural preconditions; and descriptive context characteristics.

- Those process variables having a hypothetical relationship to outcomes include staff recruitment, and external stimuli to make schools effective.

This review may be contrary to what educators believe as important in the educational process to achieve specific outcomes, such as increased student achievement. As Scheerens notes, "Not only are the relationships among these process variables and output in terms of student achievement not consistently supported by research, there may also be uncertainty on the direction of causality."[38] In addition, the process indicators, in Scheerens' view, fit into a view of school effectiveness that he terms the "rational goal model"[39] in which efficiency and effectiveness are the primary criteria.

This model has limitations in that it does not specify which educational objectives are most relevant, particularly since educational objectives other than skill and knowledge acquisition are seen to be important. These would include, for example, "social, emotional, and moral development . . . [that] may require somewhat different teaching approaches and different school organizational arrangements than the process variables that have been shown to matter in the traditional school effectiveness models."[40] Other models for consideration include:

- the Human Relations Model that uses staff cohesion and morale to enhance the desired end of human resource development;

- the Internal Process Model that uses management, information, and communication to achieve the desired end of stability and control; and

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[34] Ibid, p. 21.

[35] Ibid, p. 21.

[36] Structured teaching may be construed as meaning direct instruction to students.

[37] Effective learning time has the same meaning as time on task.

[38] Ibid, p. 22.

[39] Ibid, p. 22.

[40] Ibid, p. 22.

- the Open Systems Model that uses flexibility and readiness as the means to achieved the desired ends of growth and resource acquisition.

In Scheerens' view, each of the models has a role to play in determining overall school effectiveness. Together, the models provide an enhanced view of the process variables that affect educational outcomes. The key differences among the models relate to flexibility and control on the one hand and, on the other hand, the degree to which they focus on internal and external requirements and circumstances. All, however, contribute to outputs, outcomes, and overall educational quality. A description of the process variables found in each of the models is appropriate.

The Human Relations Model is strongly concerned with the work satisfaction of teachers. In this vein, Scheerens cites the work of Louis and Smith (1990)[41] who have identified a number of quality of work life indicators:

- respect from relevant adults, such as the school and district administrators, parents, and the community at large;
- participation in decision-making that enhances the teachers' sense of influence and control over their work;
- frequent and stimulating professional interaction among peers within the school;
- structures and procedures that contribute to a high sense of efficacy generally provided through mechanisms that provide teachers with feedback about their performance and the effects of their performance on student learning;
- opportunities to make full use of existing skills and knowledge and to acquire new skills and knowledge;
- adequate resources to do the job and a pleasant, orderly physical environment; and
- a sense of congruence between personal goals and the school's goals.

The Open Systems Model describes the school's responsiveness to external environmental requirements. The capacity of a school to deal with increasingly demanding and dynamic environments is described, as Scheerens notes, by such terms as "the policy-making potential of the school and the self-renewing capacity of the schools."[42] School organizational characteristics that contribute to this area include:

- leadership (also as entrepreneurship).
- collegiality.
- capacity for self-evaluation and learning.
- overt school marketing activities.
- strong parental involvement.
- boundary-spanning positions.
- support of external change agents.

The Internal Process Model is focused on formalizing and structuring of the school environment. Consequently, the following areas are of interest:

- explicit planning documents.
- clear rules regarding discipline.
- formalization of positions.
- continuity in leadership and staffing.

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41 See K.S. Louis and B.A. Smith (1990): *Teachers' Work: Current Issues and Prospects for Reform*, in P. Reyes (Ed.), Productivity and Performance in Educational Organizations, pp. 23-47.

42 Ibid, p. 24.

- integrated curricula (co-ordination over grades).

In this regard, policy indicators would include attendance rates, staff retention, and assigned/unassigned time for teachers.

Scheerens identified a series of process indicators that are of interest within each of the orientations to overall school effectiveness. Figure 2 contains a summary of this material. A cursory examination of Figure 2 shows that there are commonalities that need to be considered regardless of the orientation to school effectiveness. These include:

- leadership.
- coordination among the staff members.
- continuity and integration of curricula.
- evaluation procedures (staff and students).

Figure 2: Summary of Process Indicators by School Effectiveness Model

Human Relations Model	Internal Process Model	Open Systems Model
Quality of work life indicators that include: · Respect. · Participation in decision-making. · Professional interaction. · Performance feedback. · Opportunity to use skills. · Resources. · Congruence among personal and school goals.	· Planning documents. · Disciplinary rules. · Management information systems. · Formalization of positions. · Continuity in staffing and leadership. · Integrated curricula. · Attendance rates. · Preparation time.	· Entrepreneurship. · Collegiality. · Capacity for self-evaluation and learning. · Overt school marketing activities. · Parental involvement. · Boundary-spanning positions. · External change agents. · Student enrolment figures. · Resources including buildings and equipment.

The degree of emphasis placed on each can vary depending upon one's orientation. However, in Scheerens' view,[43]

> the current set of indicators covers these common features of school functioning reasonably well [although] the exception is evaluation. Analysis of the multiple organizational effectiveness criteria [for evaluation] (performance feedback, capacity for self-evaluation and organizational learning, monitoring of students' progress, and management information systems) shows that there is a compelling argument for the specification of a summary indicator relating to the evaluative potential of schools.

Notwithstanding Scheerens' advice, a summary indicator was not provided. Most importantly, however, it is essential to focus on areas that are deemed to be of most importance to any study of school effectiveness. Given the emphasis being placed on accountability and measurement of results in today's educational environment (see for example, the SCANS Report in the U.S.; Employability Skills released by the Conference Board of Canada; Alberta Education's Accountability in Education Policy), there will be a strong tendency to focus on the rational-goal model. However, neglecting aspects from the other models would be shortsighted and non-representative of what occurs in the daily life in schools. Other literature supports this contention.

[43] Ibid, p. 26.

4. DEFINING AND MEASURING SCHOOL EFFECTIVENESS

In response to the requests for educational change, accountability and quality improvement, considerable efforts have been directed at defining and measuring school effectiveness. The literature in this area links effectiveness, accountability and success in various ways; however, the concepts are typically treated discretely.

4.1. Indicators Of School Effectiveness In The Early 1990s

4.1.1. Effective and Ineffective Schools

Longitudinal research in the United States (Louisiana School Effectiveness Project) by Teddlie and Stringfield from 1980 to 1992 examined both the school and the classroom levels to determine characteristics of effectiveness. Findings in this research were similar to those emerging in Britain. In comparison to ineffective schools, effective schools: [44]

- had higher time on task.
- presented new material.
- used independent practice for students.
- possessed and communicated high expectations.
- used positive reinforcement.
- had small numbers of interruptions during class periods.
- had firm discipline and a friendly ambience.
- displayed student work.
- the physical state and the appearance of the classroom were positive.

Teddlie and Stringfield provide a listing of characteristics for one school that was seen to be highly effective and for one school that was seen to be ineffective. This listing is provided in Figure 3.[45]

[44] Ibid, p. 43.

[45] Ibid, p. 44. For a complete discussion of these findings, see C. Teddlie and S. Stringfield (1993): *Schools Make a Difference: Lessons Learned from a 10 Year Study of School Effects.* New York: Teachers College Press.

Figure 3: Comparison of an Effective and an Ineffective School
(Teddlie and Stringfield)

Effective School	Ineffective School
The principal: 1. Stable appropriate leadership. 2. Appropriate informal academic structure. 3. Shared academic leadership with faculty. 4. Resistant to external change. 5. Close relationship among administrators. 6. Good use of academic support staff.	**The principal:** 1. Unstable, generally inappropriate leadership. 2. Inappropriate informal organizational structures. 3. Non-shared academic leadership. 4. Accepting of external change. 5. Strained relationships among administrators. 6. Unimaginative use of academic support staff.
Faculty: 7. Faculty is warm and friendly. 8. Strong faculty cohesiveness. 9. No obvious personality conflicts among faculty. 10. Integration of support staff into faculty. 11. Cooperative efforts to enhance teaching. 12. High faculty stability. 13. High time on task/positive classroom climate. 14. Fairly uniform teaching across classes. 15. Assistance freely given to new faculty members.	**Faculty:** 7. Faculty is cold and guarded. 8. Lack of faculty cohesiveness. 9. Open bickering among faculty. 10. Inappropriate integration of support staff in faculty. 11. Top-down effects to enhance teaching. 12. Low faculty stability. 13. Low time on task/evidence of negative climate. 14. Large variances in teaching across classes. 15. Little assistance given to new faculty members.
Students: 16. Excellent discipline and understanding of the rules. 17. Students involved in running of the school. 18. Little use of corporal punishment. 19. Student-oriented climate. 20. Consistently high student achievement.	**Students:** 16. Poor discipline and understanding of rules. 17. Little or no student involvement in running of the school. 18. Excessive use of corporal punishment. 19. Adult-oriented climate. 20. Consistently low student achievement.

In addition, Levine's and Lazotte's[46] work focuses on the school as a whole (e.g., culture, climate, parent involvement) and on what the authors term "outstanding leadership." As in other studies, the results are listed to provide the reader with a salient summary shown in Figure 4.[47]

[46] For a complete discussion of these findings, see D.U. Levine and L.W. Lazotte (1990): *Unusually Effective Schools: A Review and Analysis of Research and Practice.* Madison, WI: National Center for Effective Schools Research and Development.

[47] See Bert Creemers (1996): *The School Effectiveness Knowledge Base.* In Reynolds et al. (Ed.): Making Good Schools: Linking School Effectiveness and School Improvement, p. 45.

Figure 4: Characteristics of Unusually Effective Schools
(Levine and Lazotte)

Area	Characteristics
Productive School Climate and Culture	1. Orderly environment. 2. Faculty commitment to a shared and articulated mission focussed on achievement. 3. Faculty cohesion, collaboration, consensus, communications, and collegiality. 4. Faculty input into decision making. 5. School-wide emphasis in recognizing positive performance.
Focus on Student Acquisition of Central Learning Skills	6. Maximum availability and use of time for learning. 7. Emphasis in mastery of central learning skills.
Practice-Oriented Staff Development at the School Site	
Appropriate Monitoring of Student Progress	
Outstanding Leadership	8. Vigorous selection and replacement of teachers. 9. "Maverick" orientation and buffering. 10. Frequent, personal monitoring of school activities and sense making. 11. High expenditure of time and energy for school improvement actions. 12. Support for teachers. 13. Acquisition of resources. 14. Superior instructional leadership. 15. Availability and effective utilization of instructional support personnel.
Salient Parent Involvement	
Effective Instructional Arrangements and Implementation	16. Successful grouping and related organizational arrangements. 17. Appropriate pacing and alignments. 18. Active/enriched learning. 19. Effective teaching practices. 20. Emphasis on higher-order learning in assessing instructional outcomes. 21. Coordination in curriculum and instruction. 22. Easy availability of abundant and appropriate instructional materials. 23. Classroom adaptation. 24. Stealing time for reading, language, and math.
High Operationalized Expectations and Requirements for Students	
Other Possible Correlates	25. Student sense of efficacy/futility. 26. Multicultural instruction and sensitivity. 27. Personal development of students. 28. Rigorous and equitable student promotion policies and practices.

Creemers provides salient advice to the readers of these lists: "[The] Louisiana School Effectiveness Studies made a distinction between the school and the classroom levels, whereas other studies continue to mix classroom and school factors, which also hold in particular for most of the reviews of the recent literature."[48] Regardless of one's orientation to effectiveness and the area under study, the list of correlates can prove to be exceedingly large and, in most circumstances, confusing to those who wish to use the research findings to inform their practice. Creemers makes this point very clearly: "Although research was improved over those years [i.e.,

[48] See Bert Creemers (1996): *The School Effectiveness Knowledge Base.* In Reynolds et al. (Ed.): Making Good Schools: Linking School Effectiveness and School Improvement, p. 47.

1979-1993], the result was still a long list of correlates for effectiveness that urgently needed regrouping and rethinking in order to generate better understanding."[49]

4.1.2.Characteristics of Effective Schools

Research conducted in the late 1980s and early 1990s[50] provided a comprehensive view of school effectiveness. Sergiovanni's synthesis of these characteristics is as follows. [51]

1. Effective schools are student centred. In this context, they:
   - ♦ serve all students.
   - ♦ create support networks to support students.
   - ♦ involve students in school affairs.
   - ♦ respect and celebrate ethnic and cultural diversity.
   - ♦ have student welfare as their first priority.
   - ♦ use a variety of methods to provide close, personal attention to students.
   - ♦ student needs take first priority.
   - ♦ an atmosphere of cooperation and trust is created through a high level of interaction between students and teachers.

2. Effective schools offer academically rich programs.

   - ♦ Student development and providing a well-rounded academic program are the primary goals.
   - ♦ Higher order cognitive objectives are addressed in addition to lower-order objectives.
   - ♦ Options are used to provide an enriched program.
   - ♦ There is in-depth coverage of content.
   - ♦ Co-curricular programs are provided to students.
   - ♦ Student progress is monitored and students receive feedback on their learning.

3. Effective schools provide instruction that promotes student learning.

   - ♦ There is a normative structure that supports instruction.
   - ♦ Programs are designed to ensure academic success and head off academic problems.
   - ♦ Teachers and administrators believe that all students can learn and take steps to ensure that students do learn.
   - ♦ Teaches and administrators believe that they can make a difference in students' learning.
   - ♦ Teachers communicate expectations to students, provide focussed and organized instructional sessions, adapt instruction to student needs, and correct student misconceptions, and use a variety of teaching strategies to facilitate student learning.
   - ♦ The schools set high standards, closely and regularly monitor performance, and recognize effort and reward success.

4. Effective schools have a positive school climate.

   - ♦ A stated mission, goals, values, and standards of performance create the organizational personality.

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[49] Ibid, p. 48.

[50] See, for example, Cawelti, 1994; Davis & Thomas, 1989; Duttweiler, 1988, 1990; Seashore & Miles, 1990; Teddlie & Stringfield, 1993; Wayson and Associates, 1988; Wimpleberg Teddlie & Stringfield, 1989. .

[51] See Thomas J. Sergiovanni (1991): *The Principalship: A Reflective Practice Perspective,* pp. 88-90.

- There is a sense of order, purpose, and direction that is enhanced by consistency of the teachers.
- Students are praised and rewarded for their efforts.
- The environment is work-centred.
- There are high optimism and expectations for student learning.
- Teachers and principals create a learning environment that is open, friendly, and culturally inviting.
- Encouragement is provided to students and staff take a positive approach to discipline.
- Administrators model the beliefs and behaviors that they say are important.

5. Effective schools foster collegial interaction.

   - Professional working environments are created for teachers to facilitate how they do their work.
   - Teachers participate in decisions that affect their work, have reasonable autonomy to carry out their work, and share a sense of purpose and community.
   - Teachers are recognized for their work and are treated with respect and dignity by others in the workplace.
   - Teachers work together collaboratively to carry out instruction, plan curriculum, and redefine teaching practices.

6. Effective schools have extensive staff development. In this sense, they:
   - use the teacher evaluation process to improve teachers' skills.
   - offer practical in-service and on-the-job training tailored to meet the needs of individual staff members.
   - place training as part of the collaborative teaching environment.
   - encourage teachers and administrators to reflect on their practices.

8. Effective schools practice shared leadership.

   - Leadership is shared.
   - Problem-solving occurs through collaboration and team or group decision-making.
   - Principals know their staff members and delegate authority.
   - Principals communicate and build cohesiveness and use their positions to recognize and reward accomplishments of staff and students.
   - Leadership features include direction setting and maintaining direction for the school and facilitating the work of teachers by adopting a wide range of supportive behaviours.
   - Principals involve others in decision-making and this involvement begins with members of the school community developing the goals, values, and mission of the school.
   - Those affected by decisions are involved in making them.

9. Effective schools foster creative problem-solving.

   - Staff members do not accept defeat or settle for mediocrity.
   - Problems are viewed as challenges for which solutions are found and implemented.
   - Staff members demonstrate commitment, creativity, persistence, and professionalism.
   - Resources such as time, facilities, staff expertise, and volunteers are used to maximum advantage to facilitate teaching and learning.

10. Effective schools involve parents and the community.

    - The school and community have a partnership linkage.

- A variety of methods is found to communicate as well as work with parents and the community.
- Parents and the community are involved in teaching and learning activities at the school, are involved in the decision-making process, and serve as advocates of and for the school.
- The schools teach students that they have a responsible part to play in society and that their contributions are valued and needed.

Sergiovanni's list of effectiveness criteria needs to be regarded, as he states, as "helpful [but] not readily translated into specific prescriptions for management and leadership practice. What needs to be done to increase effectiveness and how one does it are situationally specific."[52] Using the list of attributes as a checklist to determine how effective a school is or, conversely, in what areas it is ineffective, would be greatly inappropriate and a misuse of the findings. Perhaps the best use to which these can be put is in the development of a series of indicators that provide assistance to principals and teachers in making decisions about how to improve their schools.

4.1.3.Successful Schools

In his analysis of the literature in school effectiveness, Sergiovanni[53] chose to distinguish effectiveness from success. In his view, "Effectiveness has both common and technical meanings. It is commonly understood to mean the ability to produce a desired effect [although] technically speaking within educational circles, [it] has taken on specific and special meaning. An effective school is understood to be a school whose students achieve well in basic skills as measured by achievement tests."[54] In this context, management, teaching, and leadership that are typically found in the effectiveness literature are linked to this "limited view of effectiveness but not to the higher order and more qualitative intellectual and academic views of effectiveness."[55] On the other hand, and in a more comprehensive sense, the term "successful school" needs to be used to indicate what society expects of its schools. In this sense, Sergiovanni asks, "Should we expect more from our schools than the satisfaction of knowing that they are performing up 'to the standard' and that students are competent performers as measured by such typical indicators as test scores?"[56] Much like Scheerens who identified social, emotional, and moral dimensions of schooling, Sergiovanni advocates that "what is needed is that our young become cultured and educated citizens, able to participate fully in our economic and social society, not just trained workers with limited potential for such participation."[57]

Hence, there is far more to school effectiveness than strong academic performance on tests. The uni-dimensional view of effectiveness based on academic outcomes is limited, and much of the early literature in this area neglected to focus on the relationship of what happens in school to the achievement of other outcomes, albeit intangible but desirable outcomes nonetheless. Thus, other dimensions of effectiveness need to be considered to give an overall indication of success.

Much like Scheerens at the OECD, Sergiovanni suggests that there are three approaches that can be used to determine success of schools. These include: the Goal Attainment Approach; the Environmental Response Approach; and the Process Approach.

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[52] Ibid, p. 91.

[53] See Thomas Sergiovanni (1991, 1995): *The Principalship, A Reflective Practice Perspective.*

[54] Ibid, (1991), p. 76.

[55] Ibid, p. 77.

[56] Ibid, p. 78.

[57] Ibid, p. 78.

The Goal Attainment Approach is based on the premise that a good school is one that achieves its purposes and goals. In this sense, the approach is concerned more with student outcomes than with means or processes. In Sergiovanni's view,

> despite the logic and importance of this approach in measuring school success, its viability is threatened unless it meets the following conditions: Schools must indeed have goals [and they] must be identified and defined with enough precision so that they are readily understood by teachers and others; these goals must be few enough to be manageable; a reasonable amount of agreement as to goals must exist; and it must be possible to measure progress toward these goals.[58]

While Sergiovanni advocates that schools need to have goals and, indeed, that the "goals legitimize the school's existence as a competent organization in the eyes of important groups"[59], there needs to be awareness that goal ownership, decisions about the short-term or long-term nature of the goals, their relevance, their measurability, and the degree to which they complement or are in conflict with each other can sometimes make the use of this model somewhat difficult. In fact, Sergiovanni advocates that the goal attainment model be used in conjunction with the two other approaches to acquire a broader view of what makes schools successful. However, and because leadership is tied to the articulation of a vision and specific goals within the context of that vision, the goal attainment model will continue to be used.

The Process Approach is premised on the belief that there is a link between school characteristics and student outcomes. Student outcomes refer to "cognitive, affective, and psychomotor gains that students make as a result of schooling."[60] School characteristics[61] include such variables as:

- high morale.
- improved school-community relationships.
- efficient teaching.
- improved supervisor and evaluation systems.
- increased loyalty and commitment of teachers to the work of the school.
- improved school discipline.
- better leadership.
- better decision-making.

Thus, school characteristics define the process and methods that teachers and principals use to enhance student outcomes.

Citing research (Austin, 1979; Rutter, 1979; Sergiovanni and Starratt, 1983), Sergiovanni notes that principal leadership processes and an overarching climate of success are the key aspects of this approach. He identifies the following key aspects in principal leadership that have been identified with enhanced student achievement: [62]

- principal involvement in classroom instructional programs and teaching;
- providing a strong emphasis on goals and purposes; and
- taking an active, indeed controlling, role in the functioning of the school especially in areas of curriculum and teaching.

The "climate of success" is composed of norms and values that define appropriate behaviour for teachers and students. As Sergiovanni notes, "These schools were characterized by a

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[58] Ibid, p. 83.
[59] Ibid, p. 84.
[60] Ibid, p. 84.
[61] Ibid, pp. 84-85.
[62] Ibid, p. 85.

consistency of belief, commitment, and acceptance of these norms. Leadership and climate in these schools became processes and means that enhance student outcomes."[63]

In Sergiovanni's view, "*The process approach makes sense only when school characteristics are in turn linked to school outcomes* [italics in the original]"[64]; in other words, separating ends from means cannot occur. Combining the process approach with the goal attainment approach gives a broader picture of school success and the link between what the principal does and improved student outcomes.

The Environmental Response Approach is premised on the belief that effective schools need to communicate, in a convincing fashion, their viability and effectiveness to their school communities and to others. Schools that cannot establish their legitimacy, in Sergiovanni's view, "are not effective."[65] Hence, this approach deals with perceptions--realities formed in the minds and hearts of others about how good a school is because of what it does and what it achieves. What attributes contribute to the impression of legitimacy? At the very least, schools must: [66]

- have stated purposes.
- appear thoughtful and rational.
- give the impression of order and control.
- have sensible structures and procedures.
- provide for accountability.
- appear certain in their actions.

Like the other two approaches, this one cannot and should not be the sole approach adopted when determining overall school success. When it is integrated with the other two, it provides for a more comprehensive view of outcomes achieved, how those outcomes have been achieved, and the perceptions others have of the overall success of schools.

4.1.4.Limitations Of The Early Indicators

According to Stoll and Myers, there are the following five primary limitations to the early views on school effectiveness: a primary focus on student learning measured by standardized achievement tests that neglects other and equally important outcomes; a focus on school organization that neglects classroom interactions; a focus on the school that neglects district level initiatives that affect school activities and directions; a lack of focus on curriculum issues; and a lack of focus on resources available.

First, with regard to the focus on cognitive achievement, Stoll and Fink, like Sergiovanni and Scheerens, comment that the traditional views of school effectiveness have "become associated with a narrow, back-to-the-basics orientation."[67] This limited view, despite its ready applicability to data gathering through standardized test scores and use of trend data for student achievement (perhaps the biggest reasons for its use), has been criticized because it paid attention only to a fraction of children's skills and abilities. Researchers such as Cuban (1983), Brophy and Good (1986), and Angus (1993) have made this point. Consequently, other areas of school effectiveness have been added. These include, for example, student attendance, behavior, delinquency, attitudes, self-concept, and attainment. Stoll and Fink argue that it is imperative for broader dimensions of effectiveness be considered: [68]

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[63] Ibid, p. 85.
[64] Ibid, p. 85.
[65] Ibid, p. 86.
[66] Ibid, p. 86.
[67] Ibid, p. 28.
[68] Ibid, pp. 28-29.

> It is essential that the diversity of children's abilities and talents is recognized not only in the curriculum on offer, but its associated assessments. This also must apply to choices of outcome measures made by school effectiveness researchers. Furthermore, the world of work now looks for young people who demonstrate flexibility, creativity, and problem solving skills, and who are able to cooperate in the workplace--not only those who can spell and count, important as such skills may be.

Thus, researchers are encouraged to use a broad range of outcome measures. The first task in the development of these outcome measures is to identify the range of outcomes that pupils are expected to achieve.

Second, with regard to school level organizational focus, a limitation in the research arises from the emphasis placed on school level organizational variables to the detriment of examining what happens in classrooms. As Stoll and Fink point out, "Inclusion of classroom level process data is particularly important given that analyses demonstrate most of the variation among schools is due to classroom variation. [However], the dilemma for researchers is to know on which elements of classroom practice to focus attention."[69] This advice should not be construed to mean that the school as a whole no longer deserves focus in research or in practice. Rather, the focus must address both variables.

Third, regarding district level effects on schools, Stoll and Fink make a strong case for addressing district level initiatives or the lack of them in any studies and in practice: "Rosenholz (1989) argues the impossibility of fully grasping the nature of schools if the larger environment in which they are embedded is not analyzed. She finds a tendency for 'moving schools' to be located in 'moving districts' and 'stuck schools' to be located in 'stuck districts.'"[70] District practices affect school practices. As Stoll and Fink note, these practices include "clear academic focus and goals, curriculum alignment, analysis of disaggregated test data, staff development that addresses identified needs, and leadership training for principals."[71]

Fourth, with regard to the lack of focus on curriculum, Stoll and Fink note that criticism can be and has been levied against effectiveness research findings because of their lack of focus on curriculum. Notwithstanding this criticism, the authors believe that because "specific classroom practices and materials may come and go, . . . teacher involvement, high expectations, forms of leadership, monitoring of progress, praise and recognition, are constants . . . [that] provide a framework within which the more changing elements of schooling can operate."[72] They view these elements as the "foundation for school growth and are fundamental to further reform. They are the roots that enable the branches to grow or their life support system."[73] Thus, in their view, how teachers teach is fundamentally more important than what they teach, although there is an expectation that the curriculum will contain the essential learnings that society deems appropriate for today's world.

Finally, with respect to the lack of focus on available resources, studies have not focused in this area because many of the schools involved in those studies had similar levels of funding. However, this is not to mean that resource levels are unimportant. As Stoll and Fink state, "A more common view among researchers is that resources help but do not guarantee effectiveness. There is little support for the view that reducing levels of funding will improve the performance of pupils, teachers, or schools."[74]

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[69] Ibid, p. 30.
[70] Ibid, p. 30.
[71] Ibid, p. 30.
[72] Ibid, p. 32.
[73] Ibid, p. 32.
[74] Ibid, p. 32.

4.2. Measuring Success of Canadian Secondary Schools

In the mid-1990s, a national research study funded by Human Resources Development Canada (HRDC) and administered by the Canadian Education Association from 1993-95 sought to determine the key elements of successful secondary schools in Canada. Schools participating in the study were nominated, based on reputation, by a variety of individuals and organizations. Initially, the study was to focus on strategies that high schools had developed to reduce the drop-out rate; a number of schools had received special funding to implement programs that addressed this phenomenon but many implemented programs without the advantage of extra funds. While every school was exemplary in some practices, the schools were not the best 21 schools in Canada. Key study findings, in summary form, include:

1. There is no single model or prototype of a successful secondary school. Successful schools run the gamut in terms of size, organizational structure, communities served, priorities, and approaches.

2. All schools are experiencing some degree of tension between the social and academic goals, between meeting the needs of individual students and providing for a sense of community, and between social accountability and professional autonomy.

3. Motivated and competent teachers are the single, most essential element of successful schools.

4. Success is a fragile quality; getting and keeping it are precarious endeavors. Success depends on many factors and is acquired only with care and difficulty. It is sustained with constant vigilance and can be easily and rapidly compromised by poor decisions or by changing circumstances that are beyond the control of the school.

5. Almost all of the schools studied are conventional in terms of physical facilities, organization structure, curriculum, student groupings, and the activities of teachers and students.

6. The communities that schools serve have little influence in the academic core of those schools. Greater influence is exerted in peripheral subjects, shared values, and social goals.

7. Most schools have little systematic information on the nature and extent of their success and few indicators of institutional performance.

Haughey developed a summary report on the study and it expands upon some of the key findings presented above. In her summary, Haughey notes that "[reverting] to the lists of characteristics of the effective schools literature which stressed structure, stability, and planning was inadequate" to determine success in Canadian secondary schools. Rather, the schools were asked to define their own measures of success and what they did to ensure, recognize, and monitor it.

The findings reveal the following. First, the preponderance of findings in the teacher category point to the fact that teachers make the difference in these successful schools. Their approach to the students, their emphasis on instruction, their relationships with their students--the list is very substantial--point to the importance of the human relations model in determining any school's

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[75] See HRDC (1996): *How Schools Succeed: The National Report of the Exemplary Schools Project*. Available at http://www.hrdc-drhc.gc.ca/arb/publications/bulletin/vol2n1/vol2nla9_e.html

[76] Ibid, p.1.

[77] Ibid, pp. 1-2.

[78] See M. Haughey (1997): *Successful Secondary Schools in Canada: A Report on the Exemplary Schools Project.* In the Canadian Administrator, volume 36, number 5, February 1997.

[79] Ibid, p. 1.

effectiveness. The number of success characteristics that apply to the school culture area supports this view. Second, there are internal consistencies in these schools that address expectations, rules, decision-making, and a focus on doing what really matters that are directly applicable to the internal processes model. Third, while results are important and schools celebrate them, the degree to which the schools analyze results to make improvements does not lend itself well to the relational goal model. Perhaps with greater knowledge about and experience with measuring results, the rational goal model may enjoy broader acceptance. However, the attitudes of educators to measurement (e.g., toward student to standard comparisons of achievement) will continue to militate against acceptance. Fourth, there are numerous characteristics that relate directly to the open systems model that emphasizes parent and community involvement, adapting to external conditions in the school environment, and collegiality. In essence, the findings represent all four models that are used to determine overall school effectiveness. Selecting those characteristics that matter the most is the most difficult task in this process.

The study also points out that success is situational--different schools find different ways to react to and address the needs of their students and their communities. In this context, it is important to note that principles are tempered by a degree of pragmatism--deciding what is to be done within the context of the schools' operations.

Figure 5 shows how the key definitions of success relate to some common areas that emerge from the successful and effective schools literature. Notwithstanding Haughey's advice that traditional literature was seen to be inadequate for identifying success, it does, nonetheless, provide an organizing structure that makes sense of the findings. Findings have been grouped under the following categories: student achievement and success; teacher characteristics; administration and administrative structures; school-community linkages; school culture; monitoring of student progress; and programming for students.

Figure 5: Relating Findings from the Successful Canadian Secondary Schools Project to Effectiveness Indicators

Student Achievement and Success	Teacher Characteristics	Administration and Structures
• Completion of grade 12 diploma. • Marks in core subjects (grades 9 and 12). • Acquiring the values in the social curriculum. • Balancing rights with responsibilities. • Working collaboratively and cooperatively with others. • Review of results achieved on provincial tests in core subjects to determine where emphasis needs to be placed, teaching methods need to be changed, and whether results for a given year, considering the clientele, were different from those expected. • Departmental exam results are reported in the local press and schools regard the results as critical to maintain and enhance the school's reputation.	• Norms and values of teachers are important and are reflected in the school community. • Teachers are caring and committed to students and students value relationships with their teachers. • Teachers and administrators model their beliefs about learning and civic values. • Teachers view themselves as members of a professional community wherein values such as flexibility and collegiality are demonstrated while pursing a sense of common purpose • Teachers ascribe to the school philosophy. • Teacher autonomy and acceptance of individual differences are viewed as important. • Teachers have opportunities for staff discussion to resolve issues. • Emphasis placed on using time for instruction. • Teachers take little time for themselves and focus on instruction, marking, preparation, and contact with students.	• Emphasis on collegiality. • Seek a balance of cooperative decision making and autonomy of teachers. • Principals set the tone for the school and staff knows where they stand. • School leadership is shared rather than principal based.

Figure 5 (continued)

Student Achievement and Success	Teacher Characteristics (continued)	Administration and Structures
	• Professional development activities focus on school priorities and individual teacher priorities for growth. • Professional development activities (individual) tend to focus on curriculum initiatives and school organizational issues rather than on pedagogical needs. • Teachers see their teaching as student-oriented and based on caring relationships with their students. • Full class instruction is used most often (small group and individual work occurs also) and instructional strategies tend to be limited. • Teachers feel constrained to cover the content required for examination purposes. • Some subject integration occurs and collaborative learning • Teachers working together form the fabric of the schools, balancing autonomy and cooperation with a commitment to a common purpose about educating students both academically and socially.	

Figure 5 (continued)

School Culture	Monitoring of Student Progress	Pr
· In divergent communities, the school population develops consensus for code of behaviour that is acceptable to staff, students, and parents. · Rules are clarified with students. · Relationships built with students through personal contact, knowing students' names, and being interested in their lives. · Balance of students' rights and responsibilities. · Extra-curricular activities offered to students to enhance opportunities for students to learn about cooperation, responsibility, commitment, and leadership. · Dealt actively with racism and matters related to ethnicity. · Students typically are not involved in decision-making in matters relating to curriculum, school structure, and school behaviour. · Student acceptance of the school culture. · Student attendance. · Student behaviour and attitude. · School rules and students are able to articulate what they are. · Student perseverance, cooperation, and commitment. · Routines established that stress commitment, cooperation, respect for others, and industriousness. · Encourage student creativity and individual development. · Presence of a moral code to which students are expected to adhere.	· Monitoring of students to ensure compliance with social culture and school norms. · Attempts to develop academic potential · Establishing relationships with students · Develop non-academic skills such as time management, study skills, and handling emotions. · Student involvement in work experience is balanced against the constraints of achieving the objectives required by the curriculum. · Schools monitor their academic achievement and compare their results to other schools with similar clientele. · Celebrate success though graduation exercises and publishing results (school and provincial) in the local newspaper.	· Presenc designe success · Core co instructi · Course and abil · Vocatio partners · Balance examina · Cultural others r celebrat · Technol from tea program applicat technol · Sophisti and tea word pr

4.3. New Research In School Effectiveness

The research findings on school effectiveness cited earlier in this review are based on material developed in the late 1980s and early to mid-1990s. More recent reviews of the literature and research have begun to focus on school effects or outcomes. As Sergiovanni and Scheerens pointed out, the traditional views of effectiveness were based on measurable student learning, usually through standardized achievement tests. This view was limited in its scope as it neglected other less easily measured but equally important aspects of schooling including social, emotional, moral, and attitudinal development of the students.

Recent literature on school effects builds extensively on the earlier material. It is different to the extent that it highlights the notion that there is no single concept of effectiveness. As Stoll and Fink note, "A discussion of school effectiveness in OECD countries notes that no common definition exists across member countries. Herein lies a fundamental problem of school effectiveness. What does it actually mean and does it mean the same thing to different people?"[80] In a simplistic sense, effectiveness is taken to mean the achievement of specific desired outcomes. Unfortunately, as these authors point out, the identification and selection of outcomes is very difficult in that it forces those involved in the processes to choose based on different and competing values. Notwithstanding the difficulty, Stoll and Fink note, "Clearly, at the school level, all those concerned need to come to a shared definition and agreement on expected and desired outcomes."[81]

4.3.1.The Role of Social Context And Student Attributes

In an historical context of school effectiveness, Stoll and Fink, and Kovacks[82] as well, note that the school effectiveness movement began in response to the traditional and long-standing views that student learning, or more importantly, the lack of student learning, was explained by circumstances beyond the schools' control. These explanations, regarded in a cause-effect relationship, were psychological and/or socio-cultural in nature.

In the former, it is felt that student achievement is determined by genetic and/or psycho-affective variants. Socio-cultural explanations claim that the root of educational failure or lack of student achievement lies in the cultural disadvantage of specific social groups. Also, adherents of this philosophy argue that since schools do not respond to the special needs of these groups, they produce social inequality; thus, schools themselves help to increase the initial disadvantages of these particular students. Therefore, the view that schools could make a difference in the lives and the achievement levels of their students was neither widespread nor broadly accepted. In response, as Stoll and Fink note, "A wide range of research efforts focused on separating impact of family background from that of the school, and ascertaining whether some of the schools were more effective than others and, if so, what factors contributed to the positive effects."[83] By centering on the school, researchers could look at what happens inside the institution in terms of relationships, teacher interaction with students, leadership, processes, allocation and use of resources, and organizational arrangements to find out if these affect student learning and, if so, in what ways. Ultimately, as Stoll and Fink state, "School effectiveness research seeks to describe what an effective school looks like. [However], school effectiveness is not just defined as quality in outcomes."[84]

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[80] See Louise Stoll and Dean Fink (1996): *Changing Our Schools*, p. 26.

[81] Ibid, p. 27.

[82] See Karen Kovacs (1998): *Combating Failure at School: An International Perspective.* In Loiuse Stoll and Kate Myers (Eds.): *No Quick Fixes: Perspectives on Schools in Difficulty*, pp. 222-241.

[83] See Louise Stoll and Dean Fink (1996): *Changing Our Schools*, p. 27.

[84] Ibid, p. 27.

Edmonds, an early writer in the school effectiveness area, added the concept of equity to quality outcomes: "I require that an effective school bring the children of the poor to those minimal masteries of basic schools skills that now describe minimally successful pupil performance for the children of the middle-class."[85] As Stoll and Fink comment, "Essentially, an underlying belief of the school effectiveness movement is that all children can learn."[86] Kovacs underscores the importance of this belief:

> *There is a great difference--in all OECD education systems--between the level attained by the weakest 25% of students and the level attained by the strongest 25% of students in the same grade. Generally, the difference is equivalent to more than two years of schooling irrespective of the subject considered; and in some countries, it amounts to as much as five years of schooling* [italics in the original].[87]

With regard to student achievement, three points of view, differing only in degree, not in kind, point to the importance of centering on the school rather than on genetic, psychological, or socio-cultural factors of the students to explain effectiveness.

The first, advanced in the Victorian Accountability Framework for Education[88] holds that:

- about 10% of the differences in student learning can be attributed to differences between schools;
- about 40% of the difference in student learning is due to differences in effectiveness between programs, classrooms, and year levels within schools; and
- about 50% of the differences in student learning is due to factors external to schools such as social disadvantage, non-English speaking background, and family income.

The second view, advanced by Kovacs[89] is essentially the same save for the degree to which the school can address fundamental differences in the students it receives:

> A review of the literature suggests that school factors account for, at most, some 25% of the variance in student performance. Although this is still significant in policy terms, it does put the effort to change schools into perspective. School-based explanations have given rise to three types of measures for addressing failure: Integration of assessment into the teaching process; differentiated learning, and school improvement.

The third view, advanced by Stoll and Fink, holds that “most studies have identified that between eight and 14% of the total variance in pupils’ achievement is attributable to the school. This does not sound like very much but it may turn out to be the crucial difference between success and failure.”[90]

Notwithstanding the degree to which schools themselves can account for differences in student achievement, the research clearly shows that schools have a moral and professional obligation to make improvements to the overall quality of education offered to their students. In this way, the focus of school effectiveness can shift away from an emphasis on outcomes to student progress. Stoll and Fink emphasize this point: "Mortimore (1991) [states]: 'An effective school is one in

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[85] Ibid, p. 27

[86] Ibid, p. 27

[87] See Karen Kovacs (1998): *Combating Failure at School: An International Perspective.* In Louise Stoll and Kate Myers (Eds.): No Quick Fixes: Perspectives on Schools in Difficulty, p. 229.

[88] The Victorian Department of Education (April 1998): *Building High Performance Schools: An Approach to School Improvement*, p. 11. Available at http://www.sofweb.vic.edu.au/ofreview

[89] See Karen Kovacs (1998): *Combating Failure at School: An International Perspective.* In Louise Stoll and Kate Myers (Eds.): No Quick Fixes: Perspectives on Schools in Difficulty, p. 225

[90] See Louise Stoll and Dean Fink (1996): *Changing Our Schools*, p. 37.

which pupils progress further than might be expected from consideration of its intake.'"[91] Most importantly, this advice points to what the authors call the "value added" by the school to overall student progress.

In Stoll's and Fink's view, value added "describes the boost given by the school to pupil's achievement over and above what they bring in terms of prior attainment and background factors."[92] Where pupils achieve more than what has been expected, determined through an assessment of the student on multiple factors, value added has been demonstrated. By using the "value added" concept, the differences in students can be accounted for and the equity component of effectiveness broadened.

Stoll and Fink believe that a school is effective if it: [93]

- promotes progress for *all* [italics in the original] of its pupils beyond what would be expected given consideration of initial attainment and background factors;
- ensures that each pupil achieves the highest standards possible;
- enhances all aspects of pupil achievement and development; and
- continues to improve from year to year.

4.3.2. Context Characteristics

Consistent with Stoll's and Fink's earlier advice about broadening the characteristics of effectiveness beyond student achievement, a summary is provided of key effectiveness factors (developed by Sammons et al., 1995) that represent the best thinking that has emerged from research studies in North America and Britain. Research has, however, traditionally been based on elementary schools because it was believed these schools had the greatest long-term effect on student learning. Thus, there is some question about the applicability of the factors to secondary schools.

In this regard, the authors state, "The review of key characteristics of effective schools concluded that the 11 factors appear to be generic. Indeed, the authors originally intended to produce separate lists for the two sectors but found the degree of overlap to be repetitious." However, and this is critically important in any consideration of effectiveness, the research done in primary schools shows that "effective primary schools may help to raise pupils' achievement by raising their sense of self-efficacy. What is clear from this research is that it is too late to leave it until secondary school to 'get it right.'"[94]

An additional consideration in the use of these factors is the context in which they are to be applied. As Stoll and Fink note, "Context, in terms of pupils' social class background and school location (inner city, urban or rural) must also be considered in any application of the characteristics."[95] Context also includes the grade levels of the pupils or the phase of their schooling. The context characteristics include the following.[96]

1. Professional leadership:
   - firm and purposeful.
   - a participative approach.
   - the leading professional.

2. Shared vision and goals:

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[91] Ibid, p. 27.
[92] Ibid, pp. 27-28.
[93] Ibid, p. 28.
[94] Ibid, p. 37.
[95] Ibid, p. 36.
[96] Ibid, p. 31.

- unity of purpose.
- consistency of practice.
- collegiality and collaboration.

3. A learning environment:
   - an orderly environment.
   - an attractive working environment.

4. Concentration on teaching and learning:
   - maximization of learning time.
   - academic emphasis.
   - focus on achievement.

5. High expectations:
   - high expectations all round.
   - communicating expectations.
   - providing intellectual challenge.

6. Positive reinforcement:
   - clear and fair discipline.
   - feedback.

7. Monitoring progress:
   - monitoring pupil performance.
   - evaluating school performance.

8. Pupil rights and responsibilities:
   - high pupil self-esteem.
   - positions of responsibility.
   - control of work.

9. Purposeful teaching:
   - efficient organization.
   - clarity of purpose.
   - structured lessons.
   - adaptive practice.

10. A learning organization:
    - school-based staff development.

11. Home-school partnership:
    - parental involvement.

4.3.3.Classroom and Teaching Factors

Creemers[97], in an extensive review of the literature on effectiveness and school improvement, has provided additional insights that need to be included in this review. In particular, Creemers focuses on the importance of the classroom and teaching variables in school effectiveness.

In what he terms the "second generation of school effectiveness studies"[98], Creemers identifies the characteristics of effective schools in Britain that stress the importance of classroom and

[97] See Bert Creemers (1996): *The School Effectiveness Knowledge Base.* In David Reynolds, Robert Bollen, Bert Creemers, David Hopkins, Louise Stoll and Nijs Lagerweij (Ed.): *Making Good Schools: Linking School Effectiveness and School Improvement.*

[98] Ibid, p. 40.

teaching activities on student learning.[99] In addition to the previous findings of the importance of the role of the principal (Head Teacher) and a new factor, the role of the assistant principal (Deputy Head) in policy decisions, the research highlighted the following.[100]

1. The involvement of teachers in curriculum planning and developing their own curriculum guidelines. In addition, teacher involvement in making decisions about which classes they would teach as well as involvement of teachers in deciding how money would be spent were important.

2. Consistency among teachers. Continuity of staffing had positive effects but students did better when the approach to teaching was consistent.

3. Structured lessons. Students did better when their school day was structured. In effective schools, teachers organized student work, ensuring there was plenty for them to do but allowed them freedom within the structure. Negative effects were noted when students were given unlimited responsibility for a long list of tasks.

4. Intellectually challenging teaching. Student progress was greatest when teachers were stimulating and enthusiastic, when teachers used higher order questioning and statements, and when students were asked to use powers of problem-solving.

5. Work-centered environment. This is characterized by a high level of student time on task, students enjoying their work, and demonstrating an eagerness to begin new tasks. Also, noise-levels were low and movement around the classroom was minimal and work related.

6. Limited focus in sessions. Students did better when teachers focussed on one or two subject areas within the same classroom activity.

7. Maximum communication between the teacher and the students. The more communication students had with their teacher about the content of their work, the better the students did. Most teachers spent time dealing with individual students. This practice, although understandable, was seen to be less effective than teachers using opportunities to talk to the whole class (e.g., reading a story or questioning).

8. Record-keeping. The value of record keeping was seen to be important not only for the principal (head) but also for the teacher as it was used in planning and other assessment activities.

9. Parental involvement. Schools that had an informal open-door policy, encouraging parents to get involved in students' work at home or helping at school, were seen to be more effective than the alternative.

10. Positive climate. Effective schools had a positive ethos and the overall atmosphere in the schools was seen to be more pleasant.

Creemers also highlights the work of Levine and Lazotte that in his view "confirms the five factor model" of school effectiveness that focuses on high instructional leadership, high expectations of student achievement, an emphasis on basic skills, a safe and orderly environment, and frequent evaluation of pupil progress. [101]

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[99] Creemers relies heavily on the findings of research conducted by Mortimore (1986) in schools in Britain. In addition, Creemers uses findings from Teddlie's and Stringfield's (1993) work in the Louisiana School Effectiveness Studies.

[100] See Bert Creemers (1996): *The School Effectiveness Knowledge Base.* In Reynolds et al. (Ed.): *Making Good Schools: Linking School Effectiveness and School improvement*, pp. 41-42.

[101] Ibid, pp. 40 and 43.

4.3.4.Creemers' Comprehensive Model

Creemers provides what he terms a "comprehensive model of educational effectiveness"[102] in which he connects attributes of effectiveness at the student, classroom, school, and context levels. The model attempts to make sense of the diverse correlates that emerged from a plethora of studies in this area.

In Creemers' view, a model that takes into account these four different levels "serves to explain the previous research parsimoniously, . . . maps a series of avenues for future research which may serve to alert policymakers that investment in the field could be rewarding, [and] provides a useful road map. [It also addresses] the need for a model to generate both a more theoretical orientation and a secure foundation for research."[103] The model would seek to explain differences in student learning results by "specifying the relationships between the components in the model and student outcomes."[104]

Creemers' model builds on the research that identifies strong correlates to student learning and outcomes in each of these levels. In relation to student learning, Creemers states that "the learning rate is considered as a function of five elements: aptitude, ability to understand instruction, perseverance, opportunity, and quality of instruction."[105] The research base for this model rests with the work of Stringfield and Slavin (1992), Scheerens (1992), Creemers (1991), and Carroll (1963).

At the classroom level, factors can be determined that are related to student learning. As Creemers states, "Stringfield and Slavin (1992) summarize these factors as QAIT: Quality, Appropriateness, Incentives, and Time for instruction."[106] At the school level, Stringfield and Slavin have identified five important factors: [107]

1. Meaningful and universally understood goals.
2. Attention to daily academic functioning.
3. Coordination among programs and between schools and parents over time.
4. Removal of unsuccessful teachers from the school and the development of all staff.
5. Organization of the school to support universal student learning.

These five factors collectively are known by the acronym MACRO.

Unfortunately, and on their own, the factors are very broad and do not lend themselves well to showing specific relationship activities that can serve to link the different levels. In this regard, Creemers has identified the key criteria of consistency, cohesion, constancy, and control to link what happens in classrooms, classrooms to other classrooms, and classrooms to the school. Basic variables at the student level (in addition to the obvious ones of aptitude and motivation) are time spent on learning, the opportunity students need to meet their goals, and quality of teaching. The classroom provides both the time and the opportunity for learning to take place. At the school and contextual levels, variables related to time, opportunity, and the quality of teaching are conditions for instructional effectiveness.

In summary, Creemers has identified four criteria of school effectiveness: Consistency, Cohesion, Control, and Constancy. The concepts of quality, time, and opportunity also have been identified as the variables for each of the different levels although curriculum, grouping

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[102] Ibid, p. 48.
[103] Ibid, p. 48.
[104] Ibid, p. 48.
[105] Ibid, p. 48.
[106] Ibid, pp. 48-49.
[107] Ibid, p. 49.

procedures, and teacher behavior have been added to the classroom level. These can be applied to the different levels leading to specific student outcomes. [108]

1. Context: Consistency, constancy, and control

    - Quality: Policy focusing on effectiveness, indicator system, policy on evaluation, national testing, training and support system, funding based on outcomes.
    - Time: National guidelines for time schedules, supervision of time schedules.
    - Opportunity: National guidelines for curriculum.

2. School: Consistency, cohesion, constancy, and control

    - Quality/educational: Rules and agreements about classroom instruction, evaluation policy, and evaluation systems.
    - Quality/organizational: Policy on supervision, professionalization, and school culture including effectiveness.
    - Time: Time schedules, rules and arrangements about time use, and an orderly and quiet atmosphere.
    - Opportunity: School curriculum, consensus about mission, rules, and agreements about how to implement the school curriculum.

3. Classroom: Consistency

    - Quality of instruction curriculum: Explicitness and ordering of goals and content, structure and clarity of content, advance organizers, evaluation, feedback, corrective instruction.
    - Grouping procedures: Mastery learning, ability grouping, cooperative learning, highly dependent on differentiated material, evaluation, feedback, and corrective instruction.
    - Teacher behavior: Management/orderly and quite atmosphere, homework, high expectations, clear goal setting (restricted set of goals, emphasis on basic skills, emphasis in cognitive learning and transfer), structuring of the content (ordering of goals and content, advance organizers, prior knowledge), clarity of presentation, questioning, immediate exercise, evaluation, feedback, corrective instruction.

4. Student:

    - Time for learning and opportunity to learn.
    - Time on task and opportunities used.
    - Motivation.
    - Aptitudes and social background.
    - Achievement of basic skills, higher order skills, and meta-cognitive skills.

These key concepts serve to synchronize the different levels and to clarify the ways in which each influences the others and affects student learning. A new component that emerges for the first time in any of the literature on effectiveness is the payment for outcomes achieved. While Creemers does not expand upon this concept to any degree, it can be inferred that payment for outcomes refers to student achievement in what he identifies as "basic skills, higher order skills, and meta-cognitive skills."[109] If this is so, it is most unfortunate as other literature is critical of defining effectiveness as student achievement that can be measured solely on skills and knowledge through tests. Only one other piece of literature, the *Quality Counts* by Education Week addresses payment for results. Here, taxpayers who participated in focus groups endorsed the payment for results achieved by the schools. Neither educators nor parents were in favour.

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[108] Ibid, pp. 50-51. This is a textual summary of Creemers' model of effectiveness. Aspects identified for descriptions of quality represent Creemers' views of the research findings for each of these areas.

[109] Ibid, p. 50.

Comments made in the context area about national testing tend to support the contention that effectiveness, in Creemers' view may be narrowly defined. Notwithstanding this speculative criticism, the remaining aspects of the model seem useful, particularly in examining the classroom level and its contribution to overall school effects and outcomes. Creemers' material on effectiveness also relates well to the material on quality assurance in distance education, quality assurance in the use of technologies, and quality guidelines for the design and delivery of courses through the use of technology. Teaching practices in these areas are similar to those recommended by the effectiveness literature in general and, in particular, to Creemers' material on structuring, feedback, communication, evaluation of student learning, record keeping, and consistency in curriculum and goals. These quality guidelines are developed later in this review.

4.3.5.Expanding Upon School Failure Or Ineffectiveness

Both Kovacs and Stoll and Fink explore the concept of school failure or school ineffectiveness. Kovacks views the manifestations of school failure in economic and social terms (i.e., poor or inappropriate outcomes for students). In relation to the former, she notes that the two important manifestations of school failure are "early school leaving and the fact that a significant proportion of students finish compulsory education without having acquired the necessary skills to enter the labor market."[110] Consequently, students are marginalized, unemployed, or work in low-income jobs. As Kovacs notes, the school needs to address these issues by focusing on some key areas, most notably enhancing the motivation of students, and the manner in which institutional requirements are communicated to students: [111]

> Amongst those who drop out of school, approximately twice as many cite reasons over which they had no control (institutional pressures, economic need, and family reasons) as those who say they left out of personal choice (boredom, lack of interest in education, desire to take up employment). Further, a characteristic likely to be common to all early school leavers is poor motivation to formal education. Indifference or resistance to education is an economic liability at a time when the labor market increasingly requires a continual updating of skills and competencies of the labor force.

In addition, and just as importantly, Kovacs notes that schools do not provide students with the literacy and numeracy skills they need to be productive, contributing members of the societies in which they live:[112]

> Data from the IALS [International Adult Literacy Survey] show that the reading and numeracy skills young people actually need in order to solve the problems with which they are confronted in their every day lives or at the work place correspond to the level expected from people having completed upper secondary education. Yet, in virtually all countries surveyed, there is a significant proportion of people with upper secondary qualifications whose reading skills are below this level. This calls into question the real value of the qualifications obtained.

Stoll and Fink adopt a different approach in their analysis of failing or ineffective schools by focusing on key processes that are deficient. They caution readers that the improvement of ineffective schools cannot be improved simply by taking steps to use the effectiveness attributes. In their view, "It is insufficient, therefore, to describe the characteristics of effective schools and assume that ineffective schools posses the mirror opposite of these factors."[113] Schools may be classified on a continuum from "moving or learning enriched [to] stuck or learning impoverished."[114]

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[110] See Karen Kovacs (1998): *Combating Failure at School: An International Perspective*. In Louise Stoll and Kate Myers (Ed.), No Quick Fixes: Perspectives on Schools in Difficulty, pp. 228-229.

[111] Ibid, pp. 228-229.

[112] Ibid, p. 229.

[113] See Louise Stoll and Dean Fink (1996): *Changing Our Schools*, p. 32.

[114] Ibid, p. 32.

Characteristics of "stuck" or "learning impoverished" schools, based on research conducted by Mortimore (1986) focus on both the school and classroom levels and they are negatively related to overall pupil progress, achievement, and social development. Class size and split grades were thought to contribute to these areas: "There was some indication that larger class sizes and mixed age classes (split grades) were associated with ineffectiveness. These factors may not be solely responsible for a school's difficulties, but may put extra constraints on the school."[115]

Two other studies conducted by Teddlie and Springfield (1993) and Reynolds (1995) also informed Stoll's and Fink's choice of characteristics of ineffective schools. In summary form, these characteristics include:[116]

1. Lack of vision: Schools were thought to have a maintenance mentality and teachers held little attachment to anything or anybody. School staffs were not knowledgeable about the change process, their context, or their schools' overall cultures.

2. Unfocused leadership. Stuck schools are characterized as routine, having a numbing sameness, unaided by principals who "mostly assumed the posture of a burrowing animal." Teachers complained about a string of broken promises causing loss of faith and even despair. Principals had lower academic expectations than did their teachers, devoted more energy to other aspects of student development than academic skills, and their actions had little effect.

3. Dysfunctional staff relationships. Staff relationships were characterized as listless, self-reliant, and resistant to asking advice. Staff development policies were not coherent and choices of in-service were random and indiscriminate. Other descriptions of dysfunction relationships include irrational, reactive, and fractured or analogous to a dysfunctional family. In regard to the latter, staff experienced distress because of:
    - excessive control;
    - a striving to be right in all things and a consequent fear of failure;
    - blame;
    - denial of the basic freedoms (feelings, perceptions, wants, thoughts, and imaginings);
    - no-talk rule where issues are never discussed;
    - myth-making by which the real situations are masked;
    - non-completion because problems are never resolved; and
    - unreliability manifested by a lack of trust.

4. Ineffective classroom practices. These are characterized by:
    - inconsistent approaches to the curriculum and teaching with generally lower expectations for students of lower SES;
    - an emphasis on supervising and communicating about routines;
    - low levels of pupil interaction with the teachers engaged in housekeeping activities, pupils being left alone, and low levels of pupil involvement in the work;
    - pupil perceptions of their teachers as people who did not care, praise, provide help, or consider learning as important; and
    - frequent use of criticism and negative feedback.

Worse still, teachers in low SES schools reported "less satisfaction with teaching, a lack of teacher ownership for their ability to influence student outcomes, and greater teacher absence and desire to work in another school."[117] In short, the pervasiveness of ineffectiveness has a profound negative affect on those working within the school and more importantly upon those whom the school is to serve--the students. Improvement these schools and holding them accountable for their actions are essential. The degree to which schools do or do not facilitate

[115] Ibid, p. 33.
[116] Ibid, pp. 33-35.
[117] Ibid, p. 35.

student progress, provide value-added interventions to their students, and achieve results has assumed great attention in the accountability movement.

4.3.6.Lessons Learned From The New Research

The new research is informative in that it highlights the notions of value added and equity of opportunity for all students within school effectiveness or school success. It also is useful in that it notes school failure is not a mirror opposite of school effectiveness. Specific characteristics of school failure highlight a lack of vision, unfocused leadership, ineffective classroom practices, and dysfunctional staff relationships. By working in these areas, it is felt that schools can make progress in overall student achievement and learning.

An addition of the new research material to that summarized by Sergiovanni is the inclusion of context, district level support, and inputs to the effectiveness findings. These are critically important if schools are to improve. In addition, school success has been defined broadly to reflect overall student progress -- in fact success is defined by the degree to which the schools progress in this area.

Once again, the literature notes that schools have a moral, professional, and societal obligation to enhance opportunity for students. Parents, taxpayers, and society at large also expect that schools will be accountable for the results they achieve in particular areas. Notwithstanding some differences that emerged in the literature about what parents feel are the most important areas (e.g., safety emerged as the first concern in the United States), parents want to know how the school is doing in overall student achievement, how money is spent, and how qualified the teachers are to teach in particular areas. Research also highlights the importance of overall satisfaction of the client--the parents and the students--with educational services.

Stoll's work in identifying the 11 areas of school effectiveness builds directly on those identified by other authors. What is needed is for schools to tackle the areas over which they have the most control--climate, culture, vision, leadership, classroom practices, and so on--to build on and add to what the students bring to the schools by way of natural ability, talent, and experiences.

Creemers' model provides valuable insight into an infrequently studied area of school effectiveness--the classroom and its linkages to the school, to the context in which the school operates, and to the students themselves. By stressing the criterion of consistency in quality of instruction and curriculum, grouping procedures, and teacher behaviors in relation to mission, climate, culture, policy, philosophy, evaluation, and feedback, student outcomes can be enhanced. Creemers does not address the concept of leadership in his model, preferring instead to focus, it is supposed, on collective leadership to set the tone and the framework in which learning takes place. The addition of payment for outcomes is unique in the literature and may be subject to criticism for it emphasizes measurement of student achievement in basic skills, most probably through the national testing program that he identifies with the consistency criterion. New research in school effectiveness has chosen to view student achievement in a much broader sense than that measured by tests.

Finally, Creemers' work recognizes that students bring to schools specific aptitudes and social background that have an effect upon their achievement. These are variables that affect student motivation, time on task, and the degree to which opportunities for learning that are offered to students are used most effectively by the students themselves. However, his model, consistent with the literature, recognizes that schools can and do make a difference in student achievement.

4.4. Conclusion

Sergiovanni's analysis ties directly to the findings of the successful secondary schools research conducted by HRDC and commented upon by Haughey. In addition, the findings have a strong similarity to the process indicators suggested by Scheerens. More importantly, the insights

provided by the three authors point to the need to examine areas other than outcomes in determining overall effectiveness. In this sense, the application of the human-relations, open-systems, and the internal process models advocated by Scheerens to the process and environmental-response approaches advocated by Sergiovanni is not only desirable, but highly practicable and defensible.

This does not mean that Scheerens' rational goal model and Sergiovanni's goal-attainment approach are not important. Rather, these models need to be regarded as important in defining outcomes or ends. However, and this point must be made very strongly, the outcomes and ends cannot be separated from the means by which they are to be achieved. Hence, there is a need to adopt a comprehensive view of indicators from each of the models when determining and describing school effectiveness. In this context, however, neither is it possible to address all of the indicators for any one school (or group of schools) nor is it desirable to do so given the situational imperatives faced by individual schools.

On the other hand, the literature review on effectiveness identified common indicators that need to be applied to any school as these are seen as critical to their on-going organization and operations. In keeping with the models suggested by Scheerens and Sergiovanni, the indicators can be grouped for ease of presentation. While there is no claim that these indicators represent the best way to determine school effectiveness, they do provide sufficient information to get a "big picture" view of a school according to key indicators. Figure 6 contains the suggested indicators.

Figure 6: Potential List of School Effectiveness Indicators and Models

Human Relations Model (i.e., staff cohesion and morale)	Open Systems Model (i.e., management, information, and communication to achieve stability and control)	Internal Processes Model (i.e., flexibility and readiness to achieve growth and resource acquisition)
· Legitimacy and respect from the parents, community at large, and other administration (e.g., boards). · Frequent interaction among members of the school staff. · Participation in decision-making that enhances teachers' sense of influence and control over their work. · Adequate resources to do the job and a pleasant, orderly physical environment. · Congruence between personal and school goals. · Opportunities to use existing and to acquire new skills and knowledge. · Loyalty and commitment of teachers to the work of the school. · Clearly stated mission and vision. · Presence of normative structures. · Teachers communicate expectations to students, provide focussed and organized instructional sessions, adapt instruction to student needs, and use a variety of teaching strategies.	· Leadership · Collegiality. · Parental and community involvement. · Capacity for self-evaluation and learning. · Using results to make improvements. · Marketing the school and entrepreneurship. · Principal involvement in classroom instructional programs and teaching. · Creative problem solving methods are devised and implemented. · Parent and student satisfaction.	· Evidence of long- and short-term planning to meet student needs. · Structures and procedures contribute to efficacy. · Feedback provided to teachers on their performance. · Accountability processes (measuring and tracking results achieved to identify areas of strength and those needing improvement). · Rules and policies and operating procedures. · Integrated curricula. · Adequacy of resources to get the job done.

The literature provides insights into broader views of school effectiveness that heretofore had not been widely accepted. Primary among these views is that defining school effectiveness cannot be based solely on student academic achievement as measured by standardized tests. School effectiveness, defined in this manner, is narrow, simplistic, and does not recognize that student achievement includes much more than how well the student does on a test. As Sergiovanni pointed out, the term "school success" is a more accurate term than effectiveness since it covers the emotional, physical, attitudinal, and citizenship aspects of learning in addition to academic achievement of the students.

What defines school success and how important is it that success be measured? In regard to the first question, research, particularly that conducted by the CEA and HRDC on successful Canadian secondary schools, has shown, that what teachers do and/or do not do have the most pronounced positive and negative effects on student learning. Certainly, the literature has identified that SES of students accounts for up to half of the variation in student achievement in and among schools. However, this is tempered and mediated, to a very large extent, by practices within the schools and, more importantly, within the classrooms.

School success addresses the overall development of students and their subsequent achievement in a number of areas. The literature clearly shows that success can be broken into a variety of indicators that assist teachers, parents, the public, and the educational institutions themselves in determining how well they are doing. Scheerans work shows that outcomes cannot be separated from the context in which they were achieved, nor from the processes used to achieve them, nor from the inputs that affect and are affected by outcomes, processes, and the context.

Long lists of what makes schools effective have been strongly criticized within the literature as their applicability to every school is not only in doubt but significantly misleading to those who apply them universally. More important is the work done by Stoll and Fink that builds on the 11 primary attributes of effectiveness developed by Sammons et al. These attributes are seen to be sufficiently generic to apply to both elementary and secondary schools and include:

1. Professional leadership:
    - ♦ firm and purposeful.
    - ♦ a participative approach.
    - ♦ the leading professional.

2. Shared vision and goals:
    - ♦ unity of purpose.
    - ♦ consistency of practice.
    - ♦ collegiality and collaboration.

3. A learning environment:
    - ♦ an orderly environment.
    - ♦ an attractive working environment.

4. Concentration on teaching and learning:
    - ♦ maximization of learning time.
    - ♦ academic emphasis.
    - ♦ focus on achievement.

5. High expectations:
    - ♦ high expectations all round.
    - ♦ communicating expectations.
    - ♦ providing intellectual challenge.

6. Positive reinforcement:
    - ♦ clear and fair discipline.
    - ♦ feedback.

7. Monitoring progress:
    - monitoring pupil performance.
    - evaluating school performance.

8. Pupil rights and responsibilities:
    - high pupil self-esteem.
    - positions of responsibility.
    - control of work.

9. Purposeful teaching:
    - efficient organization.
    - clarity of purpose.
    - structured lessons.
    - adaptive practice.

10. A learning organization:
    - school-based staff development.

11. Home-school partnership:
    - parental involvement.

Throughout the literature, these themes, for want of a better descriptor, emerge as those that are most important in determining overall school success. If schools want to move in the direction of providing value-added outcomes to students as they provide equity of opportunity for those students, these areas need to be addressed.

How important is it that school success be measured? One of the key generic aspects of effectiveness deals with the school as a learning organization. It is doubtful that a learning organization will be established as long as measurement does not occur. Parents too, as witnessed by the work in Australia and the United States, want to know and need to know how well the students succeed in the schools they attend. Schools need to measure in the generic list of criteria to determine overall levels of success, chart the results over time, build on areas of strength, and address areas in which results did not meet expectations. It is ironic that high expectations need to be held for students but the application of high expectations to the schools themselves causes anxiety and stress among the professional educators in the schools (see, for example, the *Quality Counts* material produced by Education Week).

What is more useful than a list of generic indicators of success or effectiveness are the practices within the schools and the classrooms that are consistent with each of the indicators. Practices provide a model for schools to emulate. While practices in one school may not be and, perhaps should not be, directly applicable to another, they can be examined and modified to address the unique context of the schools. This addresses the learning organization criterion in the 11 attributes of effectiveness. Finally, the literature was very clear that schools have a professional and moral obligation to ensure that their students receive the best possible education.

5. CONTEXT: VIRTUAL SCHOOLS IN CANADA

As this is a study of the effectiveness of virtual schools, it is important to set the study in context. In Canada, virtual learning is relatively new, although distance education where it has its roots, is very established. This section sets out what virtual learning is and how it is developing.

5.1. Virtual Learning And Distance Education

This review provides a focus on how technology can enhance choice in learning delivery and access to instruction in new and different ways. Distance education has been the primary beneficiary of the advantages offered by telecommuting in course delivery. Schools, on the other hand, have used and continue to use technology in labs and in the classrooms for skill development and information access. Recently, schools have taken advantage of Information and Communications Technologies (ICT) to deliver programs to their students. It is in this context that virtual schools have appeared.

For the purposes of this review, the term virtual learning is used to refer to the delivery of educational materials and services using a combination of ICT. Other terms used to refer to virtual learning include online learning, networked learning, learning networks, distributed learning, cyberschooling, tele-learning, Internet-based Training (IBT) and web-based training (WBT). Virtual schooling is a form distance education and, as such, has its roots in principles and practices both of distance learning and uses of learning technologies.

Distance education is a more general term applying to the range of educational technologies that can provide instruction in situations where the teacher and learner are in separate physical locations. Haughey defines distance education as "those teaching methods in which, because of the physical separateness of learners and teachers, the interactive as well as the preparatory phase of teaching is conducted through print, mechanical, or electronic devices."[118]

A definition by Moore and Kearsley highlights the complexity inherent in distance education: “Distance education is planned learning that normally occurs in a different place from teaching and as a result requires special techniques of course design, special instructional techniques, special methods of communication by electronic and other technology, as well as special organization and administrative arrangements.”[119]

Virtual learning is a particular form of distance learning that shares the general complexity and characteristics of distance learning. While the focus of this review is on virtual learning in virtual schools, it must be noted that virtual learning approaches are also being used in regular classrooms and computer laboratory settings in conventional schools. Most of the literature dealing with virtual learning in the K -12 sector is based on applications in conventional schools rather than in virtual school environments. Similarly, much of the literature dealing with online and distance education is based on applications in the post-secondary and business sectors. Results obtained in conventional schools or with an adult post-secondary population may not apply to virtual schools. There is an urgent need for research (such as the current project) on the factors that effect the success and effectiveness of virtual schools.

5.1.1.Features Of A Virtual Learning Environment

Virtual learning provides a flexible environment for learning that may include:

- multimedia subject matter presentation;
- individual and/or group learning;
- asynchronous and/or synchronous learning activities;
- interactivity – with learning materials; with others;

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[118] Margaret Haughey (1990). Distance Education in Schools. *The Canadian Administrator, 9(8),* p. 1.

[119] Michael G. Moore & Greg Kearsley (1996). *Distance Education: a Systems View.* Belmont, CA.: Wadsworth.

- self-directed and self-paced learner participation; and,
- accessibility via the internet from any location.

Virtual learning can include a number of distinct online technologies including:
- access to the world wide web and web-based learning resources;
- e-mail;
- asynchronous computer conferencing and newsgroups;
- listserves and bulletin boards; and
- synchronous chat that may also include audiographics and/or videoconferencing.

In addition, communications using the telephone and fax are frequently included in virtual learning environments.

Information and communications technologies (ICT) can play a number of important roles in support of learning:
- the delivery of multi-media educational material and learning resources;
- a communications medium for providing facilitation and guidance to learners;
- a vehicle for promoting learner to learner interaction and collaboration; and,
- providing learners with access to a broad range of Internet resources.

5.1.2.Definition Of A Virtual Education Institution

Farrell provides a general definition of a virtual education institution.[120] A Virtual Education Institution may be defined as an institution which is involved as a direct provider of learning opportunities to students and is using information and communication technologies to deliver its programs and courses and provide tuition support. Such institutions are also likely to be using information and communication technologies for such other core activities as:
- administration (e.g., marketing, registration, student records, fee payments, etc.)
- materials development, production, and distribution
- delivery and tuition
- career counseling/advising, prior learning assessment, and examinations.

Canadian examples of virtual education initiatives in the schools sector noted by Farrell are:
- Alberta Distance Learning Centre (ADLC), in Alberta;
- The EDEN Project, in Ontario; and,
- New Directions in Distance Learning, in British Columbia.

Note that two of these examples, ADLC and EDEN, are being studied in this research project.

5.2. The Development Of Virtual Learning

Farrell provides a succinct description of the current stage of development of virtual learning and virtual learning institutions.[121]

> The development of virtual institutions is still experimental, rather unfocused, and not necessarily matched to clientele learning needs. While there are some exception, generally the applications of information and communication technologies tend to be unsophisticated. Commonly, for example, the World Wide Web is used by institutions simply as a publishing medium without addressing the interactive potential of the technology. This may be because little attention seems to be paid to the importance of staff retraining and development.

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[120] Glen Farrell (Ed.) (1999). *The Development of Virtual Education: A Global Perspective.* Vancouver, BC.: The Commonwealth of Learning, p. 11. [On-line]. Available: http://www.col.org/virtualed.

[121] Ibid. p. 3.

> The emergence of virtual institutions is directly linked to the development of, and access to, information and communication technology infrastructure. However, major socio-economic and geographical disparities exist in such access.

He attributes the growth of virtual education to the Internet.[122]

> Now the phenomenon of the Internet and the World Wide Web is driving the broadest scope of interest and involvement in technology applications ever witnessed across all levels of educational institutions.

Farrell identifies a number of factors promoting the development of virtual learning institutions.[123]

- The increasing capacity, flexibility, and suitability of information and communication technologies to educational applications, together with the continuing decrease in the cost of hardware.
- The enabling capacity of the technologies to "unbundle" functions … that have traditionally been provided by one institution.
- The growth of knowledge, with its attendant consequence of the obsolescence of much of what was previously learned, placing an ever-increasing pressure on conventional models of education.
- The realization that the quality of the learning experience can be enhanced by applying information and communication technologies. In the conventional classroom we find increasing use of the Internet to access information, which enriches the learning experience. Further, in the conventional distance education environment, we find the technologies being adopted to improve the learning process through interactive and collaborative learning to reduce the learners' sense of isolation.
- The demand from isolated learners for more equitable access and service. This, of course, is not new, and was the reason for the development of correspondence courses. However, the context is broader now as the capacity of the technologies enables a remote, single-room school to access many of the instructional resources available to schools in an urban setting.
- The perception of many institutions, particularly in Europe and North America, that the application of information and communication technologies will enable them to increase their market share in an environment that is increasingly competitive.
- The need to be seen to be "keeping up with the competition."
- The expectation by policy makers and administrators that the development of virtual delivery models will reduce costs, increase productivity, and enable expansion without cost increases.

Factors identified by Farrell[124] as constraining the development of virtual learning include:

- lack of access to the technology networks, their cost, and bandwidth limitations;
- lack of access to the technologies by learners;
- copyright restrictions;
- the front-end cost of implementing virtual learning;
- the lack of learner support systems in virtual education environments;
- the reticence of most teachers and faculty to accept the use of information and communication technologies;

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122 Ibid, p. 7.

123 Ibid, p. 5.

124 Ibid.

- the prevalent teacher-centred pedagogical philosophy;
- lack of credit transfer mechanisms; and,
- the many people who prefer a traditional face-to-face learning environment.

5.3. Virtual Schooling and Virtual Schools

Virtual schooling and virtual schools are clearly related but they have different meanings. With respect to the former, virtual schooling is the delivery of approved programs of study by a school through electronic means, either on- or off-campus. In traditional terms, the program must be supervised by a certificated teacher; this includes drafting course content, having contact with students to assist them in their learning, and evaluating student progress. Virtual schooling may be part or all of the instructional programming and focus of a school. Instruction occurs through an "on-line", computer mediated communication process.

Virtual schools, on the other hand, offer the required instructional program to students through electronic means. Alberta Education, for example, defines a virtual school as "a structured learning environment wherein the program, under the complete supervision of a teacher, is delivered electronically to students who are at home or in a physical setting other than that of the teacher."[125] As such, virtual schools enhance access to instructional programs and choice as to how the programs are delivered. Like virtual schooling, instruction is computer mediated and "on-line".

Alberta Education notes that in Alberta, "The terms on-line school and virtual school refer only to separate units that have received school status and are expected to fulfill the same requirements as other schools, including, for example, establishing a school council."[126] The essential difference between virtual schooling and virtual schools is that virtual schooling is an optional form of delivery using computer-mediated communication for a small number of courses or particular aspects of courses. Generally, virtual schooling is an adjunct to programs offered by a traditional school.

On the other hand, virtual schools use computer-mediated communication as the method to deliver the entire program and do not have walls save but for administrative purposes; they are bounded only by the geography in which their students reside. A strong similarity is that virtual schooling and virtual schools both offer instructional programs at a distance to their students. Hence, specific distance education issues need to be considered.

Issues such as access to instruction (i.e., meeting required subject time allocations), attendance, teacher contact with students within a synchronous (real time) or asynchronous environment (delayed), student characteristics that best match the delivery style, teacher characteristics, organization and administrative structures, and cost of the telecommunications and/or computer equipment relate to virtual schooling and virtual schools.

5.4. Virtual Schooling In Canada

Alberta Education's report on Best Practices in On-Line Learning[127] provides a concise but comprehensive description of the nature and extent of virtual schooling in Canada. It is important to note that the report's emphasis is on best practices in on-line learning in Alberta; however, the status of Alberta's virtual schooling is placed in the context of other similar situations in Canada, the United States, and in other key countries, most notably Australia.

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[125] See *Funding Manual, 1998-99, Alberta Education,* p. 16.

[126] See *Alberta Education: On Line Learning; Best Practices for Alberta School Jurisdictions*, January 1999, p. 3. Available at http://ednet.edc.gov.ab.ca/technology/

[127] See *Alberta Education: On Line Learning; Best Practices for Alberta School Jurisdictions*, January 1999. Available at http://ednet.edc.gov.ab.ca/technology/

Alberta has been identified as the leading province in on-line learning based on the number of schools that are operating in an on-line learning format; at the time the report was written--September-December 1998--Alberta had 22 virtual schools. On the other hand Ontario had four and British Columbia nine virtual schools.

Alberta emerges as the leader in the virtual school movement in Canada. With more than 20 schools actively engaged in offering on-line programs to students, the province represents entrepreneurship in education delivery and programming by meeting the demand for choice both by students and their parents. Since funding follows the students in this province, virtual schools obtain their operating grants by attracting students from their resident school jurisdictions. In addition to enhancing choice through virtual schools, Alberta also has enhanced access to programs. Alberta Education's research shows that a variety of methods are in place for delivering programming to students.

Other provinces in Canada are moving in similar directions, although the differing political philosophies regarding choice and funding may account, in some degree, for the slower adoption of virtual schools. In Ontario and British Columbia, the issue seems to be one of enhancing access to instructional programs. As in Alberta, a variety, although more limited, of programming options and delivery models is in place.

Other provinces have moved to enhance access through enhanced distance education delivery, although this is not the focus of this review. However, it must be noted, and strongly so, that research and practice in distance education has had an extremely strong influence on the virtual school movement. It is necessary to look no further than the extensive use of print and textual material through computer-mediated instruction to see this link most clearly. Both in theory and in practice, virtual schools continue to use and adapt distance education methodology to deliver, albeit through computer-mediated means, instructional programs to students. Most importantly, virtual schools do provide education at a distance; virtual schooling may occur both within and outside the traditional school environment, also indicating a link to distance education.

5.4.1. Virtual Schooling In Alberta

Virtual schooling and the number of virtual schools have expanded greatly in Alberta during the past three years. While the ADLC remains the traditional and original provider of distance education through a virtual school format, others have quickly moved to meet the choices of parents and students. Most programs still depend on print materials and use e-mail to contact students and parents. Many, as Alberta Education notes, have developed or adapted course materials so that more information is available electronically and students may access all their course materials through the Internet. Many programs focus on the individual learner and where group interaction occurs, it is primarily for the purposes of socialization rather than to meet learner goals. Also, there is an increasing trend toward resource-based, learner-centred, and personalized learning in Alberta's virtual school environment.

Virtual schools have benefited by the enhanced choice provided to students and parents and the funding framework that resulted from government initiatives to restructure the education system. Alberta's emphasis on the enhanced use and acquisition of computer technology and enhanced telecommunications through Internet access also have served to boost the enrolments in virtual schools and expand educational delivery options. Last, the increased accountability requirements for all schools ensure that virtual schools also have to report results achieved in key provincial and locally determined areas. Benchmark data exist for mandatory performance measures that will enable a comparison with results achieved in other virtual and traditional schools.

5.4.2. Virtual Schooling In British Columbia

British Columbia had nine schools offering distance education programs to approximately 23,000 secondary and 2,200 elementary students in 1995-96. A move began in 1994 for these schools to put courses on line; the first occurred when the North Island Distance Education School (NIDES) at Comox initiated an on-line delivery mechanism. Students are provided with modems, Internet access and technical support enabling them to participate in on-line learning with their teachers and to enhance contact with other students.

The Surrey School Board, in an attempt to deal with overcrowding in its schools moved to establish a virtual school in February 1997 for students in senior grades. Qualicum High School, a continuous entry school that includes mainstream and continuing education sections, is developing a grade 12 First Nations course to be delivered on-line.

The Vernon School Board is actively pursuing the development of a virtual school that is scheduled to open in fall 1999 and to provide service initially to 50 students in elementary grades.

5.4.3. Virtual Schooling In Manitoba

Garden Valley Collegiate in Winkler, Manitoba initiated an on-line program in 1995 to expand course offerings to students. The school LAN was used to provide additional senior courses to students registered in the school. Students access the four on-line courses from the school's web site either in the school or from their homes. Courses were designed for FirstClass conferencing software but this has been changed to use WebCrossing software as the courses are transferred to the web.

5.4.4. Virtual Schooling In Ontario

Ontario has four virtual projects that have been in operation only for a short time. The Electronic Distance Education Network (EDEN)[128] began in the Orillia Learning Centre in 1995 as a bulletin board service for adult students wanting to obtain a high school diploma. Maintaining the point of view that it was the first school in Canada to offer its courses completely on-line through a LAN, the school now offers courses via web-based delivery. EDEN is operated by the Simcoe County District School Board in partnership with the York Region, Upper Canada, Hamilton-Wentworth and Dufferin-Peel Catholic District School Boards and the Toronto School Board.

The Virtual High School,[129] in Goderich, Ontario, is an initiative of the Avon Maitland District School Board. It began offering online high school courses for credit to students in surrounding areas in January 1997.

The Dufferin-Peel Catholic School District's Webschool[130] is designed to offer on-line computer studies through continuing education. Initially, the course was created for grade 11 and then expanded to grade 12. It now serves as alternative day school programming because the demand for computer courses in the regular school day far surpassed the ability of the school to meet the demand. As such, the program is accessible to regular students outside of normal school hours.

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[128] See http://eden.scbe.on.ca/

[129] See http://www.virtualhighschool.com/

[130] See http://webschool.dprcssb.edu.on.ca/

The Toronto Virtual School[131] , an entrepreneurial school, makes available mathematics and science courses in grades eight through 12. Learning materials are presented as lesson units complete with sequential presentations, interactive exercises, and tests.

5.5. Virtual Learning As A Stimulus For Educational Reform

Virtual learning is one component in a much larger movement of educational reform. A useful way to view the process is to begin with what Bracewell et al.[132] consider to be the four key elements that make up the teaching/learning process in conventional classrooms – teacher, content, learner(s), and context. Figure 7 is an illustration of the key teaching/learning dimensions.

Figure 7: The TCLC(L) Teaching/Learning Representation

	TCLC -	TCLC +
TEACHER	transmitter	facilitator
CONTENT	pre-organized	constructed
LEARNER(S)	low access	high access
CONTEXT	limited support	extensive support

The endpoints of each continuum define two contrasting models of technology use. For example, most current classrooms would lie toward the left ends of each continuum (TCLC -):

1. the teacher is a transmitter of knowledge rather than a facilitator of learning;
2. the content is pre-organized by the teacher or 'canned' material on a CD-ROM rather than constructed by the learner;
3. the learners have low rather than high access to online resources and tools; and
4. the context offers the teacher and his or her classroom a limited rather than a high level of support for new initiatives and resources.

In contrast, the overwhelming thrust of research initiatives that examine the effects of online technologies are directed towards the opposite ends of each continuum: teacher/facilitator, content/constructed, learners/high access, context/extensive support (TCLC +). Again, the teacher primarily facilitates learning, the curriculum content is constructed by the learners, the learners have free access to online resources, and the context supports the use and expansion of the resources. There is evidence that the teacher plays a crucial role in the quality of the technology impact on the learning process, and there is also evidence that materials on the web (or on a CD-ROM) that offer stimulating and well-adapted content are a rare commodity.[133]

Note that by adding the idea of location to the key factors, a continuum of "traditional classroom" to "virtual classroom" can be constructed. This provides for the condition in the virtual classroom in which the teacher/facilitator is in a location separate from the students from some to all of the instructional time.

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131 See http://www.intoronto.com/virtualschool

132 Robert Bracewell, Alain Breuleux, Thérèse Laferrière, Jean Benoit & M'hammed Abdous. (1998). *The Emerging Contribution of Online Resources and Tools to Classroom Learning and Teaching.* Vancouver, BC.: TeleLearning Network Inc. Available at http://www.telelearn.ca/g_access/news/review.html

133 Ibid, Executive Summary, p. 2.

Bracewell et al. identify a number of trends emerging from the application of online technologies in classrooms. The trends emerging from this work with respect to the K/12-13 sector and relevant other materials include: [134]

- Trend 1: Higher levels of control by learners are called for as classrooms are getting more online.
- Trend 2: Learning situations become more realistic and authentic as classrooms are getting online.
- Trend 3: Online resources boost student interest and motivation in the classroom through a greater diversity of learning goals, projects, and outcomes.
- Trend 4: The successful online classroom combines information technology with appropriate pedagogy.
- Trend 5: The classroom is extended to online communities with the potential to support or even challenge the locally-established curriculum.
- Trend 6: The education of educators is broadened to include just-in-time and/or collaborative learning.
- Trend 7: Educators use online technology as a driving element of an educational reform.

An additional trend also has emerged: Some educational jurisdictions are using online learning technologies to create virtual schools and virtual classroom programs as an alternative or adjunct to their conventional schools and classrooms.

An important feature of this report is an extensive list of recent references pertaining to the use of online technologies in the K/12-13 sector. The results of this research are significant in pointing out the impact of ICT in conventional schools. As the TCLC + kinds of learning environments continue to develop, there is likely to be a growing acceptance of virtual programs as alternatives for certain students under certain conditions. A future scenario might see school boards providing or subscribing to a virtual school program to complement programs available at smaller schools in their jurisdiction, to provide for students with various special needs, and to be an option for any student desiring to pursue virtual learning as part of their regular program of studies.

Echoing other predictions for educational reform, Tapscott predicts that a new, more powerful, and more effective learning paradigm will result from using the Net characterized by the "eight shifts of interactive learning": [135]

1. from linear to hypermedia learning;
2. from instruction to construction and discovery;
3. from teacher-centered to learner-centered education;
4. from absorbing material to learning how to navigate and how to learn;
5. from school to lifelong learning;
6. from one-size-fits-all to customized learning;
7. from learning as torture to learning as fun; and,
8. from the teacher as transmitter to the teacher as facilitator.

[134] Ibid, Executive Summary, p. 3, 4.

[135] Don Tapscott (1998). *Growing Up Digital: The Rise Of The Net Generation.* Toronto, ON: McGraw-Hill, p. 143.

6. EFFECTIVENESS AND VIRTUAL EDUCATION

The emphasis in this study is to determine indicators of effectiveness for virtual and regular schools. A key area that needs to be addressed is effectiveness in distance education and the use of technology in instructional delivery. Virtual schools differ markedly from their regular partners in this area. The literature in field reveals indicators of effectiveness or quality in both the uses of learning technologies and distance education in general, and in virtual schooling in particular.

6.1. Effectiveness In Distance Learning

Distance learning can be used for many purposes (e.g., for formal education, continuing education, advanced professional education and management/employee development). Advocates for distance learning[136] claim that it makes learning and training more accessible, more convenient, more effective and more cost-efficient for the learners and for the education provider.

The environment for distance learning is characterized as one in which remote students have special needs[137] including: advising needs, access needs, communication needs, and administrative needs. In the traditional context -- distance education delivered by traditional learning organizations for course / program credit -- these needs should be met through appropriate institutional support structures. This means that providers of distance learning must help consumers to:

- take greater responsibility for their own learning;
- become more active in asking questions and obtaining help;
- be prepared to deal with technical difficulties in the two-way flow of information.

To develop independent and self-reliant distance learners, research[138] indicates that the following three approaches are commonly advocated.

1. The service model approach which focuses on the integration of quality, by providers, into distance delivery and courseware through, for example,
   - quality assurance methods in courses and curricula
   - high quality support services
   - integration of the study of communication itself into the curriculum
   - the TQM model of consumer-oriented quality in methods and materials.

2. A stakeholder analysis model which focuses on defining quality for distance education (i.e., involving more than the learning providers in the defining quality and setting benchmarks).

3. A quality improvement model which involves ongoing evaluation. This would include, for example:
   - qualitative assessment techniques to understand stakeholder values
   - quantitative evaluation to provide indicators of quality and areas of concern

In building a service approach to distance education programs, Fulkerth from the Golden State University recommends that courses:

- be flexible, nimble and asynchronous;
- blend traditional education and applied technology skills;

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136 For example, Lucent Technologies' Centre for Excellence in Distance Learning; from *Distance Learning – The Vision* at http://www.lucent.com/cedl/disolut.html

137 *Needs of Distance Learners* at http://www.lucent.com/cedl/needs.html

138 Reported in *Summary of Quality Issues in Distance Education* at http://www.lucent.com/cedl/sumqual.html

139 *A Bridge For Distance Education: Planning for the Information-Age Student* (Fulkerth, 1998) at http://www.syllabus.com/nov98_magfea.html

- integrate institutional services and activities into the delivery environment (e.g., registration, payment, advising, tutorial assistance, library services); and
- incorporate personalized, high-touch access to services, instructors, and classmates.

According to Seligman, the five elements of quality, specifically for the improvement of quality in distance, are:

1. materials that are learner friendly, academically respectable, able to be used by the average student, interesting in content and layout, and relevant;
2. learning materials and any peripheral media or equipment that are readily available;
3. tutors and students that become familiar with distance learning methodology and practice;
4. the whole system that is managed effectively; and
5. monitoring, evaluation, and feedback that are viewed as important.

Consumers of education and training products and services have a vast array of choices – choices that vary in quality and appropriateness to the individual. In order to make an informed choice, various consumer's guides have been created. The following are examples.

- Both in a text in the Kaplan series and on-line, a brief self-quiz helps individuals determine whether they are good candidates for on-line distance learning.[140]
  - In a book published by The Western Cooperative for Educational Telecommunications, questions are set out for the individual to ask.
- In her book, Porter (1997) sets out a checklist for evaluating distance learning courses: *Determining the Suitability of Distance Learning Courses.*

In some jurisdictions (e.g., the US and the Commonwealth), agencies have taken this one step further to develop standards of excellence for distance education. The following three are readily available.

1. The Western Interstate Commission for Higher Education's (WICHE) Principles of Good Practice for Electronically Offered Academic Degree and Certificate Programs.[141]
2. The American Council on Education, Center for Adult Learning and Educational Credentials' Guiding Principles for Distance Learning in a Learning Society.[142]
3. Guidelines For Remote Delivery Of Courses Developed By The Commonwealth Of Learning.[143]

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[140] *Guide To Distance Learning: Graduate Education That Comes To Your Home.* (Miller and Schlosberg, 1997). Interactive self-quiz *Are Telecourses for You?* in the text and online at http://rs.realeducation.com/student/index_student.asp?action=why_online&subaction=question

[141] Taken directly from Jones, G.R. (1997). *Cyberschools: An education renaissance.* Englewood, CO: Jones Digital Century Inc. – who cites Johnstone, S.M. and Krauth, B. (March-April 1996). *Some Principles of Good Practice for the Virtual University,* Change, p. 40. Available on the WICHE web site at http://www.wiche.edu/Telecom/projects/principles.html

[142] Taken directly from Jones, G.R. (1997). *Cyberschools: An education renaissance.* Englewood, CO: Jones Digital Century Inc. – who cites Sullivan, E., and Rocco, T (co-chairs, Task Force on Distance Learning) (draft: May 1996). *Guiding Principles for Distance Learning in a Learning Society,* p. 3-5.

[143] At http://www.col.org/

It is safe to say that views of distance education relate strongly to the delivery of instructional programs by virtual schools because their education programming is provided at a distance. In a review of the status of distance education in schools, Haughey (1990) notes that the demographics of student population, in particular their shift from rural to urban areas that resulted in enhanced access to educational opportunity, the enhanced use of technology for instructional delivery (in particular, the use of facsimile machines), and enhanced pedagogical options resulted in changes to distance education in the 1980s. A primary reason that students commonly gave for dropping out of correspondence lessons was their lack of interest and their lack of feedback from the teachers. Tesarowski (1982), as cited by Haughey, commented that in Manitoba, where there was close supervision of student work in the correspondence courses, student completion rates rose. Thus, enhanced student support became critical component in distance education programming. The definitions of distance education and Haughey's observation that students drop out of courses for reasons of lack of interest and support from teachers have significant bearing on guidelines for virtual schools.

6.2. Effectiveness In The Uses Of Educational Technologies

Quality in the use of educational technologies is viewed from many different perspectives: what learning technologies are touted to achieve; quality assurance in the appropriate uses of technologies; and issues of quality and the Internet.

6.2.1.Quality Assurance In What Educational Technology Could Achieve

According to a 1996 paper[144] from the BC Ministry of Education, Skills and Training, entitled *The Status of Technology in the Education System: A Literature Review*, the potential of technology is to assist with such educational goals as:

- individualization.
- increasing proficiency at accessing, evaluating, and communicating information.
- increasing quantity and quality of students' thinking and writing.
- improving students' ability to solve complex problems.
- nurturing artistic expression.
- increasing global awareness.
- creating opportunities for students to do meaningful work.
- providing access to high-level and high-interest courses.
- making students feel comfortable with tools of the information age.
- increasing the productivity and efficiency of schools.

Similarly, Frayer and West (1997)[145] identify the following ways in which instructional technology can support learning by:

1. enabling active engagement in construction of knowledge.
2. making available real-world situations.
3. providing representations in multiple modalities (e.g., 3-D, auditory, graphic, text).
4. drilling students on basic concepts to reach mastery.
5. facilitating collaborative activity among students.
6. seeing interconnections among concepts through hypertext.
7. learning to use the tools of scholarship.
8. simulating laboratory work.

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[144] Taken from *The Status of Technology in the Education System: A Literature Review* (Community Learning Network of the BC Ministry of Education, Skills, and Training: 1966), available at http://www.etc.bc.ca/lists/nuggets/EdTech_report.html

[145] *Creating a New World of Learning Possibilities Through Instructional Technology* found at http://sunsite.unc.edu/horizon/mono/CD/Instructional_Technology/Frayer.html

NCREL (North Central Regional Educational Laboratory, funded by the US government) has developed a "technology effectiveness framework"[146] that posits that the intersection of two continua -- learning and technology performance -- defines the effectiveness of a particular technology in student learning. The framework's horizontal axis is learning, which progresses from passive at the low end to engaged and sustained at the high end. The vertical axis is technology performance, which progresses from low to high. This framework could make a significant contribution to quality assurance in the use of learning technologies.

6.2.2.Quality Assurance In The Appropriate Uses Of Technology

Technology has multiple uses in the context of education and learning, for example, information management (IT), learning management, distance delivery. Technology has the capacity, for example, to deliver better forms of student assessment (what the International Society for Technology in Education[147] calls "authentic testing") that involves the following factors:

- faithful representation of the contexts encountered in a field of study or in the real-life tests faced by adults;
- engaging and important problems and questions;
- non-routine and multistage tasks and real problems;
- self-assessment;
- trained assessor judgement; and
- the assessment of habits of mind and patterns of performance.

The following list, developed by the Open University in the UK[148] to differentiate between different media, helps to judge the various uses and appropriate uses of technology.

- ease of use - ease of use and avoidance of technical hitches
- availability - availability of teaching when needed
- access - access to other resources
- questions - opportunity to hear other students' questions
- contacts - contact with other teachers
- experts - opportunity to hear experts in the field
- Acc/Exp - opportunity to question experts
- integration - ease of integrating material with existing work
- status - improved status due to use of the medium
- synergy - synergy of medium with other projects

The categories for comparison[149] used are learners' needs, usage, effectiveness, perceived value, and comparative value.

A review of distance education and web-based training by Brown describes four roles for ICT:[150]

1. an instructional tool for educators in the provision of distance education, web-based training;
2. a facilitator of learning in support of constructivist practices, cognitive development, and equity;
3. a strategy for development through collaborative interaction, critical thinking, and authentic assessments; and

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146 *Technology Effectiveness Framework* found at http://www.ncrel.org/sdrs/edtalk/tef.htm

147 *Assessment: Information Technologies in the K-12 Curriculum*. Aa report from the International Society for Technology in Education (1996) at http://www.iste.org/specproj/roadahed/assess.html

148 Found at www-iet.open.ac.uk/iet/PLUM/PerceivedBen

149 Found at www-iet.open.ac.uk/iet/PLUM/Findings

150 Bettina L. Brown, (1998). *Distance Education and Web-based Training.* Columbus, Ohio: ERIC Clearinghouse on Adult, Career, and Vocational Education, p. 1. [On-line]. Available: http://ericacve.org/mp_brown_02.asp

4. an impetus for educational reform.

In a more focused way, the four key characteristics of effective software, a particular component of learning technologies, may be presentability, accountability, customizability, and extensibility.[151] Quality of learnware is not a focus of this paper; however, considerable information is available.[152] Much more information about quality assurance in education / learning technologies is available on the Internet.[153]

6.2.3.Quality Assurance And The Internet

Increasingly, distance delivery of education/training incorporates uses of the Internet, both for information retrieval (distributed learning) and for on-line delivery of courses and programs (distance learning). While some educators view the use of the Internet and ICT as being highly contentious, there have been considerable strides made in assuring the quality of Internet information sources and education/training practices.

6.2.3.1. Quality Of Internet Sources

The criteria for evaluating Internet information ranges from the simplistic to the highly complex. The following are examples of quality assurance efforts relative to information sources on the Internet.

At the simplistic end of the scale, according to the University of Wisconsin, the Ten C's for Evaluating Internet Resources[154] are:

1. Content
2. Credibility
3. Critical thinking
4. Copyright
5. Citation
6. Continuity
7. Censorship
8. Connectivity
9. Comparability
10. Context

At the complex end of the scale, Wilkinson and others at the University of Georgia have developed a list including 11 criteria and 125 indicators in *Evaluating the Quality of Internet*

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[151] *The Future of Educational Technology* at http://sunsite.unc.edu/horizon/mono/CD/Instructional_Technology/Dawson.html

[152] *Learnware Quality Background Paper* (Barker, 1997) at http://www.yorku.ca/research/dkproj/etpnet

[153] Additional sources of information on the uses of technologies include the following.

- An extensive bibliography located in an article at http://www.ilt.columbia.edu/ilt/papers/ILTpedagogy.html
- *The Field of Educational Technology: Update 1995 – A Dozen Frequently Asked Questions* at http://ericir.syr.edu/ithome/digests/edtechnology.html
- Specific to planning, The National Center for Technology Planning – a clearinghouse for the exchange of many types of information related to technology planning – can be found at http://www.nctp.com/
- *Guidebook for Developing an Effective Instructional Technology Plan* is available from http://www2.msstate.edu/~lsa1/nctp/guide.html
- a Worldbank discussion paper, perhaps dated 1994, *Interactive Educational Technologies in Higher Education* at http://www.worldbank.org/thml/hcovp/educ/background/ietihe1.html

[154] At http://www.uwec.edu/Admin/Library/10cs.html

Information Sources: Consolidated Listing of Evaluation Criteria and Quality Indicators.[155] They are:

- site access and usability (18 indicators)
- resource identification (13 indicators)
- author identification (9 indicators)
- authority of author (5 indicators)
- information structure and design (19 indicators)
- relevance and scope of content (6 indicators)
- validity of content (9 indicators)
- accuracy and balance of content (8 indicators)
- navigation within the document (12 indicators)
- quality of the links (13 indicators)
- aesthetic and affective aspects (13 indicators)

After conducting a study[156], the indicators of (1) information quality and (2) site quality were ranked in importance by experienced Internet users.

Somewhere in the middle, the Internet Public Library[157] uses the following selection policy for quality information sources (e.g., products / services) that:

- are high in useful content, preferably those which provide information in their own right rather than simply providing pathways to information;
- are updated consistently;
- are designed is such a way that any graphics are an attractive complement to the information rather than a flashy distraction from it;
- provide text-only interfaces for non-graphical browsers;
- show evidence of having been proofread carefully; and
- contain only "live" links, only to documents which are as relevant as the primary document.

Resources that are selected / approved by the IPL receive the IPL Ready Reference Seal.

According to Jakevicius at the Idaho State University, the following is a list of recurring criteria when Internet resource evaluation is considered[158]: content, authority, publisher-source, reference/awards, facts, documentation, bias, links and stability. At the University of Washington, Alexander and Tate adapted five traditional print evaluation criteria to web resources.[159] Possibly the most useful list of evaluation criteria was developed by A. Smith in New Zealand. Covering the same concepts is *the Library Selection Criteria for WWW Resources.*[160]

Actual rating sheets for evaluating Internet sites have been produced by Teacher's CyberGuide,[161] and others. An online rating sheet[162] from From Now On includes the following criteria with definitions: reliability, accuracy, authority, currency, fairness, adequacy and efficiency.

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155 At http://itech1.coe.uga.edu/faculty/gwilkinson/criteria.html

156 *Evaluating the Quality of Internet Information Sources: Quality Indicators as Ranked by Experienced Internet Users* is found at http://itech1.coe.uga.edu/faculty/wilkinson/rankings.html

157 At http://www.ipl.org/ref/RR/Rabt.html

158 *Internet Resource Evaluation Guidelines* found at http://www.isu.edu/departments/library/tutorials/neteval.htm

159 At http://weber.u.washington.edu/~libr560/NETEVAL/criteria.html

160 At www6.pilot.infi.net/~carolyn/criteria.html

161 At http://www.cyberbee.com/guide1.html and at http://www.siec.k12.in.us/~west/edu/rubric1.htm and at fromnowon.org/jun97/eval.html

162 At http://www.fromnowon.org/jun97/eval.html

6.2.3.2. Quality Education Practices On The Internet

A variety of tools and standards has been created that are specific to education and training offered on the Internet.

At the broadest level, the American Association for Higher Education has produced a *Bill of Rights and Responsibilities for The Electronic Community of Learners*[163] that sets out the rights and responsibilities of individuals, the rights and responsibilities of educational institutions.

Considerable advice is available to those who are creating web-based instructional programs:

- *Anatomy of An On-line Course*,[164] including recommendations to include (1) access to chapter and project objectives and intended outcomes, teacher's lecture notes, course activities and assignments, answers to end-of-chapter questions; and (2) instructor assistance with problems, guidance and reminders of assignments and exam dates; and (3) the opportunity to share with other class members.

- *Online Education: New Paradigms for Learning and Teaching*,[165] including recommendations for attention to (1) creative use of technology; (2) sound instructional design; (3) integration of active learning; and (4) evidence of educational effectiveness.

- *Suggestions for Development of Online Courses,*[166] including the items in a basic online course: course description, instructor section, syllabus, resources, lectures/notes, assignments, examinations, and on-line portfolios and grades.

Teachers considering Web-based instruction (WBI) are strongly encouraged to consider choice of pedagogy over choice of available technology, particularly when some research suggests that the use of technology to enable instruction conveys *no significant difference* [italics in the original] in student achievement.[167] The Web has particular affordances that make it an appropriate instructional tool in *some* instances and has developed a model that looks at those dimensions of learning that are affected by the medium of the Web.[168] The instrument invites evaluation of Web-based instruction along a continuum in each of ten dimensions described in the model. The resulting profile can help to direct the design of potential Web material, evaluate existing Web-based instruction or provide a means of comparing versions of Web-based and other instruction. One way of using the model is to identify which dimensions of interactive learning provided by the Web are to be included in WBI. Later the same model could be used to evaluate the degree that the objective of each dimension was accomplished. Finally, the dimensions identified in the model could help to inform one's own classroom teaching.[169]

Students selecting an Online K-12 course are encouraged to ask the following questions:[170]

1. Why am I interested in a web-based course?

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[163] At http://www.luc.edu/infotech/sae/bill-of-rights.html

[164] Cooper (1999) at http://www.thejournal.com/magazine/current/feat01.html

[165] Kearsley (1998) at horizon.unc.edu/TS/vision/1998-09.asp

[166] Creating a Successful Virtual University (Eisler, Gardner, and Millner, 1998) at http://www.educause.edu/ir/library/html/cnc9839/cnc9839.html

[167] *A Model of the Effective Dimensions of Interactive Learning on the World Wide Web*. (Reeves, 1997) at http://itech1.coe.uga.edu/Faculty/treeves/WebPaper.pdf

[168] *The "No Significant Difference" Phenomenon* (4th ed.) (Russell, (Ed.), 1997). At http://tenb.mta.ca/phenom/.

[169] *WBI or Not WBI?* (University of Western Australia newsletter *Issues of Teaching and Learning*) at http://www.acs.uwa.edu.au/csd/newsletter/issue0798/dimensions.html

[170] How to Select an Online K-12 (WestEd, 1998) at http://www.wested.org/tie/dlrn/dlrn-j4.html

2. Do I work well on my own, or do I need guidance and supervision?
3. Do I need a course offered by an accredited, degree-granting educational institution (high school, community college, or university)?
4. Is the instructor qualified to teach an online course?
5. Do I need to take a course for credit?
6. How does the educational institution assess online work? Does it assess participation in online discussions and group projects and how might the assessment contribute to continuous learning and feedback?
7. Are the course offerings diverse and interesting?
8. Do I need a few courses or a complete high school curriculum?
9. What do former students think?
10. How do I find an online course?

Haughey and Anderson state that online, networked learning has the following advantages:[171] communication and interaction; immediacy; permanence; diffusion; and, excitement.

A key feature is communication and interaction based on the interactive learning model that places the learner at the centre.[172]

> Learners can interact frequently with each other as well as with the instructor, provide support for each other's learning and develop ways of working and learning together. Networked Learning supports just-in-time cooperative learning. Learners at a distance from each other can work together on the same problem in real-time using a shared computer screen. Besides conserving time, Networked Learning helps ensure more efficient access to valuable resources. Learners can access resources anywhere in the organization or throughout the world without leaving their own work area.

Harasim et al[173] note that, while virtual learning shares many of the features of classroom education, it also has unique features. Key among these is that learners are geographically dispersed and interact with each other and the teachers in a largely text-based, asynchronous online environment.

6.3. Quality Guidelines for Technology-Assisted Distance Learning

The following is a comprehensive set of quality indicators for technology-assisted learning, developed by FuturEd[174] for the Office of Learning Technology and the Canadian Association for Community Education. They are the outcome of combining all the quality indicators set out in the research above, and they will serve as a checklist for the document analysis component of the research project.

Preamble and Assumptions

1. There is a free market and a growing market in distance delivery of teaching/learning with great variety in content areas and quality. Potential students have choices. Not all distance education is provided by accredited institutions/agencies or recognized by accrediting bodies.

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[171] Margaret Haughey & Terry Anderson. (1998). *Networked Learning: The Pedagogy of the Internet.* Montreal, QC.: Chenelière/McGraw-Hill.

[172] Ibid, p. 5.

[173] Linda Harasim, Star Roxanne Hiltz, Lucio Teles, & Murray Turoff. (1995). *Learning Networks: A field guide to teaching and learning online.* Cambridge, MA: The MIT Press.

[174] Available at http://www.futured.com/

2. While distance learning includes all forms of delivery, such as regular mail and telephone, these guidelines focus on those that incorporate learning technologies such as computers and the Internet. The term "technology-assisted distance learning" is intended to capture that notion.

3. Technology-assisted distance learning takes various forms: distance education, distributed learning, virtual or web-based education/training, synchronous and asynchronous learning. What they have in common is the fact that the learner is in one location and the "provider" of the learning is in another and technology is used to make the link.

4. Both providers and consumers of distance learning want education and training products and services that are effective and efficient. The term "quality" is used to encompass these concepts.

5. All learning products and services are a combination or system of inputs and resources, processes and practices, and outputs and outcomes. All are important; however, from the consumer's point of view, the outcomes are the most important, then processes and practices, and finally inputs and resources that have gone into the design, production and delivery of the learning product/service.

6. Learning products and services take numerous forms: individual courses, entire programs. The same principles or quality guidelines should apply to both.

1. Quality Outcomes from Technology-Assisted Distance Learning

1.1. Acquired content skills and knowledge are:

1.1.1. relevant to work and/or the best thinking in the field

1.1.2. general enough to be transferable between work / learning situations, e.g., employability and communication skills

1.1.3. specific enough to lead to work or higher learning, e.g., content or technical expertise

1.1.4. a blend of traditional education and applied technology skills

1.2. Necessary learning skills are acquired for:

1.2.1. course / program completion and success, explicitly
- sources of information and retrieval processes
- analytical and critical thinking
- reading and writing skills in context
- exam taking

1.2.2. lifelong learning by:
- providing a systematic introduction to the field
- offering a comparative or contextual framework for viewing the field of study
- seeking to broaden the learner and provide generic skills
- offering some freedom of choice and flexibility in structure
- providing for the incremental development of self-directed learning

1.2.3. self-directed learning management, for example:
- creation of a portfolio of acquired skills and knowledge
- awareness of personal gaps in skills and knowledge and relevant learning opportunities

- personal responsibility for one's own learning

1.3. Completion takes the form of **credits or credentials** that are:

1.3.1. recognized by professional accreditation bodies and employers
1.3.2. recognized by other education institutions – locally and internationally
1.3.3. of the same value whether acquired through on-site or distance learning
1.3.4. transferable within programs and institutions, and between provinces/territories

1.4. Return on investment of the learner's time, finances and energy meets expectations for:

1.4.1. accessibility as needed and when needed
1.4.2. objective benefits and utility
1.4.3. effectiveness: subjective achievement of personal goals
1.4.4. efficiency: best use of resources
1.4.5. customer satisfaction with all course/program elements

2. Quality Processes and Practices in Technology-Assisted Distance Learning

2.1. Student management processes and practices include:

2.1.1. registration procedures that deliver:
- assurance that accepted students have the background, knowledge and technical skills needed to undertake the course/program
- a clear statement of expectations of learners
- an orientation program/service for those desiring it

2.1.2. intake and place procedures that provide:
- individualized course / career counseling
- assessment and recognition of prior learning
- appropriate placement

2.1.3. management of student records for:
- documentation of student achievement in each course and at completion of a program
- confidential treatment of records

2.1.4. learner involvement in decision-making
2.1.5. assistance with the technologies being used, i.e.,
- the purpose of the technology(ies)
- the etiquette involved
- skills and knowledge to manipulate and interact with it

2.2. Learning management processes and practices include:

2.2.1. teaching processes that:
- communicate high expectations
- provide prompt feedback to students
- respect diverse talents and ways of learning
- recognize the diversity of learners, learning needs, learning contexts, and modes of learning
- respond to individual learners
- incorporate an appropriate student-teacher ratio

2.2.2. approaches to **learning** that:
- foster active learning

- emphasize time on task
- build on learner's strengths and acquired skills and knowledge
- accommodate different individual learning styles
- support interaction and the development of learning communities
- increase learner control over time, place and pace of instruction

2.2.3. scheduling and timetabling that is:
- deliberately synchronous and/or asynchronous
- flexible and responsive to learners
- adequate and realistic

2.2.4. assessment of learning that is:
- frequent and timely
- appropriate and responsive to the needs of the learners
- in various forms such as written and oral assignments, self-assessment, demonstrations, and exams
- competency-based

2.2.5. authentic assessment of learning through:
- faithful representation of the contexts encountered in the field of study or in the real-life tests faced by adults
- engaging and important problems and questions
- non-routine and multistage tasks and real problems
- self-assessment
- trained assessor judgement
- the assessment of habits of mind and patterns of performance

2.2.6. evaluation of learning against criteria that are transparent, relevant, realistic, reliable, and valid

2.3. Technologies are **appropriately used** to:

2.3.1. make students feel comfortable
2.3.2. accommodate and promote individualization
2.3.3. create opportunities for students to do meaningful work
2.3.4. increase proficiency at accessing, evaluating and communicating information
2.3.5. improve students' abilities to solve complex problems
2.3.6. nurture artistic expression
2.3.7. enable active engagement in the construction of knowledge
2.3.8. drill students on basic concepts to reach mastery

2.4. Communications facilities, processes and practices are able to:

2.4.1. encourage contact between students and faculty
2.4.2. provide flexible opportunities for interactions and problem-solving
2.4.3. develop reciprocity and cooperation among students
2.4.4. provide the opportunity to "hear" other students' questions
2.4.5. enable students to hear and to question experts in the field

2.5. Human resources management practices include:

2.5.1. recruitment and selection of appropriate personnel
2.5.2. a requirement for ongoing professional development in content areas
2.5.3. availability of technical skills development and support
2.5.4. regular evaluation of competence

2.6. Program management accountable for:

2.6.1. student management and students' rights
2.6.2. learning management
2.6.3. technology planning and utilization
2.6.4. planning and evaluation of all aspects of the product/service
2.6.5. responsiveness and flexibility to the student and to changing learning requirements
2.6.6. maintaining links within the education and business communities
2.6.7. research and continuous improvement
2.6.8. financial viability and continuity

3. Quality Inputs and Resources for Technology-Assisted Distance Learning

3.1. Intended learning outcomes are:

3.1.1. clearly stated
3.1.2. observable / demonstrable
3.1.3. measurable
3.1.4. achievable
3.1.5. useful and appropriate for the intended learners
3.1.6. shaped, where possible, with input from learners
3.1.7. appropriate to the rigor and breadth of the degree or certificate awarded
3.1.8. consistent with the providing organization's role and mission

3.2. Curriculum content is:

3.2.1. credible and academically respectable (source identified)
3.2.2. accurate
3.2.3. relevant
3.2.4. balanced and free of bias
3.2.5. updated consistently
3.2.6. documented
3.2.7. appropriate to the learning objectives
3.2.8. culturally sensitive

3.3. Teaching / learning materials are:

3.3.1. prepared by qualified content experts (author identified) working with qualified design experts (identified)
3.3.2. readily available and learner friendly – able to be used by the average student
3.3.3. interesting in content and layout
3.3.4. affordable
3.3.5. well-organized and free of errors
3.3.6. free of cultural, racial, class and gender bias
3.3.7. accessible to those with disabilities
3.3.8. relatively easy to use and free from technical hitches

3.4. A **complete learning package** includes:

3.4.1. course description
3.4.2. course/project objectives
3.4.3. information about the instructor(s)
3.4.4. learning/lecture notes and additional learning resources
3.4.5. course activities and assignments
3.4.6. quizzes and examinations
3.4.7. answers to questions/quizzes
3.4.8. a portfolio of acquired learning

3.5. Learning **technologies are appropriate** to:

3.5.1. the field of study or subject matter content and skills
3.5.2. the intended learning outcomes
3.5.3. the relevant characteristics and circumstances of the learner
3.5.4. cost and benefit for the learner
3.5.5. provide access to high-level and high-interest courses
3.5.6. provide representations in multiple modalities
3.5.7. provide interconnections among concepts through hypertext
3.5.8. increase global awareness
3.5.9. make available real-world situations and simulate laboratory work
3.5.10. provide instructor assistance with problems, guidance and reminders of assignments and exam dates

3.6. Sound technical design such that learning materials and delivery methods are:

3.6.1. navigable
3.6.2. updatable and updated
3.6.3. complemented by graphics rather than distracted by them
3.6.4. available in text-only interfaces for non-graphical browsers
3.6.5. inclusive of "live" links to relevant, previewed documents
3.6.6. reliable
3.6.7. complete

3.7. Appropriate and necessary **personnel** include:

3.7.1.instructors / teachers / professors with
- recognized qualifications in the subject area
- teaching experience at the relevant level (e.g., secondary, adult)
- relevant experience and/or current knowledge in the field

3.7.2.customer-oriented management that helps with
- information and course/program advising
- application and registration procedures

3.7.3.content support persons, e.g.,
- course / academic counseling
- library staff
- tutors and mentors

3.7.4.process support persons, e.g.,
- technical support
- learning skills support
- career planning and employment counseling
- problem-solving

3.8. Learning resources, in addition to teaching materials, are:
3.8.1.varied
3.8.2.easily and totally accessible via distance delivery
3.8.3.respectful of copyright
3.8.4.flexible to accommodate different learning styles

3.9. Program plans and budget include:

3.9.1.written policies for all aspects of the course/program

3.9.2.an adequate budget to achieve stated program goals

3.9.3.enabling legislation (public education / private enterprise)

3.9.4. financial and administrative commitment to the continuation of a program for a period sufficient to enable students to complete a degree/certificate

3.9.5. integration of distance delivery with the institution's overall policy framework

3.9.6. a technology plan defining technical requirements and compatibility needed to support the learning activities

3.9.7. security of systems to ensure the integrity and validity of information shared in the learning activities

3.10. Evidence of program success through **routine review and evaluation** of:

3.10.1. course content and objectives
3.10.2. learning materials
3.10.3. instructional design
3.10.4. instruction and instructors
3.10.5. learning and student achievement
3.10.6. policies and management practices
3.10.7. operational procedures
3.10.8. customer satisfaction

3.11. Product/service information for potential students is:

3.11.1. in writing
3.11.2. clear
3.11.3. current
3.11.4. accurate
3.11.5. comprehensive and complete

3.12. Advertising, recruiting and admissions information includes:

3.12.1. pre-requisites and entry requirements
3.12.2. the curriculum overview
3.12.3. specific delivery format
3.12.4. course level and credit points
3.12.5. course length and degree requirements
3.12.6. all fees: registration, tuition, books and materials, equipment, other
3.12.7. institutional regulations
- residency requirements
- workload requirements
- extensions
- grade appeals
- withdrawals and refunds
- costs and payment policies

3.12.8. the nature of the faculty/student interaction
3.12.9. assumptions about technical competence and skills
3.12.10. technical equipment requirements, and availability of rentals
3.12.11. academic support services and learning resources
3.12.12. technical support services
3.12.13. financial aid resources
3.12.14. types of assignments and grading methods
3.12.15. learning assessment procedures and evaluation criteria
3.12.16. program success from evaluation and student follow-up reports

3.13. The **comprehensive course package** (all materials and technologies) is:

3.13.1. appealing in appearance
3.13.2. user-friendly
3.13.3. customizable
3.13.4. extensible
3.13.5. inclusive of all institutional services and activities (registration, payment, advising, tutorial assistance, library services)
3.13.6. personalized
3.13.7. coherent and complete
3.13.8. reviewed and evaluated routinely

These criteria include all elements of a quality learning product or service.

6.4. Effectiveness in Virtual Schools

As was discussed earlier, the virtual school is a recent phenomenon and has not had extensive research to determine effectiveness. There are some preliminary indications however.

The effectiveness of virtual approaches to learning is a complex interaction among the design of the learning materials, the pedagogical approaches used in online tutoring and facilitating, student factors, teacher factors and technical system factors including specific features of the online learning environment, its ease of use, and technical reliability. What is important to realize is that it is not only technology that is important, but the learning methodologies utilized to employ the technology.[175] Farrell makes a similar point when he says,[176] "It should remind educational policy makers and managers that, in many respects, it is not the technologies themselves that are at issue, but the purpose and manner of their use that are likely to influence opinion of virtual education."

6.4.1.Effectiveness Factors

The following five effectiveness factors have been identified and studied: factors specific to the teachers, learners, learning process and instructional design factors, tutoring/facilitating, and technology.

6.4.1.1. Teacher Factors

First to be considered are some of the differences between virtual learning and the conventional classroom. A survey by Harasim and Yung reported in Harasim et al. found that 70 % of respondents, who were teachers and learners on the Internet, indicated that "using computer networks had changed how they viewed education." Ninety percent further indicated that they found computer-mediated conferencing different from traditional classroom learning. They noted the following:[177]

- the role of the teacher changes to that of facilitator and mentor.
- students become active participants: discussions become more detailed and deeper.
- access to resources is expanded significantly.
- learners become more independent.
- access to teachers becomes equal and direct.
- interactions among teachers are increased significantly.

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[175] Murray Turoff (1999). Education, Commerce, & Communications: The Era of Competition. *WebNet Journal, January-March, 1999,* p. 22.

[176] Farrell, p. 6.

[177] Linda Harasim, Star Roxanne Hiltz, Lucio Teles, & Murray Turoff (1995). *Learning Networks: A Field Guide to Leaching and Learning Online.* Cambridge, MA: The MIT Press, p. 14, 15.

- learning opportunities for all students are more equal; learner-learner group interactions are significantly increased.
- personal communication among participants is increased.
- teaching and learning is collaborative.
- there is more time to reflect on ideas; students can explore on the networks; exchange of ideas and thoughts is expanded; the classroom becomes global.
- the teacher-learner hierarchy is broken down. Teachers become learners and learners become teachers.

Negative aspects of working online reported by respondents included:[178]

- more preparation time is required for teachers.
- learners have to work hard and participate actively to stay current with the topic.
- information overload, communication anxiety, increased work, difficulty in navigating and following discussions, loss of visual cues and health concerns about computer use were also reported by students.

Second is the professional development needs of teachers related to ICT. Teachers trained and experienced in conventional classroom teaching and learning processes require new approaches to teach successfully in virtual learning environments. A survey conducted by Roberts & Associates found seven categories of professional development needs related to the use of ICT:[179]

1. Time to learn, during regular school hours, how to use the technology, experiment with it and integrate it into the curriculum.

2. Proof that technology integration makes a difference in teaching and learning, and that it can be justified in terms of improved student learning.

3. Practical "how-to" knowledge and the first-hand, experience-based skills need to use and operate technologies to support teaching and learning.

4. An organized, ongoing, varied program of professional development activities designed to reach all teachers "where they are at."

5. Time and opportunity to consider the role of learning technologies as tools for learning and teaching, and how they change the teacher's role.

6. In-depth knowledge of learning and instructional theories – constructivism, cognitivism, behaviourism, andragogy, facilitation skills, etc.

7. Opportunities to use learning technologies during in-service programs.

6.4.1.2. Learner Factors

No articles relating specifically to learner characteristics contributing to success in virtual learning environments were found in the literature reviewed. There is an obvious need for research in this area.

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[178] Ibid, p. 15.

[179] Roberts & Associates (1999). *Professional Development and Learning Technologies.* Hull, QC.: Public Resources and Government Services Canada, pp. 20–26, http://olt-bta.hrdc-drhc.gc.ca/publicat/index.html#professional

6.4.1.3. Learning Process and Instructional Design Factors

According to Haughey and Anderson, the supports necessary to provide quality online learning include: [180]

- instructional design support;
- administrative support;
- graphics, video and audio support; and,
- technical support.

Hall proposes that there are three essential elements of good web-based learning design:

- great instructional design,
- great graphics, and
- a metaphor or simulation.

A good Web site also should have a clear information structure, be easy to navigate, and follow the basics of design.[181]

6.4.1.4. Tutoring/Facilitating Factors

How to teach/instruct/tutor/facilitate online and how to set up conditions for effective online learning are issues addressed by a number of publications (e.g., Burge and Roberts,[182] Harasim, et al.,[183] Haughey and Anderson,[184] and Khan[185]). While not specific to the K -12 sector, they provide research based and experiential evidence across a wide range of subject areas and from all sectors of the educational continuum about how to set up conditions for effective online teaching and learning. Berge[186] categorizes the conditions necessary for successful online tutoring into four categories (pedagogical, social, managerial, and technical) and provides lists of specific recommendations related to each.

6.4.1.5. Technology Factors

First are considerations in selecting or configuring a virtual learning system. The list of criteria for selecting a virtual learning environment should include:[187]

- features required (e.g., e-mail, bulletin board, conferencing, testing/self-assessment,);
- security features;
- learner access (e.g., via web browser or other);
- learner usage and tracking features;
- ease of use by learners and teachers;
- ease of updating and revising;
- technical reliability; and,
- availability of training and technical support.

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[180] Ibid.

[181] Brandon Hall (1997). *Web-Based Training Cookbook.* New York, NY.: John Wiley & Sons, Inc., p. 189.

[182] Burge, E.J. & Roberts, J. M. (1998). *Classrooms With A Difference: Facilitating Learning On The Information Highway 2/E.* Montréal: Chenelière/McGraw-Hill.

[183] Harasim, L., Hiltz, S.R., Teles, L. & Turoff, M. (1995). *Learning Networks: A Field Guide To Learning And Teaching Online.* Cambridge, Mass: The MIT Press.

[184] Haughey, M., & Anderson, T. (1998). *Networked Learning: The Pedagogy of the Internet*. Montréal, QC.: Chenelière/McGraw-Hill.

[185] Khan, B.K. (Ed.). (1997). *Web-based Instruction.* Englewood Cliffs, NJ: Educational Technology Publications.

[186] Zane Berge (1996). *The Role of the Online Instructor/Facilitator.* http://jan.ucc.nau.edu/~mpc3/moderate/teach_online.html

[187] Murray Richmond (1999). *Using the Internet for Training.* Audiographic workshop presented via the Internet, Toronto, ON.: Ontario Society for Training & Development.

The ranking of features in terms of importance should reflect the teaching-learning (pedagogical) model to be employed. However, a missing element in much of the literature is any discussion of the process used in selecting or configuring the virtual learning environment. Instead, there seems to be an unstated assumption that all virtual learning environments have similar features and operate on a common set of pedagogical assumptions.

A case study by Litke indicates that the selection process is not always based on teaching-learning considerations: "There was no discussion of which system would make the best pedagogical sense or which system would best facilitate learning; the decision was made on political and economic grounds."[188]

Second are some technical challenges to the effective use of virtual learning. There are other challenges inherent in virtual learning, in addition to the design of effective learning materials and activities, and effective online teaching. These include:[189]

- Internet bandwidth and congestion;
- browser plug ins or other special software may be required;
- an Internet server and technical capabilities are required;
- the relatively slow speed of most dial-up Internet connections;
- the lack of standards for user interfaces, navigation, and other features; and,
- learners require a basic level of computer literacy, typing proficiency, computer hardware and software, and an Internet account.

Other technical issues in online learning include:

- choosing an online learning software package or packages;
- providing support for users, both teachers and learners; and,
- setting up the computer hardware and networks.

Hall[190] address the technical issues required to establish effective online learning environments. He classifies web-based training as Type 1, Type 2, or Type 3 depending upon the degree of interactivity provided and the types of media included. Type 1 is text and graphics only with minimal interaction. Type 2 is more interactive, including application exercises in a variety of formats. "This goes beyond simple text and graphics presentation and brings the learner into the program to engage with the content and practice the skills".[191] Type 3 is truly interactive multimedia. Most programs that fall into this category allow the user to manipulate graphic objects in real-time, sometimes taking on the quality of a game-playing exercise. The simulations are realistic and the situations are often difficult. Appropriate use of audio and/or video helps from an instructional point of view and from the human side as well.[192]

These are useful distinctions from a technical point of view. Type 3 applications are presently available only on high bandwidth proprietary networks. Internet/world wide web learning environments are largely confined to Type 1 and 2 applications at the present time because of inherent limitations in available bandwidth and the relatively slow speed of most dial-up Internet connections.

The implication of these limitations for virtual schools and virtual learning is that current applications are largely unable to exploit the full potential of ICT as a vehicle for teaching and learning.

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188 C. Del Litke (1998). Virtual Schooling at the Middle Grades: A Case Study. *Journal of Distance Education. 13(2),* p. 37.

189 Richmond.

190 Hall.

191 Ibid, p. 5.

192 Ibid, p. 8.

6.4.2.A Case Study Of Virtual Schooling At The Middle Grades

A case study of an Alberta middle-grade (students aged 11-14) virtual program by Litke[193] provides information directly relevant to this project. Based largely on interviews, it provides participants' perceptions of the strengths, weaknesses, and factors influencing students' success in a virtual school program given the pseudonym Cyber Junior Secondary. The sections that follow mirror Litke's organization and contain extensive quotes from his study.

Litke's[194] description of the program follows.

> *T*he virtual program involved in this study may be more appropriately described as a virtual classroom. The reason is that the virtual program Cyber Junior Secondary consists of just 20 to 25 students from grades 7 through 9, and it is under the jurisdiction of the host junior high school, which enrolled over 500 students….
>
> Students in Cyber Junior Secondary enrolled in five core courses (math, science, physical education, social studies, health/advisory, language arts) and three complementary courses (computer studies, keyboarding, and eco-studies). Students also had the option of blending their program by taking complementary courses and/or physical education at the school site with regular classes. Students participated in callbacks at regular intervals. Callbacks are days when the students returned to the school site to engage in face-to-face instruction with their teachers. Testing, labs, the teaching of difficult concepts, and issue resolution were common activities.

6.4.2.1. The Teachers' Perspective

Teachers identified a number of issues associated with program implementation:

- increased workload;
- overwhelmed teachers and students in confronting change;
- computer software and maintenance problems;
- difficulties in building positive relationships with students and their parents; and,
- curriculum issues in adapting programs, textbooks and support materials to the online environment.

The teachers believed that the program benefited the students, the school, and themselves. Benefits for students included an education superior to traditional home schooling programs, an increase in social interaction compared with home schooling, the program's flexibility, a viable option for students who were unhappy at school, and a low pupil-teacher ratio. Home schooling students returning to the school, an additional program for the school, and an alternative to expulsion were identified as benefits for the school. Home schooling was the term used for students who were using correspondence programs at home. Personal benefits for teachers included enhancements to one's résumé, increased organizational skills, an interesting change in teaching assignment, a decrease in discipline problems, and personal professional growth.

In terms of weaknesses in the program, teachers listed: students missing deadlines and not completing assignments; an educational environment that was inferior to the traditional classroom; an absence of personal relationships with students and parents; the loss of discussion, stories, and "teachable moments"; the math program; the lack of parental involvement; the emergence of responsibility and authority issues; a lack of time; the occasional inappropriate use of the e-mail system (profanity); problems with clearly communicating instructions in text form; a lack of teacher articulation about the curriculum,

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[193] C. Del Litke. (1998). Virtual Schooling at the Middle Grades: a Case Study. *Journal of Distance Education. 13(2),* pp. 33 – 50.

[194] Ibid, p. 36.

program, and students; the home schooling clientele; and difficulty in dealing with students whose major problems were academic.

For these teachers, student success was influenced by student success characteristics (self-motivation, persistence, intelligence); supportive parents; and self-motivation, the latter considered as the most important.[195]

In discussing the teachers' perceptions, Litke notes that "Their preoccupation with both direct and indirect comparisons to home schooling revealed their belief that home schooling was an inferior form of education and that, ideally, students are best served in regular classrooms."[196] Thus by providing virtual schooling, they were attempting to provide a program with more of the features of regular schooling. Their perceptions of the benefits and weaknesses were similarly coloured by their beliefs about the benefits of the regular classroom situation. Litke's concludes, "The teachers struggled to learn to teach online."[197]

6.4.2.2. The Students' Perspectives

The student participants came from a variety of educational backgrounds. Students indicated that they were drawn to the Cyber program because of problems at school such as harassment by other students, not fitting into the school setting, problems with teachers, and the "atmosphere" of public schools. In addition, the students indicated that the computer also played a role in motivating them to enroll in Cyber as opposed to other forms of home schooling.[198]

Litke collected students' perceptions of the strengths, weaknesses. and factors influencing success of the virtual program. [199]

> Student participants identified freedom, time flexibility, fewer distractions, better marks, more individual attention from teachers, a higher degree of satisfaction, and fewer hassles with teachers and other students as the major strengths of this program. They also identified the benefits of the program as financially cheaper than private school, involving parents in their studies, and working collaboratively.
>
> Students identified the isolation at home, lack of personal contact with teachers and classmates, and distractions in the computer such as computer games or experimenting with the functions of the computer as the major weaknesses of the online environment. Other weaknesses identified by the students were inappropriate student use of e-mail (such as harassing messages to other students or profanity), slow response to e-mail messages (by teachers), and unclear instructions from the teachers. In addition, some students complained that they experienced headaches from working at the computer for long periods.
>
> Students selected personal characteristics such as motivation, organization, and independence as the most important factors influencing success. Agreeing with the teachers, the students saw themselves as being most responsible for success in the program. Also, students felt that parental support, good teachers, and quality of instructional packages influenced their success.

Students reported a continuum of parental support from absentee parent to parents as supporters to participatory parents. In discussing the students' perceptions, Litke notes that his

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[195] Ibid, p. 38, 39.
[196] Ibid, p. 39.
[197] Ibid, p. 40.
[198] Ibid, p. 40, 41.
[199] Ibid, p. 41.

findings parallel other studies that suggest "the home schooling movement is often an expression of intense dissatisfaction with the structures of existing schools."[200]

Another finding was the striking differences in the teachers' and students' perceptions of the virtual classroom. [201]

> One of the major themes of the teachers was their perception that the virtual classroom offered a better program for students than the traditional home schooling program; however, the teachers were insistent that the students in their regular classroom were getting a superior quality of education. On the other hand, the students had a strong focus on what they could do online versus the limitations of the traditional classroom. Issues such as freedom and control over one's day, time flexibility, fewer distractions and hassles clearly speak to what students see as weaknesses in traditional schooling.
>
> Interestingly enough, despite their positive perceptions of online learning, the students did not feel that the virtual classroom was a viable option for most students. The student participants emphasized that the program was only appropriate for those students who had social problems at school, had the proper motivation to succeed, or desired the opportunity to move at their own pace. The students were clear in conveying that online environments were not the answer to the educational needs of all students; rather, they saw it as an answer to their own unique needs. This perception closely paralleled the views of the teachers.

6.4.2.3. The Parents' Perspective

Litke reports that parents viewed the program mainly from the perspective of its effects on their children. [202]

> Generally, most of the parents perceived their children as bright but underachieving, different from other children, and bored with the structures and environment of the traditional classroom.
>
> Parents' justifications for enrolling their children paralleled the students' explanations: unhappy children and dissatisfaction with schools. Most parent participants believed that schools had failed to provide for the unique needs of their children, leaving their children bored, frustrated, and unhappy. In addition, the computer helped to legitimize the program in the minds of some parents because it made the program appear "high tech" and current.

Parents identified the virtual program's strengths, weaknesses and the factors influencing success as follows. [203]

> In terms of program strengths, the parents identified time flexibility, the removal of problems associated with schools (hassles with other students, unfriendly environments, distractions such as the class clown, teachers' labels, and peer pressure), increased parental involvement, happier kids, academic skill development, the development of life skills, improved family relationships, and an improvement over traditional home schooling programs.

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[200] Ibid, p. 42.
[201] Ibid, p. 42, 43.
[202] Ibid, p. 44
[203] Ibid, p. 44, 45.

Parents cited lack of socialization, lack of contact with teachers, time demands on parents, student motivation, the loss of the teachable moment, increases in teacher workloads, and issues of trust as weaknesses in the program.

Parents cited student motivation, parental support, and quality of instruction as the major factors influencing student success. It was also the consensus of the parents that the student's motivation was the most important factor influencing success.

Despite minor technical glitches, parents were generally satisfied with the implementation of the program. Many parents also reported that they were pleased with the changes that they observed in their children since they began the program.

Litke concludes with some suggestions for educators considering virtual school programs. [204]

- Schools must be philosophically committed to concepts of virtual schooling prior to the implementation of a program.
- Educators and parents need to reflect on how the online experience differs from how they traditionally view education. The emphasis is no longer focused on the teacher as the source of information; rather, the teacher assumes the role of the facilitator of learning, assisting students in developing their own skills. Students need to understand that they are mainly responsible for their own progress. Parents must comprehend the enormous supervisory role that they must assume.
- Any education program ideally starts with a careful analysis of the needs of the students; the virtual school is no different. A number of the students in this virtual school were unsuccessful in the regular classroom. Simulating an unsuccessful learning situation, the traditional classroom, is simply not an appropriate approach for these students.
- Post-secondary institutions also need to respond to the growth of virtual schooling by providing prospective and continuing teachers with the appropriate theoretical and experiential background to instruct in online environments.
- This program was far more labor-intensive than the teachers had envisioned. It was also more costly than the school had anticipated to operate a program that provided the students with adequate instructional and personal support.
- The isolation experienced by the participants in this program indicates that there is a need for increased coordination of activities and resources in the greater online community. In order to ensure program quality and the coordination of activities and resources, officials in education departments in consultation with online providers and other stakeholders need to develop a vision for virtual schooling in their respective provinces.

A notable omission in Litke's study is any data on student achievement. As a result, it is impossible to answer one of the most crucial questions asked about virtual learning. Is the academic achievement of virtual learners, on average, as good as, better, or worse than their peers in conventional classrooms?

6.4.3.Research On The Effectiveness Of Virtual Learning

Measuring the effectiveness of virtual learning approaches requires a more comprehensive approach to measuring effectiveness than is commonly employed. In order to understand the

[204] Ibid, p. 57-58.

effectiveness of a virtual learning system, one must examine the individual components and how they are developed and implemented.
Khan and Vega posted a survey on four listserves concerned with applications of learning technologies asking respondents what criteria they would consider when evaluating the effectiveness of a Web course. They received 24 responses which yielded 36 criteria for evaluating the effectiveness of a Web-based course. The top ten responses, ranked by frequency of occurrence, were the following.[205]

1. Were the course objective(s) clear and achievable?

2. In terms of interactivity, did the course:
   - contain more required activities for the user than optional activities?
   - give feedback on choice or input?
   - provide access to instructor or other students (e-mail, listserve, chat rooms, and on-line conferencing)?
   - use the Internet phone to give additional instructional support?

3. In terms of quality of content, was the course:
   - accurate?
   - interesting?
   - appropriate to discipline?
   - appropriate to method of distribution?

4. In terms of structure, did the course:
   - have good navigational design?
   - have a complementary structure of similar, print-based materials?
   - Have a reasonable metaphor of organization (hierarchical, linear, etc.)?

5. In terms of accessibility, was the course:
   - on a stable system?
   - written in simple HTML or a similar, user-friendly protocol?
   - clear, and did it use effective language?
   - limited in coding errors?

6. Did the course provide application of content to practice?

7. Could student usage be followed for evaluation of effectiveness?

8. Was there proper technical support (hardware and software)?

9. In terms of a "hook", did the course have:
   - illustrations?
   - games or puzzles?
   - a questionnaire with feedback or scoring?

10. Was reasoning for using the Web suitable?

6.4.4.Evaluating Students' Achievements in Virtual Learning

Evaluating students' achievement in virtual learning environments requires more than simply reporting test and exam results. Hackbarth provides an overview of additional ways of evaluating students' learning in virtual environments.[206]

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[205] Badrul H. Khan & Rene Vega. (1997). Factors to Consider When Evaluating a Web-Based Instruction Course: A Survey. In Badrul H. Khan (Ed.), *Web-based Instruction* (pp. 375 - 378). Englewood Cliffs, NJ.: Educational Technology Publications, Inc., p. 376, 377.

[206] Steve Hackbarth (1997). *Web-Based Learning Activities for Children.* In Badrul H. Khan (Ed.), *Web-based Instruction* (pp. 191 – 212). Englewood Cliffs, NJ.: Educational Technology Publications, Inc., p. 201.

Evaluation of what students learn has both process and product components. We administer tests primarily to determine how well students achieved the objectives set for, and with, them. We draw also upon conferences, direct observations of behavior, and portfolios. We note if students learned something of value not anticipated in the objectives, if they enjoyed the experience, and if they felt challenged to explore further on their own. We ask them to discuss with us and write in journals about the quality of our teaching and the value they perceive in what they have learned. Portfolios include both drafts and final products. For each piece, students express why they selected it and how they feel about it. Our own criteria for assessing the quality of work is made explicit, both in written form and in our conversations with students and their parents.

6.4.5.Research-Related Issues In The Use Of Virtual Learning

A number of gaps in current knowledge about the use of online technologies are identified by Bracewell and others.[207] These include the following four items.

Connectivity and access

Given limited connectivity and access, research results reflecting practical uses of online resources and tools in the elementary and secondary school classrooms are scarce.

Professional development interface with online resources and tools

More information is needed on the nature and extent of teacher's experience with information technologies, how teachers view these resources, how they understand their impact on society as a whole, and how they alter their instructional practices in order to use them effectively. More information is needed on online professional development activities.

Better balance between stable and dynamic content

The content of what will be taught using online resources is becoming more diverse and shifting towards more construction and input by the learner. More information is required on whether this more dynamic content conflicts with traditional curriculum content and goals, and, where it does, on how to reconcile these conflicts.

Performance indicators for evaluating the use and impact of online technologies

As the presence and use of information technologies becomes increasingly widespread, schools and universities will need to develop performance indicators to monitor the use and outcomes of the technologies, and to demonstrate accountability to funding sources and the public. These indicators are needed specifically to monitor the types of resources available, and access to them, professional development efforts, changes in teaching and learning practices, and changes in what is learned by students.

6.4.6.Key Indicators for Best Practice in Virtual Schooling

Alberta Education's report on Best Practices in On-Line Learning has identified key areas that can be used as indicators. These indicators are drawn from the research itself and represent the views of those most closely involved in the provision of on-line learning--the teachers and coordinators. Admittedly, this view is narrow because it does not reflect a balanced perspective that would incorporate views of students and parents. On the other hand, the findings are extremely current and indicative of best practices in the field (although the best practices are self-

[207] Ibid, Executive Summary, p. 4-5.

reported); hence, there is applicability to the nature of this inquiry. To generalize these findings to all virtual schooling environments would, however, be inappropriate.

The report[208] identifies key issues that emerged from the study and it is these issues that contain the descriptive elements necessary to construct indicators of performance. These issues include the following.

1. Student characteristics

    - Personal aspects:
        - well motivated to learn.
        - self-directed and self-disciplined.
        - like school.
        - diligent in work habits, persistent in completing tasks, and organize and manage their time.

    - Academic aspects:
        - at grade level.
        - have well developed reading and writing skills and a good grasp of mathematics.
        - are independent learners.

    - Technology skills:
        - can keyboard at a rate of 25 words per minute.
        - interested in using technology in general and computers in particular.

    - Social skills:
        - pursue socialization in out-of-school activities.

2. Student/parent relationship

    - parent support is viewed as essential to student success.
    - students need to be independent learners but the supervision of the work by the parents, although essential, varies in degree according to the age of the students.

3. Teacher characteristics

    - Experience
        - home schooling background viewed as desirable.
        - experience as a teacher viewed as important.
        - belief that a "good teacher is a good teacher."

    - Use and application of technology
        - need to feel comfortable and competent with technology and know how it can be used for teaching.
        - need to know how to troubleshoot technology problems.

    - Content expertise:
        - knowledgeable in subject content and resources.
        - aware of and knowledgeable in curriculum changes.
        - balance between subject specialists and generalists (depending upon the teaching assignment).
        - expected to personalize content for the students, to be student-centered, and to use constructivist rather than behaviorist principles.

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[208] Alberta Education (1999); *Best Practices in On-Line Learning*, pp. 27-34. Available at http://ednet.edc.gov.ab.ca/technology/

- awareness of distance learning principles viewed as desirable but not essential.

- Interpersonal communication:
  - able to initiate and sustain oral and written communications.
  - need to like students on an individual basis, be able to build relationships, have patience for "wait time", and for keeping communications opportunities open for parents and students.

- Personal attributes:
  - flexibility.
  - high energy, demonstrate risk-taking, thrive on change, and dedicated to teaching.
  - able to handle a large amount of e-mail each day.

4. Materials:

   - Security of materials:
     - sites are pass-word protected.
     - protecting final examinations.

   - Copyright:
     - few concerns raised in this area.
5. Cost of telecommunications:
   - rates need to be negotiated to cover the high costs.
   - costs need to be included in the school's budget.
   - standardizing the programs on one platform and using shareware helps to reduce costs.

6. Philosophy:
   - emphasize the use of technology for education as opposed to using it for delivery only.
   - belief in continuous progress of students.
   - break from the age/grade tradition found in regular schooling.
   - student needs should determine focus and goals for the program.

7. Planning:
   - viewed as important.
   - set target dates, develop an infrastructure needs plan and conduct research on purchased programs.
   - to continue after the program has begun.
   - procedures manual for virtual schools and operations seen as desirable.

8. Technology:
   - ensure consistency in services offered.
   - having an individual server on site was viewed as advantageous.
   - maintain separate e-mail addresses for parents in the main site.
   - access to a 1-800 toll free number improves communications, especially when the program first begins to operate in the school year.
   - network access.
   - system of rules and policies relating to technology support (i.e., maintenance and protection of assets).
   - student access to the Internet and appropriateness and inappropriateness of content that is accessed.
   - bandwidth that determines the amount of information that can be sent via the Internet and the speed at which it is transmitted.
   - server location.
   - standardization of platforms provided to teachers and students.

- selection of appropriate peripherals.
- software suites (word processing, spreadsheets, specialized applications) and Internet access software.

9. Size:
   - ability to predict size was viewed as necessary but no appropriate size limits were suggested.

10. Communication with parents:
    - virtual school parents were seen to need more information than those with students in a traditional school.
    - regular and positive feedback to parents was viewed as essential.

11. Marketing:
    - parents are shopping to ensure that their children can get the most from a virtual school.
    - competition viewed as negative and greater cooperation among the virtual schools was seen as a means of reducing this aspect.
    - new markets were seen to be essential; in this context, education was seen as a business and requires a market focus.

12. Structure:
    - teachers work from home; this has implications for identification of hardware and software.
    - practicality of the model of instruction.
    - student access to instruction.
    - synchronous or asynchronous instruction.
    - expected level of student contact.
    - program must have adequate administrative and counseling components.

13. Support and legitimacy:
    - political “buy-in” from the board and senior staff viewed as essential.
    - potential support from the system for technical and maintenance assistance.

14. Input costs:
    - concern raised over the costs of acquiring and maintaining the technology needed for program delivery and communications.
    - need for research and development to maintain currency in the field.

15. Organization:
    - team approach necessary for success.
    - need for rules and regulations.
    - coordinators interviewed identified the important of:
      - teacher motivation and commitment.
      - teachers having adequate time to prepare materials.
      - taking into consideration the costs associated with the above.
      - encouraging teachers to share their experiences.
      - include time for the human touch wherein teachers can make in-home visits and meet with parents and students in other venues.
      - teacher evaluation and supervision.
      - professional development of teachers.

16. Assessment and Evaluation:
    - need for a well-constructed method of evaluating the effectiveness and validity of on-line programs for student learning.
    - must be able to demonstrate their value and be accountable for results achieved.

6.5. Conclusion

By way of conclusion, Figure 8 provides a list of the effectiveness indicators for virtual schools within the context of learning systems: inputs, processes and outcomes.

Figure 8: Effectiveness Indicators for Virtual School Programming

Area	Consumers	Providers
Inputs	· Receptivity to alternative educational delivery. · Integrated curricula. · Student personal characteristics including motivation to learn, self-directedness and self-discipline, task-oriented. · Student academic characteristics including reading and mathematics skills, independence in learning, possess technology skills. · Support from parents for learning. · Access to technology. · Funding for student access to communications. · Materials present learning content. · Student counselling.	· Receptivity to design and implement alternative educational delivery. · Integrated curricula. · Teacher characteristics including experience, use and application of technology, content expertise, interpersonal communication skills, personal attributes (flexibility, energy, organization). · Parent support for learning. · Skilled in use of technology. · Funding for technology. · Staffing. · Standardization of technology. · Quality and quantity of learning materials and delivery mechanisms. · Student support.
Processes	· Teacher instruction, feedback, and relationships with students. · Instructional methodology. · Planning. · School philosophy. · Student evaluation. · Communication of expectations. · Communication with parents. · Exercise of choice and enhanced access.	· Leadership by administration. · Involvement in decision-making by teaching staff. · Accountability of teachers. · Organization and policies to provide structure. · Teaching processes. · Relationships with students. · Communication with students. · Teacher evaluation. · Professional development opportunities for teachers. · Home contacts with students to establish relationships and to monitor student progress. · Team approach to problem identification and resolution. · Marketing of school.
Outcomes	· Student access to instruction. · Time on task. · Technical skill acquisition. · Student academic, social, emotional, and attitudinal achievement. · Acceptance of and satisfaction with the programs offered. · Graduation from school with necessary requirements met. · Employability or entrance to post-secondary institutions.	· Staff retention. · Teacher morale. · Enrolment increases. · Acceptance of school by school board, community, and the general public. · Satisfaction with structures, leadership, organization, technology, training, teaching load, contacts with students.

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GLOSSARY OF TERMS

Accountability	A process that has as its basic principle answering for the execution of one's responsibilities. Applied to an educational context, accountability usually consists of a cyclical approach characterized by planning (identifying a series of goals, expected results, and strategies to achieve them, selection of a series of indicators that are thought to represent the most important areas in which outcomes or results are sought, developing and applying measures to determine the magnitude of the results achieved, and reporting the findings. The last stage of the cycle uses the results to identify areas of strength and those needing improvement and reflecting these in the plans for the school.
Asynchronous	Refers to instruction that is not coordinated or offered in real time. Participants' responses to messages are not immediate because of a time delay.
Audio conferencing	An audio communications session among three of more people who are geographically dispersed; provided by a conference function in PBX or multi-line telephone or by telephone companies.
Bulletin Board System (BBS)	A computer system used as an information source and forum for a particular interest group. These were widely used in the USA before the World Wide Web became operational and widely available to the general public. The BBS has its own telephone number into which people dial.
Distance Learning	Literally, students who reside in remote geographic areas learning though the use of prepared lessons. In this format, teachers typically prepare print materials, and send them to the students via the mail. Students in turn, complete the lessons and send them to the teacher for marking and feedback. In the traditional sense, distance learning relied almost exclusively on print material. The development and subsequent adoption of new technologies, especially telecommunications, has changed the traditional delivery methods. There is a series of principles that guide distance learning. These include student support, autonomy, and flexibility for students studying at home.
FirstClass	An electronic conferencing system that allows a group of people to exchange messages and electronic documents without having to be together at the same time and the same place. In education environments, this proprietary software is used to distribute assignments and lecture notes, to receive homework and lab reports, and to serve as a form for students to communicate with faculty, teaching assistants, and other students in the same class.
Goals	Improvements to work toward over the long term in order to achieve a particular vision and to fulfill an organization's responsibilities. Goals establish broad direction and address local needs of the students and the school. Usually, goals are developed in the context of those for the district and the broader administrative unit (e.g., province, state).
HTML (Hyper Text	A computer protocol that changes screen text into a

Markup Language)	form that can be placed on the World Wide Web. It attaches codes to the text for formatting purposes and linking it to other sites.
Indicators	Defined as key input, context, process, and outcome areas that represent schooling. Identification of indicators is thought to be a difficult but essential process as it focuses attention on those areas thought to be most important in the educational enterprise.
Internet	The international network of computers connected through phone lines based in a standard of protocols so they can communicate with each other.
Listserv	Mailing list wherein messages are sent to all subscribers. Management software (i.e., L-Soft International at http://www.lsoft.com/) scans e-mail messages for the words "subscribe" and "unsubscribe" to update the list automatically.
On-Line Learning	A program offered by a school that is delivered electronically, either at the school or off campus.
Performance Measure	Provide quantitative data on the degree to which results were achieved in particular areas. Results obtained from using performance measures are used to establish benchmark levels of performance, track performance over time, and set targets.
Psycho-affective view	Holds that student learning and achievement are largely determined through a student's IQ and genetic traits. When combined with the socio-cultural view, schools could account for a lack of overall student achievement.
Results	Measurable outcomes to be achieved that answer the question, "What will this look like when we get to where we want to be?"
School Effects	Based on the view that schools can and do make a difference in educating children. Schools are thought to enhance student progress and achievement in many areas (e.g., academic, social, emotional, attitudinal).
School effectiveness	A body of literature that sought to document how school processes and inputs affect student learning. Early research in school effectiveness focused narrowly on cognitive outcomes that could be most easily measured by standardized tests. Much like school effects that takes a broader view of overall effectiveness, research in this area developed as a direct response to the widely held views that student achievement was based on psycho-affective (i.e., IQ), genetic, and socio-economic status.
School failure	Defined as the inability of the school to provide meaningful opportunities to students to learn and to achieve. School failure is not the mirror opposite of school effectiveness; specific characteristics have been identified for schools that are in failure. These include lack of vision, unfocused leadership, dysfunctional relationships, and ineffective classroom practices.

School improvement	A movement to apply the school effectiveness and school success criteria within a specific context to address areas in which results have not met expectations. Usually, school improvement occurs with a systematic assessment of results achieved and the development of a specific plan to address low performance. Performance is not determined exclusively by results on tests.
School success	Defined as the degree to which student progress is enhanced in a wide variety of areas. Success also takes into consideration improvements in student learning and overall school performance.
Socio-cultural view	Hold that students' learning and their consequent achievement are determined primarily through cultural and social economic status (SES). Often used to justify the point of view that schools cannot make a difference in student learning and achievement.
Strategies	Actions designed to achieve goals and desired results.
Synchronous	Refers to events that are synchronized or coordinated in time; events take place at the same time.
Targets	A desired level of performance to be achieved in a period of time. Current performance is used to set a target. Targets are usually developed in consultation with staff and the community and take into consideration local context.
Value added	Reflects the view that schools, by specific actions and interventions can enhance students' innate abilities, develop interests, and enhance overall student success in a variety of areas that include but are not limited to academic growth.
Virtual Schools	A school that offers the mandated provincial curriculum to students through electronic means. A virtual school is characterized by: · A structured learning environment wherein the program is under the complete supervision of a teacher. · Electronic delivery to students who are at home or in a physical setting other than that of the teacher. · Instruction that may be synchronous or asynchronous.
Virtual Schooling	An optional method of instructional delivery from a school wherein all or a part of the student's instructional program is delivered electronically. The student may or may not access virtual schooling in the school itself. Virtual schooling occurs to offer students enhanced access to courses and the opportunity to exercise choice in instructional delivery.
World Wide Web (WWW)	The portion of the Internet consisting of servers and large quantities of textual material all built on HTML. WWW is accessed by a browser.