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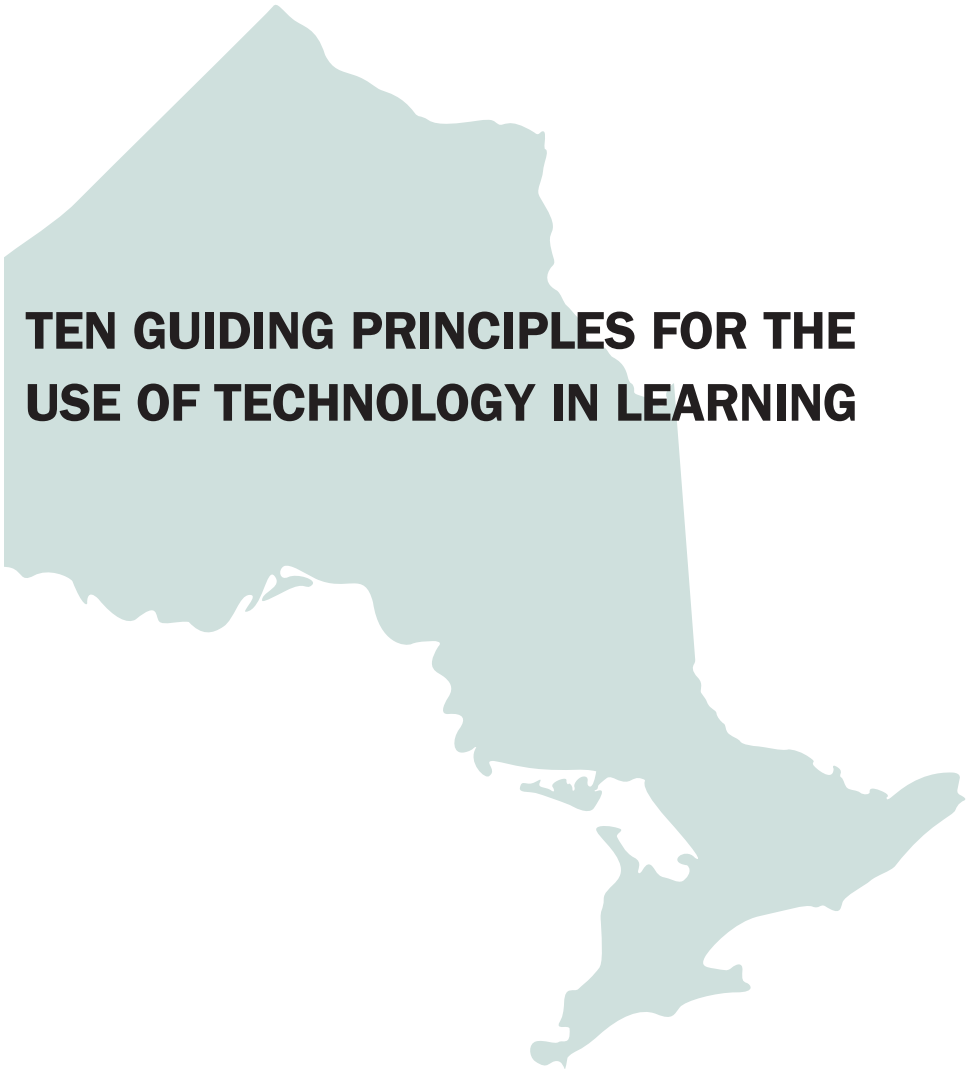
Ontario's Distance Education & Training Network



TEN GUIDING PRINCIPLES FOR THE USE OF TECHNOLOGY IN LEARNING

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INTRODUCTION

Ontario colleges, universities, secondary schools, the Ministry of Training, Colleges and Universities, the Ministry of Education, as well as service and technology providers from the public and the private sectors are investing significant funds, time and energy on technology in learning.

It may not always be clear how or even whether this investment will add sufficient value to our education system. There are skeptics as well as technology evangelists who rightfully draw attention to the decisions that are made, or not made, and seek explanation and justification.

At Contact North | Contact Nord, Ontario's distance education & training network, we believe there is a critical need to articulate the fundamental guiding principles that drive our decisions and policymaking with respect to technology in learning.

We have a set of guiding principles, which has informed our planning and served our network well over the past number of years. Many of these principles, at least the ideas themselves, did not originate with us but were gleaned from a variety of sources. We did, however, synthesize these ideas into a coherent set of principles and provided our own explanations and clarifications.

It is most likely that all of our decisions as college, university, and secondary school administrators, instructors, policymakers and funders have already been implicitly driven by some or most of these principles. It is by identifying just what these principles might have been that we are more likely to be consistent and on target.

The following is a summary of ten principles that have had merit for us at Contact North | Contact Nord over the years, and may have merit for others.

THE VERY MEANING OF TECHNOLOGY IS PROBLEMATIC

As faculty, administrators, and policymakers, one of the key issues with which we wrestle in regards to technology in learning is to define just what is meant by technology, specifically as it relates to learning. The meaning of technology is problematic. Learning technologies are those methods and practices used to learn and to facilitate learning. It is the way we learn and the way we teach. It includes the tools we use and the instructional designs we apply.

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Technology in learning refers to both the tools – the hardware, software, networks, etc. – and the processes – the methods and strategies used for instruction, the design of our educational organizations, learning management systems, etc. – in short, the way we do things in education.

Just as it is never the tools alone that are required to build a house – there must be a design and construction process – it is never the computer or the network alone that contributes value. It is the manner in which these tools are used that will ultimately make the difference. It is indeed the soft technologies that we must attend to as well, as we invest in the tools and hard technologies of learning.

AN ATTEMPT TO OUTLINE A SET OF GUIDING PRINCIPLES FOR TECHNOLOGY IN LEARNING

Technology in learning is many things.

- It is the tools we use to deliver instruction in classrooms and in virtual space.
- It is the tools learners use to extend, enhance, and transform their learning.
- It is the tools we use to increase our productivity as learners, instructors, and administrators.
- It is the processes we engage in to construct learning environments.
- It is the design of learning activities and programs.
- It is the process by which we learn.
- It is curricula – a body of knowledge and skills – that studies how things are done.

Technology is a complex term, made more so by the many interpretations we all have of it.

Our application of technologies in learning has been in many ways unfocused. The following principles are intended to provide a (far from definitive!) guide for reflecting on the purpose and use of technology in learning.

These ten principles are:

1. Adding value
2. A pedagogical focus
3. Quality
4. Sustainability
5. Access
6. Scalability
7. Sharing
8. Choice
9. Continuous, lifelong learning
10. Customization

TEN BASIC FUNDAMENTAL PRINCIPLES FOR TECHNOLOGY IN LEARNING

1. Adding Value

The choice of any particular technology, be it a tool or a process, ought to be based on the principle that it adds value to the task at hand. The value should be explicit, that is, stated clearly as the rationale for the choice, and be defensible. Values may be such matters as efficiencies, effectiveness, robustness, reliability, usability, contributions to the betterment of humankind and the quality of life for all, etc.

The choice should be based on some form of evidence that demonstrates or explains the (inherent) value. We are often too quick to adopt a new technology, be it hardware, software, or a new design, without fully understanding or explaining to others why this new technology is better than what we have been using.

We have adopted computers in our classrooms and institutions without fully understanding or explaining to others what it is they do and don't do, and how, with appropriate software and skill in their use, they can add value to productivity, communication, information management, etc. We make claims about how computers can enhance learning without explaining what is meant by this, or by falsely claiming that 'computers' can enhance test scores. Research to date suggests that it is not the computer per se that can make the difference, but the instructional design. It is not a spurious point to make this distinction.

a. Technological enhancements in education are both created and selected for the value that they add, and this value is made explicit and is defensible.

b. Careful scrutiny and research are applied to choices of technologies to ensure that the impact is understood and monitored.

c. New technologies for learning are developed within a framework of 'value adding' – the contribution a technology can make to learning is fundamental to the way it is presented so that claims may be scrutinized

2. A Pedagogical Focus

The prime (but not sole) mandate for technology in learning must be on learning itself.

Too often networks, software, hardware – the 'tools' – are designed for purposes other than learning, or designed by those who have little understanding of the concepts of good pedagogy. There is a need, of course, for the administrative, productivity-oriented technologies but there is an urgent need to respect the implications of pedagogy on the selection of tools (hardware and software), on bandwidths, on security of data and privacy, on access to networks and data, on choice and individual needs.

a. Choices of educational technologies should be based on sound principles of learning. Does the online learnware environment adapt to a wide variety of pedagogical philosophies and methods? Does the course design match the learning objectives with course activities and learner assessment? Do the hardware standards prevent instructor choice of delivery methods?

b. There can be a synergy between the tools that are used and the cognitive processes engaged in learning. Databases, for example, prompt learners to examine the interrelationships, the organizational patterns, and the codification systems of data itself. Hyperlinking technology can generate new forms of interactivity between the reader/viewer and the content displayed. The tools can amplify and extend cognitive processes. Research needs to continue to explore the interrelationships of learning (process technologies) and 'hard' technologies (the tools).

c. Educators should be extensively consulted when educational hardware, software, networks, etc. are being designed and selected.

3. Quality

Quality programs and quality infrastructures are desired, that's a given.

To achieve this goal takes more than a statement of intent. Quality is defined by criteria and standards. By making explicit the criteria and standards we strive for in our use of technology in learning, it is more likely that these standards can be met. This also helps us to recognize that standards are not universal and that different standards are needed for different contexts.

a. Explicit standards should be established through research and discussion when issues of quality arise. We can create professional standards, contractual standards, and standards based on the needs and wants of learners and instructors (the customers).

b. Individualized expectations need to be recognized and standards of quality applied to match diverse needs.

c. Quality standards can be applied to input (e.g., technical specifications for hardware; entrance criteria for students), process (e.g., standards for delivery, standards of design) and output (e.g., certification standards).

d. Quality standards of certain matters will need to be frequently reviewed as enhancements are made rapidly to some products and processes.

4. Sustainability

New technical infrastructures in colleges, universities, and secondary schools are adding costs, and hopefully value, to educational enterprises.

Support systems, training, upgrades, new functional requirements (e.g., databases, data warehouses) add to the expense budget. Sustaining these new costs, and thus the programs and functions, is critical. While long-term projections with respect to 'hard' technologies, finances, and new innovations are difficult to make at times, it is valuable to recognize that sustainability – be it for programs, hardware, or new processes – can be calculated and planned.

Some stability is essential to ensure motivation and growth. Risk factors can be analyzed. Time projections can be made explicit, and then adapted as necessary. Policies can be established to support the principle of sustainability and the context in which it applies.

a. Programs need to be less dependent on political vagaries, where possible. One-time funding can be attractive as an incentive to get going, but plans are required to ensure that ongoing costs can be sustained.

b. There is a need for longer-term revenue streams and multiple funding sources to offset cycles in the economy and political fortunes.

c. Multi-purpose products and services can be created to encourage departments and even institutions to share costs. Learning object repositories are an example of this.

d. Knowledge and talent with respect to hard and soft technologies becomes a critical resource for a field that is changing so rapidly. Poor advice is costly. Human capital investment is seen as a key to growth and improving the quality of life.

e. Cost-effectiveness is a function of value. Is the value added by a specific technology (hard or soft) worth the cost? Is the value itself clear?

f. Sustainability is a function of investment related to returns, in terms of both financial and human returns. In education, the returns, particularly the benefits to society, are often long-term and somewhat intangible, but there are returns. Continued investment in education can be increased, as these returns are made more visible and public.

5. Access

A dominant value in Canadian society is that education provides an opportunity for anyone to be successful, to fulfill themselves, and to contribute positively to society. Public schooling is legislated in every province and territory as a universal right.

Post-secondary and continuing education is not universally provided, but it is acknowledged by many that access to these programs and services should be the least restrictive possible. If the future of Canada lies in our ability to generate a knowledge economy, then lifelong learning, and concomitantly access to learning, is an absolute necessity.

Restrictions to formal learning activities can result from distance and remoteness, physical barriers, social and psychological barriers, inappropriate programs or lack of programs, lack of 'seats' available, financial barriers, readiness factors, and other conditions that prevent access by learners to formal and informal learning opportunities.

a. Access to learning for adults should be made the least restrictive possible. Bringing learning opportunities to all learners through communication media such as the Internet should be a priority of all levels of government, educational institutions, and industry.

b. Personal versus public benefits and costs should be respected, but access to learning should not be restricted to only those with the ability to pay.

c. There are a multitude of sound educational delivery systems for distributed learning, such as teleconferencing, videoconferencing, TV, radio, web-based learning environments, and audiographics. The appropriateness of the media is a function of the learning goals, as well as the preferences and circumstances of the learner. The Internet can provide broad functionality across a variety of learning systems and as such is very scalable. Extensive access to the Internet, with appropriate bandwidth speeds, across all regions of Canada should be a prime goal of governments and industry.

6. Scalability

Efficiencies can be created when processes, programs, infrastructures, and any component or technological element can be shared and expanded without radically altering the core.

Scalability refers to networks that can be connected to other networks and thus expanded; software that is compatible with relevant other software; educational content, courses or programs that can be shared or transferred across departments, programs, distance or context; learning objects that can be codified to demonstrate multiple applications; learning management systems that can expand as student numbers and courses grow, and new functionality can be added.

a. Scalability needs to be considered in the technological architecture of all systems – hardware, networks, software, educational programs and services. The interoperability benefits can reduce costs, prolong usability, extend usability, and facilitate cooperation.

7. Sharing

Learning to share and cooperate with one another is a principle taught in kindergarten, but unfortunately sometimes forgotten.

It is a principle based not only in a social good and altruism, but also in pragmatism. Institutions that learn to share and cooperate can reduce costs and improve quality in a number of technological areas.

a. Community and cooperation are essential for the common good. There are matters such as low enrolment and duplication within programs where sharing and cooperating make fiscal sense. Online courses are expensive to create. Increasing learner enrolments through partnerships between departments or institutions can make a lot of sense. Structures that encourage sharing, and barriers that restrict the same should be explored.

b. Partnerships can be created on any number of fronts, from joint programs across several institutions to joint services, or anything that enables economies of scale or leverage. The key to successful partnerships is often in the details: common purpose and values; defined positions and decision-making processes; positive interpersonal relationships and trust; clear goals, roles, responsibilities, and structure; commitment at all levels; flexibility and adaptability; clear legal and financial liabilities.

   There are many examples of successful partnerships in education across Canada, yet there remains a myth that this form of cooperation cannot be maintained in a competitive environment. Governments and educational institutions should examine the feasibility and benefits of partnerships more closely, as information and communication technologies make this form of organizational structure with institutions operating at a distance possible.

8. Choice

Technology in learning, while by definition is hardly a new phenomenon, is still in need of exploration and examination. We have tentative assumptions that can be best safeguarded by encouraging choice, by enabling learners and educators to make local decisions as much as this is possible.

a. Individual differences amongst learners, instructors and institutions, and also within society and the workplace, should be respected. Choices of technologies, for both tools and processes, can support and promote differences.

b. The responsibilities that are inherent with choice should be made clear.

c. Diversity should be valued, though balanced with principles of efficiency.

d. Polarization (e.g., face-to-face vs. online; public vs. private; direct instruction vs. constructivism, etc.) should be discouraged and the benefits of differences enjoyed.

9. Continuous, Lifelong Learning

The principle of lifelong learning makes inherent sense to most, yet its practice is challenging.

There is a tension between learning and maintaining what exists, be it for personal behaviours and attitudes, or relationships within society, the workplace or social groupings. Learning is a state of change, which requires overcoming inertia or the status quo. Lifelong learning implies constant change, a principle not valued by all.

If technology is defined as the way we do things, we should acknowledge a need to constantly examine what we are doing, and to make changes where appropriate, required, or desired. There is a requirement or expectation that learning be ongoing. The challenge is to encourage the adoption of this perspective.

a. The paradigm for learning as a lifelong endeavour should be built into the structure of learning institutions and the workplace. Learning and changing must be more highly valued in all that we do.

b. Learning should be seen as personal and continuous, not lockstep, institutionalized, and always formalized.

c. We treat change as events, scheduling major overhauls of business processes, government policies, and educational reforms. For learning to be continuous, we need to shift our thinking and our practices on both a personal level and on an institutional level, so that change is a process, a technology of continuous learning.

10. Customization

One of the advantages that computer technologies bring to learning is the ease with which we can customize courses, programs, and services to individual learners.

The world of business is learning of the benefits (and costs) of customized service for customers, be it for matching customer wants with specific products, tailoring products to fit the specifications of customers, or personalizing service itself. Such customization can be beneficial in the context of education and learning as well.

Learners are diverse, with individual needs in terms of their goals, the pace at which they learn, the modes of communication they prefer, their motivations for learning, the stimulations they respond to, the prior learning aptitudes they bring, physical and sensory differences (e.g., sight, hearing) and the manner in which they can demonstrate what they know and can do. Our learning delivery technologies and our course designs can be tailored to meet the needs of individual learners.

a. The needs of individual learners, as well as the diverse needs of individual professions, businesses, industries, cultures and society at large, should be accommodated, as appropriate. There are limits we suspect, in terms of economies, but there is so much more that can be done with the aid of tools and process technologies to improve the quality of education for each learner.

A SPRINGBOARD FOR FURTHER REFLECTION AND DISCUSSION

Investing in technology in learning can either be a Pandora's Box or a thoughtful, rational and tremendously valuable process. The essence of technology should be that it adds value. This fundamental belief rests in each of our principles.

These ten guiding principles have helped Contact North | elearnnetwork.ca provide services to learners and educational institutions across Ontario. Our hope is that they may also help others, as our province develops a comprehensive vision and strategy for technology in learning.

This set of principles may not be comprehensive, or even reflect the values held by others. We offer them as a springboard for reflection and discussion.