Chapter 5: What Is Learning?

So far, we have considered the history and context of education in Ontario and the major issues that underlie current debates about it, and we have attempted to articulate our sense of the purposes of schooling, which centre on learning and teaching. Before we can proceed to examine aspects of schooling in greater detail, and make recommendations to support and improve the province's formal elementary and secondary systems, we must describe more fully some basic principles of learning (and, in the next chapter, of teaching); these, after all, inform our recommendations about curriculum and teacher education. Our essential task is to envision and describe an education system that can best facilitate learning for students. But, first, there is the question of the nature of learning, and how it is nurtured and facilitated.

To learn, according to both Webster's and the Concise Oxford dictionaries, is to gain knowledge, understanding, or skill through study, instruction, or experience. Learning is the process of becoming able to comprehend or do, moving from lesser to greater competence. Human beings learn throughout their lives, but the process is especially obvious and accelerated early in life. While we learn constantly and everywhere, we define formal learning as the goal of education, which is institutionalized in schools. Learning in schools is the deliberately designed outcome of purposeful interactions. To some extent, what is to be learned in school has been predetermined by the larger society, by the educational authorities who represent it. In school, learning is not left to chance - the material to be learned is taught.

In recent decades, scholars have made considerable progress in understanding how learning occurs and how it can be promoted in schools, by:

- appreciating the value of motivation in learning, and the place of success and self-esteem as a learner in being motivated to learn;
- understanding the importance of sequencing what is to be learned, so that the learner builds on prior knowledge;
- making it clear that learners must reflect upon and think about what they already know and how it connects to other knowledge;
- being aware of the way interaction in pairs and groups facilitates learning.

All these are contributions of experimental science to the applied science of teaching for learning. In addition, experiments have revealed the importance of meta-cognitive strategies - thinking about thinking - as a way of taking learners to more complex levels of comprehension and competence.(1)

The education system must give high priority to doing precisely that. The results of provincial, national, and international testing show that Ontario students do reasonably well on measures of basic or lower-order skills and knowledge - in math, for example, facts about numbers and simple arithmetical

operations but appear to do less well on measures of higher-level skills, such as estimating and problem-solving.(2) Similarly, in tests of literacy, students in Ontario and other provinces tend to perform fairly strongly when decoding text and answering simple recall/comprehension questions, but many fall short in being able to synthesize, to infer, or to extend what they have read. (This same pattern is seen in Ontario?s adult population.)(3)

It is these higher-level thinking skills we must strengthen, not simply teaching a specific body of knowledge, but teaching students to look at the connections between what they are learning and what they already know, and to build on it.

What do we know about how learning happens?

Learning occurs from cradle to grave

While education tends to be defined as a formal process, institutionalized in schools and other educational and training organizations, learning is both formal and informal, and is not limited to school. A classroom is only one example of a learning community. Learning begins long before kindergarten and continues long after graduation. It happens before school begins in the morning, and after the last bell rings. As all parents know, children start learning when they are born (if not before) and it would be very difficult - in fact, impossible - to stop them from doing so.

Learning occurs with and without direct instruction

While the learner may not be conscious of it, learning is always an active process; on the other hand, teaching may or may not be direct and deliberate. For example, most parents do not set out to teach the language used in the home, but children are immersed in it and learn to communicate in it during the first years of life.

Schools exist in order to help young people and adults acquire knowledge and skills not acquired instinctively, by osmosis or immersion; instead, schools use instruction so that students obtain access to oral and written expertise. What is deliberately taught at school is the formal curriculum; what may also be taught, although not deliberately, is what is usually called the "hidden" curriculum - the values, behaviours, attitudes, and information teachers and students communicate to one another, however unwittingly. There is, as well, the "missing" curriculum, which is what is not taught and, by implication, is not valued. (Whose voices are not heard in our histories? Whose pictures are not seen in our textbooks?)

The missing curriculum would include, as an example, a unit on 20th-century Canadian literature that made no mention of writers who are female, members of racial minorities, aboriginal or French-Canadian. The personal, negative message to students in those groups: good contemporary literature is not written by people like you. Native students might assume that a Canadian history that starts from the time of the European settlers was telling them their culture and history are not "Canadian." Other students may not notice what is missing or, having noticed it, may accept it uncritically. In either case, the students are being given a curriculum that is less inclusive and less rich than either reality or a good education system demands. It is difficult but essential to remember that students learn what they are taught, whether or not teaching is intentional.

Over time, students must learn to be self-rewarding and self-correcting if they are to continue to grow in

competence after they leave school; while they are students they must be able to depend on instructors for helpful and timely feedback. Errors must be pointed out, and youngsters must be reassured that occasional regression and forgetting are part of learning, and not a serious stumbling block or major failure. Not only must they know when an answer is wrong or inadequate, they must know why, so they can use that information for further learning. In their capacity to individualize feedback, as well as instruction, computers have the potential to become an important tool for self-assessment and self-correction.

The idea that we learn from our errors, and can hardly learn without them, is extraordinarily important, and it must be understood by teachers and conveyed to students. They must be encouraged to see learning as a process of continual improvement, rather than as a contest you either win or lose. This rather common-sense idea is not obvious to students, and there is ample evidence that many children develop a pattern of giving up when they don't succeed immediately. They first begin to falter after the early years in school because, while they were able to master the work easily, they did not develop the habit or expectation of having to improve - for example, they treat a first attempt at an essay or composition as the finished product, rather than as a draft.

Learning depends on practice

Learning is greatly dependent on practice. Knowledge is lost unless it is used and applied. Like instruction, practice may be deliberate or be a by-product of daily need and use. While initial instruction depends on a more knowledgeable other person, practice may be solitary (as in the piano practice that follows a lesson); or it may be shared with others focused on the same tasks (practising for a school play, for example), whether or not all of them have reached the same level of competence.

However, students seldom learn new ideas through practice and drill; rather, those exercises consolidate what they already know, and enable them to commit important principles to memory.(4)

The best practice is purposeful, and involves developing skills that achieve real goals: using new words to write a story or new computing techniques to solve problems. (This is sometimes described as "authentic learning.") Skills must be repeatedly reinforced through practice until they become automatic. The acquisition of new concepts or greater competence depends on thorough assimilation of previous knowledge, which is cumulative and grows from a solid base. Such fundamental codes as the alphabet and number systems, which are acquired through practice and application, are building blocks for everything that follows.

Learning is a social process

While we learn through such solitary activities as reading, listening, thinking, practising, and applying what we have learned, our essentially social and communicative nature as human beings enables us to profit from practising with others. In fact, we think and understand more rapidly when we work together, because of the link between talking and thinking, between explaining and understanding.(5) Advances in understanding the social nature of learning have implications for the structure of learning opportunities, either in or out of the classroom. As sound theory and extensive research have shown, learning in small groups can be highly effective as long as individual and group responsibilities are clearly defined.(6) Similarly, peer and cross-age tutoring can be powerful ways of extending a school's teaching and learning resources.(7)

There is another sense in which learning is social: especially, but not exclusively among the young, it is embedded in the personal. Most learners, children in particular, respond to warm, caring teachers and the relationship with them acts as a strong motivator. Teachers should remember the maxim that "If they don't know you care, they don't care if they know" when they are reflecting on ways to create a context for classroom learning.

Learning occurs most readily when learners want to learn

Not only does learning depend on practice, it depends on motivation: people learn best and fastest when they feel a need to know something, and can see a clear reason for learning. While pain and fear can act as powerful motivators, in a normal social setting such as a classroom, positive motivators are clearly more effective than negative ones, rewards more productive than punishments.

There are two kinds of motivation: the first is intrinsic learning something because it is interesting and because the learner wants to know more or gain greater expertise. The second motivator is an external reward: a happy-face sticker at the top of the paper, an A on the assignment, the offer of a job. While students are not always highly motivated, teachers can expect they are most likely to perform best when they are convinced that assigned material is interesting, important, or useful to them, or when they have had some part in selecting it.(8)

While both types of motivation may lead to learning, what we call the "love of learning" comes from intrinsic motivation. Rewards can help get students started at times, but research indicates that the reward should not become overly important to the learner: children who are motivated by concrete, short-term rewards (marks, etc.) are less likely to continue learning once the reward has been received.(9) Because reward becomes the reason for learning, the only motivation for taking the next step is to receive the next reward. Teachers are responsible for evaluating students' progress, but they must be aware of the compelling disadvantages in strongly emphasizing marks as an end in themselves.

We must nurture curiosity, make learning interesting and challenging, and help youngsters, especially in their early years, to appreciate the challenges and pleasures of learning. Only then can we develop citizens with a sense of obligation to do their personal best, not merely for a mark or a pay cheque, but because they derive satisfaction from the challenge of working a problem through.

All of this is complicated by the fact that motivation-learning is a circular process. Motivated students learn more, but, in truth, more skilled and knowledgeable students are more motivated: students work hardest at their "best" subjects. Dull material indifferently taught is counterproductive to learning. However, the assumption that "fun" schooling will automatically increase learning is equally misguided. Students need to be motivated to accept challenges; they also need to be challenged to remain motivated. Nothing is more motivating than competence, and increasing competence is the essence of schooling. As students acquire competence, they perceive the power of knowledge, and are motivated to stretch themselves even more.

Most children come to school eager to learn, full of enthusiasm for the books, the pictures, and computers they see in the classroom, and are full of questions. Good teachers keep that eagerness alive and growing and help children and young people become increasingly competent.

Learners have to know how to go on learning

It would seem that students must be conscious of their own thinking processes before they are able to

solve new problems, problems that have more than one possible answer, or problems that call for critical inference and analysis. They must ask themselves key questions, and ask questions of their answers. In other words, if they are to become strong, independent, lifelong learners, students must become their own teachers.

While this depends, in part, on maturation - for example, young children are less able than adolescents to predict accurately how well they know or can do something - it is equally true that many students will never learn to examine their own thinking unless that skill is expressly taught. Most often this occurs when a teacher models "thinking about thinking" for students, and then has them practice by talking through the solution to a problem. One of the most effective methods is to put the learner in the position of teacher to another student.

As every teacher knows, there is no better way to find out whether you understand something than to try to teach it to someone else. After several such experiences, it becomes increasingly automatic for students to go through a process of self-examination, to ask themselves: "Did it work? How am I doing? Does this make sense?" Of course, learning cannot proceed unless it is based on a body of knowledge; you cannot ask "Does this make sense?" about a text written in a language you cannot read. The ability to examine your own thinking becomes useful only when there is a body of knowledge on which it can be used. But what large-scale assessments have shown is that students often have the knowledge, but not the generic thinking-about-thinking skills needed to get beyond the basics. Increasingly, educators have come to understand that anything less is inadequate.

> We should set high standards for our children and be demanding of them in what we expect from their schoolwork ... We place too much emphasis on remediation, and too much emphasis on mastery. Instead, we need to reaffirm a commitment to excellence in our schools, in the way the corporate world has been doing. In practical terms, we need to expect more from our children ... more work ... is not [necessarily] more challenge ... We need to challenge children to the utmost, not only by giving them more work, but by giving them more difficult but also more meaningful work.(10)

Learning is different for different learners

The question of whether different people or groups learn differently is an old one, but the evidence is still largely theoretical. Thus, some educators suggest the reader who develops more slowly learns more readily by listening than by looking. But it is not clear whether they are describing students who have difficulty reading because they have not been well instructed or because they have some specific visual or learning disability, rather than because they are readers who have a different learning style.(11)

Others ascribe preferences in learning style or environment to differences in ethnicity, gender, and socio-economic status, but it is unclear whether such differences are related to characteristics of the learners or of their situations.(12) It may be that the reason many female students prefer smaller groups or less competitive situations is that males, as has been well documented, tend to compete more successfully for teacher attention.(13)

While it is difficult to substantiate the belief that there are significant differences in fundamental ways of learning, it is certainly true that individuals have varied preferences for learning conditions: some want a quiet place to study, others insist that noise and surrounding activity are necessary. Some are more able to focus on and remember material if it is presented graphically, while others find images distracting.

Some learn better when they have more direction, others when they have less.(14) If parents are willing to accommodate some of these differences (even among siblings), and judge according to results rather than on the basis of fixed ideas about proper learning, conflict can be avoided. Teachers, too, have to be inclusive and flexible in the way they help children learn, and in the diversity of the materials and approaches they use because such variety is likely to create a more successful context for learning.(15)

While people vary in general intelligence, there is evidence that intelligence is multifaceted, that some people are more intelligent in one way of learning than another, and that they learn best when their strongest abilities are being engaged. Schools most readily reward linguistic and logical-mathematical kinds of intelligence (as do intelligence tests). Students whose most-developed abilities are spatial, musical, social, or kinetic (movement) are at a disadvantage in school, which typically under-utilizes these approaches to learning and knowing. The implication is that school curricula should be designed to engage all types of intelligences in order to provide equal access to learning for all students.(16)

If (as some research suggests) these individual differences are quite marked, then schools, in order to carry out their primary mandate of making children literate and numerate, must also respond to the diverse abilities children have, using these abilities as routes by which children may gain understanding and competence with words and numbers. To do otherwise is to risk the opportunities many children could have for the success that depends so heavily on literacy and numeracy. The Commission's emphasis on society's need for literate and numerate learners in no way lessens its belief that these differences must be acknowledged.

There are barriers to learning

Although humans are natural learners, there is abundant evidence that the ability to learn is impeded by unfulfilled basic needs: for food, shelter, and well-being. People can learn when they are hungry, cold, or sick, but their ability and the rate at which they do so are severely impeded. This is equally true of young people who are poorly cared for or who are chronically frightened by violence or the threat of violence at home or at school, by sexual harassment, racism, homophobia, and other forms of bullying and persecution. Moreover, they are unlikely to taste academic success. For many children, poverty and disadvantage are strongly associated with learning problems and school failure; furthermore, many students know that unsafe schools cannot be good learning environments.

Another factor that can interfere with the ability to learn is a hostile or unsupportive socio-cultural environment. If the school offers little support in a student's home language or cultural heritage, if students do not see themselves reflected in the curriculum or among the teaching staff, they may be less motivated to learn, less confident in themselves as learners, and, therefore, less successful.(17) Schools that acknowledge the missing curriculum by being sensitive to students' identities, and that clearly value diversity, eliminate what can be very powerful impediments to learning; they increase students' motivation to learn, and their confidence and success as learners. This is most likely to happen when the school is open to, and a working part of, its community; otherwise, the school itself can become part of the problem.

The importance of self-esteem in learning and achieving has been hotly debated. Some educators and parents see it as a prerequisite to school success, and the lack of it as a hurdle that must be overcome before learning can proceed.

In fact, there is evidence that self-esteem is both a cause and an effect of academic success.(18) Many

children who do poorly in school have quite high self-esteem, according to standardized measures of personality, probably because they are doing well in other areas of life: parents accept them, they are popular with friends, they shine on skates, or whatever. Thus, it may be non-productive for teachers to focus principally on self-esteem as a way of increasing students' motivation. On the other hand, it is likely that success in schoolwork would encourage students to think of themselves as good at learning, which would enhance their sense of themselves as learners, which is crucial to their formal education.

The students who understand that part of what they learn, while not immediately useful, will be of future benefit, have a great advantage over those who depend heavily on the immediate environment - the teacher, the learning materials, the attitude of parents and of peers - for motivation. Students who think and act only in the present - and there are many of them - are easily distracted from schoolwork and are more likely to respond to what seems relevant and useful in the here-and-now rather than to promised rewards in a dim and uncertain future.

Community-based education, which takes students out of school and into workplaces and community agencies, and brings local business and professional people into the school, has the potential of connecting the school to real life. So does the use of computers, because technology impresses young people, and connects them to the larger and somehow more "real" world outside the school walls. The computer also offers students control over their own learning, which may help to reduce over-dependency on others and encourage them to be less passive learners.

Learning is also readily derailed by unsocial or anti-social behaviour in the classroom. To the degree that their inattentiveness disrupts the teacher's and the class's focus on the task at hand, easily distracted students may present a barrier to learning for others. In a classroom, an individual problem can quickly become a problem for the group.

Learning for life: The importance of early learning

It is likely that the most developmentally sensitive period for laying the groundwork of later competence and coping occurs during the infant's earliest social interactions, probably in the first two years of life. Basic habits of mind that guide how we interact with others, how we attend to the world, what we focus our attention on, and how we learn to deal with new situations, are shaped in the context of these key social relationships.(19)

While all children are learning from (or before) the day they are born, some arrive at school four, five, or six years later with significant learning advantages. While some of this is related to innate cognitive abilities, a great deal of it can be explained environmentally. Such negative influences as lack of stimulation are often associated with poverty and lack of parental understanding of how children develop. Positive factors include a strong literacy environment in the home: children are read to, see their parents read, and learn that what is written or read is important to daily life.

There are more subtle factors as well: we know, for example, that there is a relationship between the frequency and quality of parent-child conversations and the child's success in school in learning to read and write.(20) Parenting centres and high-quality child care can also positively affect children's success in school.(21)

Even more important to learning ability than the bond between child and teacher is that between child

and parent or other caretaker: it affects both competence and the ability to cope with, or withstand, stress. Perhaps the presence of a nurturing and dependable adult gives children the security needed if they are to feel safe to explore and experiment with the world around them. When children enter school, the connection between the most significant figures in their life - usually their parents - and the school becomes important. In fact, it is a crucial support to their ability to manage in the larger and more impersonal setting.(22) As well, as a nurturing adult, the teacher represents continuity for young children moving from the pre-school to the school experience.

Whatever their previous experience, all children come to school knowing, informally, a great deal about language, numbers, and physical objects. Formal schooling must build on the knowledge children bring with them. One of the basic principles of learning is that it proceeds in an orderly way, and is cumulative; an effective teacher - the parent, at home, and the classroom teacher, at school - helps the child to the next step, which depends on knowing what should come next. This is true for learners at all ages, but it is particularly crucial for getting youngsters off to a good start.

Informal to formal learning: The transition from home to school

What is different about school is not that it is a place for learning - which happens in the crib and in the kitchen as well as in the classroom. Two extremely important elements differentiate school from pre-school learning contexts.

First, although many parents deliberately teach such skills as counting or letter and word recognition, most learning at home is casual and non-directed and occurs through immersion in a social setting. In school, by contrast, classroom learning is intentional and directed by a professional teacher.

Second, learning in school takes place within a group of peers, instead of one-on-one or two-on-one. The transition to school is from solitary to group learning. Children who get high-quality, pre-school group care before they are old enough for school make the transition more easily and earlier, which gives them advantages as learners.(23)

Children arrive at school with different levels of preparedness to interact positively with others, to defer individual gratification, to focus attention, to follow instructions, and, in general, to profit from the classroom setting. Children who can achieve all this will grow in competence and in their ability to cope with frustration. By contrast, children who are less able than their peers to benefit from group learning face increasing frustration and diminishing levels of competence.

The challenge for teachers and other educators is to create a nurturing and supportive environment that is stimulating and challenging, where all children have the opportunity to become more competent. The home environment, which is such a strong influence in early childhood, continues to shape a child's progress throughout the years of formal education.'

Without teaching to the lowest common denominator, the teacher must narrow the gap between the neediest children and those who have social, emotional, or intellectual advantages.

How can classrooms become learning communities? What are the best strategies for ensuring that most - not just many - students become successful school learners? What do we know about what works?

Active teaching and learning

Students and teachers must be actively involved in the learning process if the potential of the classroom as a context for cognitive and social development is to be realized. Passivity is as much an enemy of learning as it is of self-esteem and mental health. An excellent teacher is sensitive to each youngster's interests, achievements, and difficulties. Indeed, research shows that teachers who are most acutely aware of each student's response to a lesson or activity have the fewest problems of discipline and disruption.(24) Because they monitor the progress of each student, they know the kind of help each needs, and they provide it appropriately and can give an accurate assessment to a parent, another teacher, or to the student, leaving little doubt about the degree of progress being made and some sense of whether problems are temporary or serious.

Since learning is the enduring growth of competence, it is clear that teachers cannot force students to learn. To the extent that teachers create a supportive and challenging classroom and curriculum, they will find that most students willingly put forth effort to master new ideas and skills. On the other hand, if material is remote from students' interests, backgrounds, or experiences, if it is insufficiently challenging or beyond the students' level of development, or if students are afraid to make a mistake, their opportunities to learn will be severely curtailed. The resultant boredom and alienation may lead to disruptive behaviour that interferes with everyone's learning.

Exploiting the diversity of the group

An important clue to the best way of exploiting the learning context of the classroom is to capitalize on its uniqueness: unlike the family (but like most other work settings), it is organized around a relatively large group. While one-on-one tutoring is an extremely efficient (as well as extremely expensive) instructional mode, there are very distinct advantages to the group setting: the social nature of human learning makes each learner a potential teacher of peers, and social interaction a prime route to learning.(25) While it is truest for children before they become literate and can learn from print as well as from speech, it applies to learners of all ages.

In a classroom, students learn from the teacher and from one another. Teachers who understand the group's potential as a learning vehicle exploit the developmental diversity that is otherwise perceived as (and can, indeed, become) a barrier to learning. Helping a peer in school is excellent preparation for life, for home, for the community, and for work.

Collaborative learning may involve work with children of the same, or of different, ages. It encourages the less developed "learner" to see and reach for the next level of skill or understanding; it also helps the more developed "teacher," in the process of clarifying and explaining material to another person, understand it better.(26)

Extending the boundaries of the learning environment

When, under the teacher's strong leadership, these experiences are clearly related to the academic curriculum, community visits, workplace experiences, the presence of community members in the classroom - all extend the school's boundaries and show students the reality that learning is lifelong. Schools often give the implicit message that just the opposite is true: that all important learning takes place within their walls, and can be delivered only by teachers; to the degree they do that, schools become barriers to learning. Schools and teachers cannot possibly replicate the myriad opportunities for learning that exist outside their walls; moving beyond those walls extends learning and, by connecting the curriculum to valued people and valued settings, strengthens its meaning and impact.

Information technology is an increasingly powerful vehicle for enlarging students' learning opportunities; many schools are already connected to networks of information and thinking that lie beyond their own walls. Students are linking up with each other, across school, board, provincial, and national boundaries, sharing information, ideas, and interests. These endeavours force them to use and develop communication skills and to expand perspectives beyond the local school or neighbourhood.

Despite the enormous amount of information technology for learning that already exists, the field is still very young and will obviously be an increasingly powerful force in school education. The passivity that shuts out learning in general is an especially powerful disincentive for some students in conventional classrooms. In so far as technology is used interactively, it has the potential to motivate students and to be an especially effective learning tool, particularly for those who have difficulty with text and lecture formats. Computers can individualize curriculum and pacing, enabling students to work at their own best rate. Most of all, technology offers students access to a world of information, so that the work of learning clearly belongs to them - a world full of choice, decision-making, and the responsibility for asking as well as answering questions.

Creating a learning community that works

A school is a community of learners for teachers and students, and an effective classroom is a community of learners, in which the teacher functions as instructor, facilitator, and observer, and the students learn by listening, talking, helping others, and receiving help from others. Teachers, in observing and monitoring their students' progress and response to the curriculum, are also learners, just as students, in teacher-structured interactions, tutor one another. If school is preparation for life, it must be life-like, with everyone able to do some teaching and a lot of learning.

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