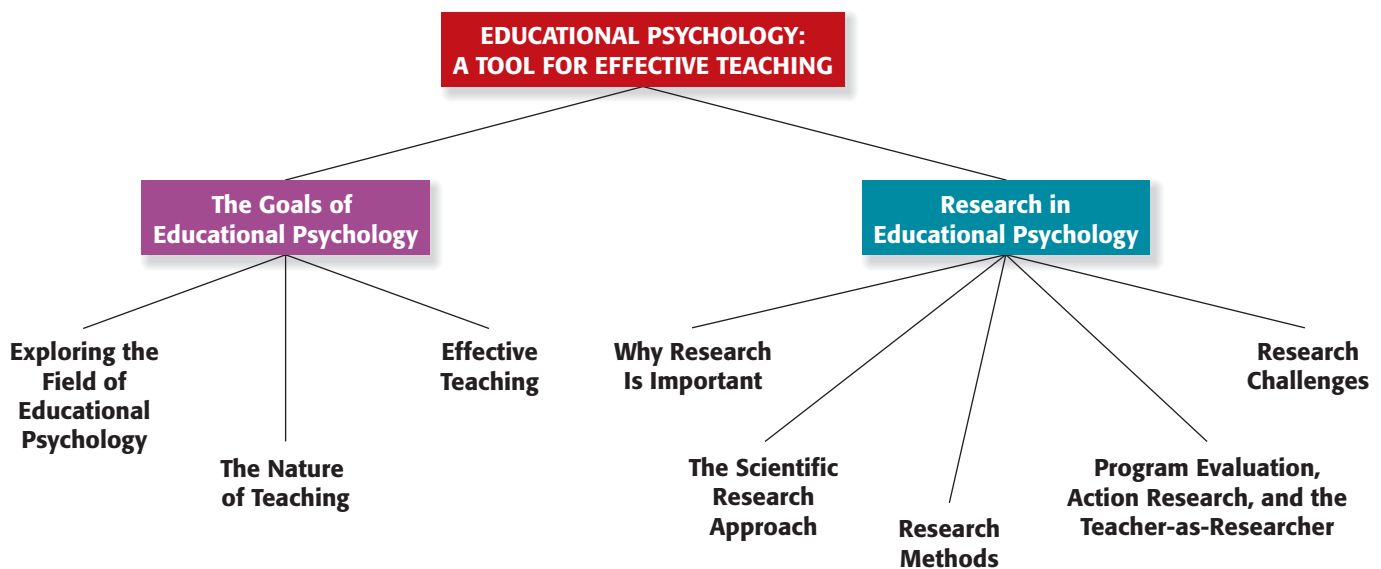# 1 Educational Psychology: A Tool for Effective Teaching

Preview

In the quotation on page three, Canadian astronaut Julie Payette comments that education opens the door to the future. As a teacher you will open this door for your students, and you will help shape that future by helping the youth of today become the leaders of tomorrow. In this chapter we will examine what the field of educational psychology is about. These are some of the questions we will explore:

- What are the major challenges of teaching?

- Is teaching more of an art than a science?

- When you imagine yourself as a teacher, what is your image of yourself? What kind of teacher do you want to be?

- What can the science of educational psychology offer to teachers in the classroom?

EDUCATIONAL PSYCHOLOGY: A TOOL FOR EFFECTIVE TEACHING

The Goals of Educational Psychology

- Exploring the Field of Educational Psychology
- The Nature of Teaching
- Effective Teaching

Research in Educational Psychology

- Why Research Is Important
- The Scientific Research Approach
- Research Methods
- Program Evaluation, Action Research, and the Teacher-as-Researcher
- Research Challenges

Teaching Stories

When preparing for the writing of this text, we asked teachers from around the country to reflect on the craft of teaching. Almost everyone we surveyed included some comments or words of advice for those who were beginning their teaching careers. Below, four award-winning educators from across Canada offer suggestions about how to make teaching a positive experience for yourself and your students.

"I've learned that a teacher's job is never truly finished, so it's important to find a healthy balance between your extended professional life and your personal life. For example, while participating in school co-curricular activities can provide teachers with valuable insights about students' personalities and interests—information that can be used when planning lessons and for classroom management—assuming too many of these responsibilities is problematic for some teachers. Select one or two co-curricular activities that you enjoy but that still leave time for yourself and your family and friends."[1]

"Teachers need to teach students how to learn, but teachers also need to continue in their own professional development and learning. I recommend that teachers attend national or international conferences in their specific subject or interest area. These large conventions can help teachers develop a sense of career direction and focus. They also provide a host of valuable teaching materials and instructional ideas for classroom use."[2]

"Beginning teachers should strive to be flexible and open to new ideas. Teaching the same concept from a variety of perspectives makes your lessons engaging and addresses the learning styles of the students in your classroom. Being flexible also means being sensitive to the perspectives of students and parents. Parents are depending on you to create the best learning environment possible for their children. Put yourself in their shoes and plan accordingly."[3]
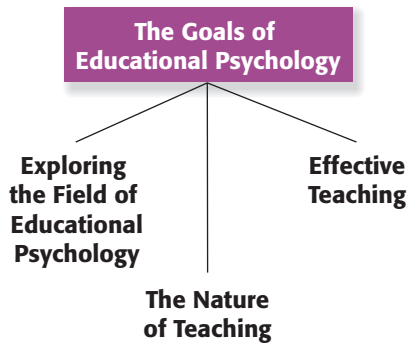
"One of the best pieces of advice I'd offer a beginning teacher is to remember to celebrate your students' successes. Acknowledge your students' efforts and accomplishments. If you believe in them and show them that their efforts are valued and recognized, they will respond accordingly. After all, helping students learn to succeed is what teaching is all about."[4]

---

1 Dan Forbes: 18 Years Elementary/Middle Years Teacher, Manitoba; TOBA Award for Physical Education Program, 2001; Roy C. Hill Award for Important Educational Innovation, 1999; Prime Minister's Certificate of Achievement for Teaching Excellence, 1997
2 Anita Ghazariansteja: Secondary-School Science/Chemistry Teacher; Recipient of the 2002 Ontario Secondary School Teachers' Federation Status of Women Award for Outstanding Female Educator
3 David Tallach Miller: Secondary-School Science, Mathematics, & Computer Science Teacher; Recipient of the Teacher of the Year Award
4 Jane Witte: Family Studies Teacher; Independent Educational Consultant; Part-Time Instructor, Faculty of Education, University of Western Ontario; Recipient of the Phyllis Meiklejohn Leadership Award

> **The Goals of Educational Psychology**
>
> Exploring the Field of Educational Psychology
>
> The Nature of Teaching
>
> Effective Teaching

THE GOALS OF EDUCATIONAL PSYCHOLOGY

Educational psychology is a vast landscape that will take us an entire book to describe. In this introduction we will explore what the field of educational psychology is about, examine the nature of teaching, and consider what is involved in being an effective teacher.

Exploring the Field of Educational Psychology

Historical Background   The field of educational psychology was founded by several pioneers in psychology just before the start of the twentieth century. One of those pioneers was William James (1842–1910). Soon after launching the first psychology textbook, *Principles of Psychology* (1890), he gave a series of lectures called *Talks to Teachers* (James, 1899/1993) in which he discussed the applications of psychology to educating children. James argued that laboratory psychology experiments often can't tell us how to effectively teach children. He argued for the importance of observing teaching and learning in classrooms for improving education. One of his recommendations was to start lessons at a point just beyond the child's level of knowledge and understanding, in order to stretch the child's mind.

A second major figure in shaping the field of educational psychology was John Dewey (1859–1952), who became a driving force in the practical application of psychology. Dewey established the first major educational psychology laboratory in the United States, at the University of Chicago in 1894.

We owe many important ideas to John Dewey. First, we owe to him the view of the child as an active learner. Before Dewey it was believed that children should sit quietly in their seats and passively learn in a rote manner. In contrast, Dewey believed that children learn best by doing. Second, we owe to Dewey the idea that education should focus on the whole child and emphasize the child's adaptation to the environment. Dewey believed that children should not be narrowly educated in academic topics but should learn how to think and adapt to a world outside school. He especially thought that children should learn how to be reflective problem solvers. Third, we owe to Dewey the belief that all children deserve to have a competent education. This democratic ideal was not in place at the beginning of Dewey's career in the latter part of the nineteenth century, when education was reserved for a small portion of children, many of whom were boys from wealthy families. Dewey was one of the influential psychologist– educators who pushed for a competent education for all children—girls and boys, as well as children from different socioeconomic and ethnic groups.

Another pioneer was E. L. Thorndike (1874–1949), who initiated an emphasis on assessment and measurement and promoted the scientific underpinnings of learning. Thorndike argued that one of schooling's most important tasks is to hone children's reasoning skills, and he excelled at doing exacting scientific studies of teaching and learning (Beatty, 1998).

Educational Psychology: Art or Science?

Educational psychology *is the branch of psychology that specializes in understanding teaching and learning in educational settings.* Both science and practice play important roles in educational psychology (Calfee, 1999; Shuell, 1996). The field draws its knowledge from theory and research in psychology, from theory and research more directly created and con-
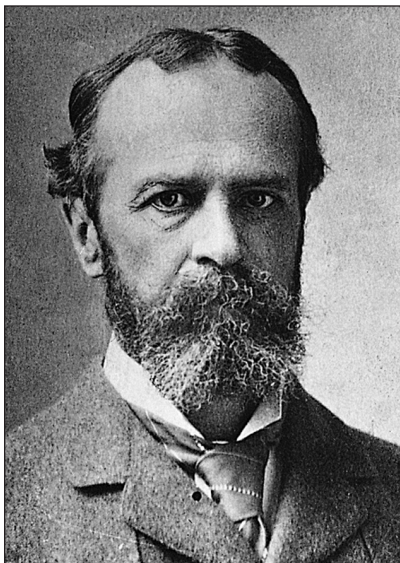
William James
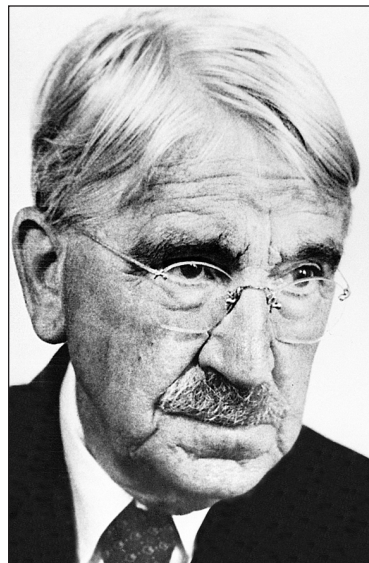
John Dewey

James and Dewey created and shaped the field of educational psychology. Many of their ideas are still embodied in current views of how children should be educated.

Diversity and Education
Canadians in the Early History of Educational Psychology

The formal study of educational psychology in Canada dates back to the turn of the twentieth century. The most prominent figures in the early history of educational psychology were individuals like William James, John Dewey, and E. L. Thorndike in the United States; and James Baldwin and Samuel Ralph Laycock in Canada. After the Second World War, more women began to fill academic and research positions in Canadian institutions. Two Canadian women pioneers in psychology were Mary Salter Ainsworth and Katharine M. Banham.

Mary Salter Ainsworth was born in Ohio in 1913 but spent most of her youth in Toronto. She attended the University of Toronto, where she earned her Ph.D. in developmental psychology in 1939. Mary Ainsworth taught at the University of Toronto, where she conducted research into patterns of early emotional attachment in infants. She pursued her interest in attachment in London and Uganda. While in Africa she conducted a longitudinal study of the development of mother–infant attachment, which she wrote about in *Infancy in Uganda: Infant Care and the Growth of Love.*

Katharine M. Banham, born in 1897, was the first woman to earn a Ph.D. at the University of Montreal. Her research interests included mental development in infancy and early childhood, with particular emphasis on social and emotional development and the rehabilitation of children with cerebral palsy. She was the author of *The Social and Emotional Development of the Child* (1931) and numerous articles, as well as a number of rating scales and psychological test instruments that are still in use today. She was a lecturer in psychology at the University of Toronto from 1921 to 1924, practised as a psychologist for the Canadian National Committee for Mental Health, became a clinical psychologist for the Montreal Mental Hygiene Institute, and held several positions at McGill University. Dr. Banham was the first woman on the psychology faculty at Duke University and a major force in North American psychological research until her death in 1995.


Mary Salter Ainsworth

Katharine M. Banham

ducted by educational psychologists, and from the practical experiences of teachers. For example, the theories of Jean Piaget and Lev Vygotsky were not created in an effort to inform teachers about ways to educate children. Yet in Chapter 2, Physical and Cognitive Development, you will see that both of these theories have many applications that can guide your teaching. Other theorists and researchers in educational psychology have tied their activities more directly to learning and teaching in schools. For example, after carrying out a two-year study of 12 secondary schools in British Columbia, Alberta, and Quebec, Henchey and his colleagues (Henchey et al., 2001) offer insights about school and teacher practices that promote high achievement for low-income students. Their findings underscore the importance of holding positive attitudes and high expectations for students, a focus on academic achievement and good teaching, structured classroom instruction, "traditional" standards of behaviour, and a sense of engagement and belonging among teachers and students. Educational psychologists also recognize that teaching sometimes must depart from scientific recipes, requiring improvisation and spontaneity (Gage, 1978).

There is spirited debate about how much teaching can be based on science versus how much of it is art. As a science, educational psychology's aim is to provide you with research knowledge that you can effectively apply to teaching situations. But scientific knowledge alone cannot inform you about all of the teaching situations that you will encounter, and this is where educational psychology is an art. You will need to make some

I have been a student and I have been a teacher. I have seen the pain that comes from not doing nearly well enough. And I have seen the pleasure that can come from the absolute joy of good learning.

Kim Campbell
Former Canadian Prime Minister, Contemporary
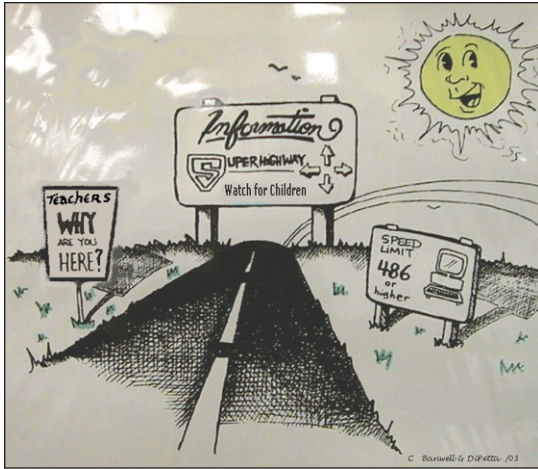
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important judgments in the classroom based on your personal skills and experiences as well as the accumulated wisdom of other teachers. As we see next, those judgments often take place in a classroom that is complex and fast-paced.

The Nature of Teaching

Teaching Is Multidimensional　One reality of teaching is that many events occur simultaneously and in rapid-fire succession (McMillan, 1997; Sumara, 2002). Events happen quickly in the classroom. Researchers have found that a teacher can be involved in as many as 1,000 to 1,500 interactions with students each day (Billips & Rauth, 1987; Jackson, 1968). Amid these interactions, teachers must make immediate decisions to manage the flow of events and keep the time productive (Doyle, 1986).

Teaching also is multidimensional in that it involves many different domains. We often think of teaching in terms of academic or cognitive domains (emphasizing thinking and learning in subject areas such as English, math, and science). However, teaching also involves social, affective, moral, and health domains, as well as many other aspects of students' lives. In school, students gain understanding and skills in academic subject areas. Also, in school they are socialized by and socialize others, learn or do not learn how to control their emotions, gain or do not gain a positive sense of moral values, and do or do not develop good health knowledge and skills. Thus, a teacher's agenda might consist of not only teaching academic subjects but also promoting socialization and personal development. Teaching involves helping students learn how to be self-reliant and monitor their own work, as well as to work cooperatively and productively with others.

Overlapping events and agendas mean that teachers constantly face dilemmas, not all of which can be resolved. And sometimes a decision that resolves one problem fails to address or even intensifies another problem. For example, teachers often must balance what is good for the individual against what is good for the group. A common challenge in the elementary grades is the need to help one student develop better self-control while at the same time maintaining order and activity in the class as a whole.

Teaching Involves Uncertainty　In the hectic world of the classroom it is difficult to predict what effect a given action by the teacher will have on any particular student. Often teachers must make quick decisions that have uncertain outcomes and hope that they have made the best move for that moment. In this book we will extensively examine the best general principles you can use to instruct and motivate students, assess their learning, and manage the classroom. Although these principles will help you make classroom decisions, every situation you encounter will in some way be new. Even the students in the same class change from day to day as the result of additional experiences together and intervening events.

Uncertainty and unpredictability also include the need to teach students in ways that teachers might not have been taught themselves. Current educational reform emphasizes the social contexts of learning, the use of portfolios, and conducting long-term projects (Arends, Winitzky, & Tannenbaum, 1998). Increasingly, the teacher's role is seen as being more like that of a guide who helps students construct their knowledge and understanding than that of a

Through the Eyes of Teachers

To Teach Is to Learn Twice

As a first-year teacher, I quickly learned that my pre-service training had not prepared, and could not prepare me for all the situations that I would encounter in the classroom. Teacher education programs stress the importance of initiative, intuition, and life-long learning as skills that teachers need to develop. However, pre-service programs cannot teach those skills—just as they cannot instill in teachers the desire to make a difference in their students' lives.

When teaching, I remind myself that I was once where my students are now—struggling with theories and concepts and relying on teachers as learning guides. Now, however, it is my responsibility to ensure that students understand the very concepts that I once struggled to learn. I realize that what I had learned as a student, I had to learn again as a teacher. I had to revisit this content with the intent of finding ways to make it meaningful to students. I began to see concepts in new ways and I realized that I was learning along with my students. This realization secured my commitment to the processes of life-long learning and professional development that my pre-service instructors had talked about so long ago.

Paul Allen
Associate Professor, Faculty of Education,
University of New Brunswick
Former Secondary-School Teacher

director who pours knowledge into students' minds and controls their behaviour (Brown, 1997; Brown & Campione, 1996; Hogan & Pressley, 1997). In these respects many prospective teachers are being asked to teach in ways that are unfamiliar to them.

Teaching Involves Social and Ethical Matters   Schools are settings in which considerable socialization takes place. The social and ethical dimensions of teaching include the question of educational equity. When teachers make decisions about routine matters such as which students to call on, how to call on them, what kinds of assignments to make, or how to group students for instruction, they can create advantages for some students and disadvantages for others. In some cases, they might unintentionally and unconsciously perpetuate injustices toward students from particular backgrounds. For example, research suggests that teachers generally give boys more instructional time, more time to answer questions, more hints, and more second attempts than they give girls (AAUW Report, 1998; Cole & Willmingham, 1997; Crawford & Unger, 2000).

Teaching Involves a Diverse Mosaic of Students   Your classroom will be filled with students who differ in many ways. They will have different levels of intellectual ability, different personality profiles, different interests, varying motivations to learn, and different family, economic, religious, and cultural backgrounds. How can you effectively teach this incredible mosaic of students?

You will want to reach all of your students and teach them in individualized ways that effectively meet their learning needs. Students' vast individual variations and diversity increase the classroom's complexity and contribute to the challenge of teaching. This diversity is especially apparent in the increasing number of students whose racial, ethnic, linguistic, and cultural backgrounds are quite different from students of Western European heritage, to whom most North American educational systems originally were addressed (Banks & Banks, 1997; Marshall, 1996; Morrison, 2000).

Effective Teaching

Because of the complexity of teaching and the individual variation among students, effective teaching is not like the "one-size-fits-all" sock (Diaz, 1997). Teachers must master a variety of perspectives and strategies, and be flexible in their application. This requires three key ingredients: (1) professional knowledge and skills, (2) commitment, and (3) professional growth. We will evaluate these three needs shortly, but to begin thinking about effective teaching, let's explore students' images of effective and ineffective teachers.

Images of Effective and Ineffective Teachers   You have had many teachers in your life, and soon you will be a teacher yourself. Spend a few moments thinking about the teachers you have had and your image of the teacher you want to be. Some of your teachers likely were outstanding and left you with a very positive image. Others probably were not so great.

In a survey of almost 1,000 students ages 13 to 17, having a good sense of humour, making the class interesting, and having in-depth knowledge of the subject matter were the three characteristics listed as being the most important for teachers to have (NASSP, 1997). These results clearly support the belief that a sense of humour is critical for teaching. Consider this humorous incident: A kindergarten teacher was struggling mightily to get a pair of rubber boots onto a student's feet so that he could go out for recess. It was a difficult task that had taken up much more time than the teacher would have liked, but she had finally gotten the boots onto the little boy's feet when he said, "These aren't my boots, you know." The teacher sighed and started taking the boots off. This process proved to be as difficult as putting the boots on, and she had only one of the boots off when the boy continued: "They're my brother's, but my Mom let me wear them today!"

Our childhood images of teachers continue to influence us as adults. Anne Elliot, a professor of education at Brock University, has this image of Mr. McMurtry, her high-school history teacher:

The eye sees only what the mind is prepared to comprehend.

Robertson Davies
Canadian Novelist, 20th Century

www.mcgrawhill.ca/college/santrock

Teaching Strategies
For the Complex, Fast-Paced Classroom

✔ Ground your expectations as a beginning teacher
- expect to be challenged to think
- adapt, and come up with effective solutions to problems not anticipated

✔ Take a long-term view to planning and problem solving
- develop systemic strategies to solve classroom problems
- keep in mind that strategies take time and consistent effort

✔ Focus on all dimensions of teaching: social, ethical, and academic
- children are complex and teachers interact with them in multidimensional ways
- get to know your students as individuals
- recognize that you are a model for their behaviour

The art of teaching is the art of awakening the natural curiosity of young minds.

Anatole France
French Novelist and Poet, 19th Century

He was a quiet, average-looking man, but when he started talking about history it was as if he grew taller and stronger with the stories he told. He was so passionate and knowledgeable about history and he made it come alive for all of us. I still recall listening so intently to his stories that I didn't hear the bell ending the class. He instilled in us the need to always search for the stories behind the story in history. Because of him I studied history in university, and to this day whenever I read a history book I search for the people and the stories that Mr. McMurtry would have brought out in his classes.

Professional Knowledge and Skills   Effective teachers have a good command of their subject matter and a solid core of teaching skills. They have excellent instructional strategies supported by methods of goal setting, instructional planning, and classroom management. They know how to motivate, communicate, and work effectively with students from culturally diverse backgrounds. They also understand how to use appropriate levels of technology in the classroom (see Figure 1.1).

Through the Eyes of Students

A Good Teacher Is Someone Who...

A good teacher is someone who gives students a second chance to do their work correctly. She is fair with her students. If she says she is going to do something, she does it. She gives children fun challenges and rewards good work. She helps you learn by spending extra time with you and taking up homework with the class. A good teacher will let you take home the class pet and do chores around the classroom. Most importantly, a really good teacher cares about her students and never yells or gets angry with them.

Jonathon and Raymond
Grade 4 Students, Ontario
Reading, Movie, Video Game, and Sport Enthusiasts

Subject-Matter Competence   In the last decade, in their wish lists of teacher characteristics, secondary-school students have increasingly mentioned "teacher knowledge of their subjects" (NASSP, 1997). Having a thoughtful, flexible, conceptual
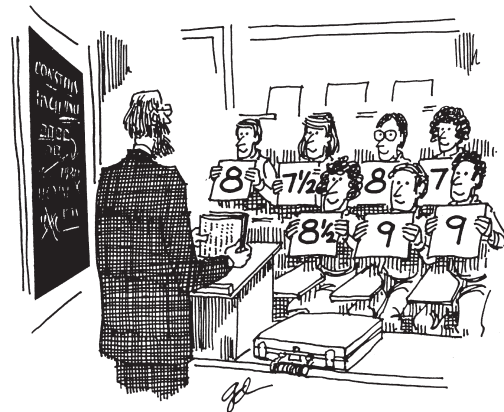
Used by permission of the estate of Glen Dines

understanding of subject matter is indispensable for being an effective teacher (Borko & Putnam, 1996). Of course, knowledge of subject matter includes a lot more than just facts, terms, and general concepts. It also includes knowledge about organizing ideas, connections among ideas, ways of thinking and arguing, and patterns of change within a discipline; beliefs about a discipline; and the ability to carry ideas from one discipline to another.

Instructional Strategies   The principle of constructivism was at the centre of William James' and John Dewey's philosophies of education. **Constructivism** *emphasizes that individuals actively construct knowledge and understanding. In the constructivist view, information is not directly poured into children's minds. Rather, children are encouraged to explore their world, discover knowledge, reflect, and think critically.* Today, constructivism includes an emphasis on collaboration—students working with each other in their efforts to know and understand (Oldfather et al., 1999). Thus, a teacher with a constructivist instructional philosophy would not have students memorize information rotely but would give them opportunities to meaningfully construct the knowledge and understanding themselves (Gibson & MacKay, 2001; Kahn, 1999).

Increasingly, the trend in educational reform is to teach from a constructivist perspective (Bransford, Brown, & Cocking, 1999; Kuhn, 1999; Perkins, 1999). The constructivist belief is that for too long in North American education children have been required to sit still, be passive learners, and rotely memorize irrelevant as well as relevant information. However, not everyone embraces the constructivist view. Some traditional educators believe that the teacher should direct and control students' learning more than the constructivist view implies. They also believe that constructivists often don't focus enough on basic academic tasks or have sufficiently high expectations for children's achievement. Some experts in educational psychology believe that you can be an effective teacher whether you follow the current trend in educational reform and teach more from a constructivist perspective or you adopt a more traditional direct-instruction approach. As you will see in the rest of our journey through evaluating what makes a teacher effective, many other domains and issues are involved.

CHARACTERISTICS OF EFFECTIVE TEACHERS
Characteristics
1. Have a sense of humour
2. Make the class interesting
3. Have knowledge of their subjects
4. Explain things clearly
5. Spend time to help students
6. Are fair to their students
7. Treat students like adults
8. Relate well to students
9. Are considerate of students' feelings
10. Don't show favouritism toward students

CHARACTERISTICS OF INEFFECTIVE TEACHERS
Characteristics
1. Are dull/have a boring class
2. Don't explain things clearly
3. Show favouritism toward students
4. Have a poor attitude
5. Expect too much from students
6. Don't relate to students
7. Give too much homework
8. Are too strict
9. Don't give help/individual attention
10. Lack control

FIGURE 1.1   **Students' Images of Effective and Ineffective Teachers**

Goal-Setting and Instructional Planning Skills   Whether constructivist or more traditional, effective teachers don't just go in the classroom and "wing it." They set high goals for their teaching and develop organized plans for reaching those goals. They also develop specific criteria for success. They spend considerable time in instructional planning, organizing their lessons to maximize students' learning. As they plan, effective teachers reflect and think about how they can make learning both challenging and interesting.

Classroom-Management Skills   An important aspect of being an effective teacher is being able to keep the class as a whole working together and oriented toward classroom tasks (Borko & Putnam, 1996). Effective teachers establish and maintain an environment in which learning can occur. To create this optimal learning environment, teachers need a repertoire of strategies for establishing rules and procedures, organizing groups, monitoring and pacing classroom activities, and handling misbehaviour (Evertson, Emmer, & Worsham, 2000; Freiberg, 1999; Weinstein, 1997).

Motivational Skills   Effective teachers have good strategies for helping students become self-motivated to learn (Boekaerts, Pintrich, & Zeidner, 2000). Educational psychologists increasingly believe that this is best accomplished by providing real-world learning

opportunities that are of optimal difficulty and novelty for each student (Brophy, 1998). Effective teachers know that students are motivated when they can make choices that are in line with their personal interests. Such teachers give them the opportunity to think creatively and deeply about projects (Runco, 1999).

Communication Skills   Also indispensable to teaching are skills in speaking, listening, overcoming barriers to verbal communication, tuning in to students' nonverbal communication, and constructively resolving conflicts. Communication skills are critical not only in teaching students, but also in interacting effectively with parents. Effective teachers use good communication skills when they talk "with" rather than "to" students, parents, administrators, and others; keep criticism at a minimum; and have an assertive rather than aggressive, manipulative, or passive communication style (Alberti & Emmons, 1995; Evertson et al., 2000). And effective teachers work to improve students' communication skills as well. This is especially important because communication skills have been rated as the skills most sought by today's employers (Collins, 1996).

Working Effectively with Students from Culturally Diverse Backgrounds   In today's world of increasing intercultural contact, effective teachers are knowledgeable about people from different cultural backgrounds and are sensitive to their needs (Sadker & Sadker, 2000; Spring, 2000; Wilson, 1999). Effective teachers encourage students to have positive personal contact with others and think of ways to create such settings. They guide students in thinking critically about culture and ethnicity issues, and they forestall or reduce bias, cultivate acceptance, and serve as cultural mediators (Banks & Banks, 1997).

Technological Skills   Technology itself does not necessarily improve students' ability to learn. Technology, however, does alter the environment within which learning takes place. Marshall McLuhan (1964) explained that "It is the framework itself that changes with technology, and not just the picture within the frame." A combination of five conditions is necessary to create learning environments that adequately support students' learning with technology. The first condition is vision and support from educational

It is more important to be ingenious than to be a genius.

Pierre Elliott Trudeau
Former Canadian Prime Minister,
20th Century

As you know more you understand less.

Lao Tzu
Chinese Philosopher, 6th Century B.C.

What are some important aspects of professional knowledge and skills that make up effective teaching?

leaders. The second condition includes clear educational goals, content standards, and curriculum resources. Access to technology is the third condition. The fourth condition includes time, support, and ongoing assessment of the effectiveness of the technology for teaching and learning. This latter condition is based on the 1999 report *Preparing to Implement Learner Outcomes in Technology: Best Practices for Alberta School Jurisdictions.* Finally, the fifth condition is a constructivist focus (Couture, 1997). Each of these conditions is necessary but insufficient in and of itself for increasing teacher and student use of new technologies. The glue that binds these conditions together and makes the parts work as a whole is teachers—teachers who are skilled in the use of technology for teaching and learning, and who integrate information and communication technology appropriately into classroom practice.

Effective teachers know how to use and teach students to use computers for discovery and writing, can evaluate the effectiveness of instructional games and computer simulations, know how to use and teach students to use computer-mediated communication resources such as the Internet, and are knowledgeable about various assistive devices to support the learning of students with exceptionalities.

In the United States, the International Society for Technology in Education (ISTE) established the National Educational Technology Standards (NETS) in 1999. In Canada, a national protocol to enhance the sharing and use of online educational material, called the Canadian Core Learning Resource Metadata Protocol (CanCore), was started in 2001 to provide a standard for describing all multimedia educational objectives. A national education technology consortium of university, government, and industry developed the protocol (see **www.cancore.ca**).

The ISTE and CanCore standards provide a framework for defining:

- what students should know about and be able to do with technology at various stages throughout their academic lives
- what educators need to know about how to use technology effectively and appropriately throughout the curriculum
- what systems, access, staff development, and support services are needed to work with technology in education
- what assessment and evaluation strategies are best suited to monitoring student progress and technological effectiveness in teaching and learning.

Commitment   Being an effective teacher also requires commitment. This includes being motivated, having a good attitude, and caring about students.

Beginning teachers often report that the investment of time and effort needed to be an effective teacher is huge. Some teachers, even experienced ones, report that they have "no life" from September to June. Even putting in hours on evenings and weekends, in addition to all of the hours spent in the classroom, might still not be enough to get everything done.

In the face of these demands, it is easy to become frustrated. Commitment and motivation help get effective teachers through the tough and frustrating moments of teaching. Effective teachers also have confidence in their own self-efficacy and don't let negative emotions diminish their motivation.

In any job it is easy to get into a rut and develop a negative attitude. Initial enthusiasm can turn into boredom. Each day, effective teachers bring a positive attitude and enthusiasm to the classroom. These qualities are contagious and help make the classroom a place where students want to be.

Effective teachers also have a caring concern for their students, often referring to them as "my students." They really want to be with the students and are dedicated to helping them learn. Effective teachers do what they have to do to meaningfully engage students in learning, even if it means spending extra time or resources. Although effective teachers are caring, they keep their role as a teacher distinct from student roles. Finally, besides having a caring concern for their students, effective teachers look for ways to help their students consider each other's feelings and care about each other.

Schools and Communities

Information and communication technology is helping children learn more effectively in school and it is also helping open schools up to communities. In most parts of Canada, students and parents can communicate with teachers and administrators through e-mail. Teachers can post students' homework assignments and inform parents of upcoming school events on Web pages. Some schools even provide students with take-home laptop or personal hand-held computers.

SchoolNet, a federal government initiative in partnership with the provincial and territorial governments, the educational community, and the private sector, helped connect Canadian libraries and schools to the Internet. By 1999, Canada was the first country in the world to have all of its public libraries and schools, including First Nations schools, on the Net; as of May 2000, there were a half-million networked computers in Canadian classrooms. SchoolNet's current focus is on creating more and better e-learning content for teachers and students. One such project, the Grass-Roots Program, is designed to promote and facilitate the effective integration and use of information and communications technologies (ICT) in the classroom, as well as building unique and relevant Canadian content on the Internet. The Profiling Canada Project, co-sponsored with Statistics Canada, invites schools to develop an electronic portrait of Canada and Canadians based on data available through Statistics Canada. Students use text and images to emphasize relationships or patterns in data that depict the development of their regions and local communities (see **www.statcan.ca/english/kits/grassroots/grass1.htm**).

Professional Growth   Effective teachers develop a positive identity, seek advice from experienced teachers, maintain their own learning, and build up good resources and supports.

Developing a Positive Identity   Your identity is the whole of you, a composite of many pieces. One of life's most important tasks is to integrate the pieces into a meaningful and positive self-portrait (Deaux, 1999; Novak & Purkey, 2001). Fortunately, teaching as a career is gaining more respect. The Ontario Institute for Studies in Education's 2001 public opinion survey of public attitudes and opinions related to educational policy and preferences reported that, while general satisfaction with schools is now at a low point, there is more satisfaction with teachers' performances. The report suggests that support for increased funding of public education is now higher than ever before. Today most teachers see a positive identity in their profession, but there is also an increasing sense of anxiety and stress associated with increased public demands on, and expectations of, teachers (Schaefer, 2001).

Your identity includes more than your role as a teacher. It also includes your personal life, lifestyle, relationships, physical health, mental health, and personal interests. Seek to integrate these various pieces of your life into a positive, meaningful identity of who you are. Also keep in mind that although your identity will stay with you for the rest of your life, it won't be cast in stone. Through the rest of your career as an educator, you will change and grow as the world around you changes, especially if you invite yourself personally and professionally to explore new opportunities and challenges (Novak & Purkey, 2001).

Seek Advice from Competent Experienced Teachers   Competent experienced teachers can be an especially valuable resource for beginning teachers—and for other experienced teachers as well. Increasingly, teachers engage in collaborative consultation in which people with diverse areas of expertise interact to promote competent instruction and provide effective services for students (Hewitt & Whittier, 1997).

A number of research studies have compared beginning teachers and experienced teachers (Berliner, 1988; Borko & Putnam, 1996; Calderhead, 1996; Webb et al., 1997; Leinhardt & Greeno, 1986; Scott, 1999). In general, experienced teachers are more likely than beginning teachers to:

- Have confidence in their decision-making and problem-solving strategies
- Have expertise in managing their classrooms
- Orchestrate smoothly running classrooms
- Engage in well-practised, virtually automatic routines
- Have extensive knowledge of instructional strategies
- Make deep interpretations of events.

However, researchers have found that too often both experienced and beginning teachers lack the rich and flexible understanding of subject matter that is required to teach in ways that are responsive to students' learning needs (Borko & Putnam, 1996). Indeed, it is important to recognize that not every experienced teacher is a good teacher. Some experienced teachers will say, "Forget everything you learned in school and watch what I do instead." This might or might not be a good idea for you. Many new strategies of teaching have been developed in recent years, especially from a constructivist perspective, so it is important to keep an open mind about whether an experienced teacher is giving you the best advice.

Never Stop Learning   At the start of this chapter we quoted Canadian astronaut Julie Payette's statement that education opens the door to the future. Payette also reminds us that

> The biggest hurdle to progress is the illusion of knowledge. One of the worst mistakes we can make as a people is to think that we know it all. To forget that there is always something more to learn, something new to discover. However far we think we have been, there is much further to go. And we owe it to ourselves and to our children to keep on exploring. For if one day we stop looking, asking, and learning, that day we will start regressing.

Your learning won't stop when you get your degree—learning is ongoing and life-long. Currently, there is much educational reform taking place, and reform is likely to continue into the foreseeable future. It is an exciting time to become a teacher because of the many new developments. Make a commitment to keep up to date about research and knowledge on effective teaching. This will include taking advantage of workshops, taking courses beyond your initial degree, reading educational journals and books, and seeking information from experts in various educational domains.

Teaching Strategies
For Effective Teaching

✔ Plan on wearing many different hats
  - have a sound knowledge of your subject matter
  - develop people, collaboration, and organization skills
✔ Put yourself in your students' shoes
  - think about how your students perceive you
  - model what you want your students to do
✔ Prepare for the future
  - reflect on your teaching practice
  - look for opportunities to grow personally and professionally
  - think about your students' futures

> You rarely achieve more than you expect.
>
> *Carol Grosse*
> *American Educator, 20th Century*

Build Up Good Resources and Supports   Don't think that you have to educate your students by yourself. It is especially important to develop good relationships with your students' parents or guardians and encourage them to be partners with you in educating their children. Throughout this book, we will highlight effective ways for you to do this. Developing good working relationships with your administrator and other teachers also can benefit your teaching. Consulting with experienced teachers can be especially effective. One good strategy is to ask a competent experienced teacher to serve as your mentor, someone you can go to for advice and guidance to help you become a more effective teacher.

Also examine other resources of the school system or community you might call on in teaching your students. A school system might have funds available for a teacher's aide or technology equipment. Get to know people in your community who might be willing to come to your class to share their expertise or to serve as mentors for students. Some businesses have mentoring programs for students. For example, Pratt & Whitney Canada, of Longueuil, Quebec, provides a variety of mentoring programs. One of these programs, called Jeunes Entrepreneurs, involves youth in schools across Canada who may be interested in careers in technology. The program has one mentor working with a team of three to four students. Hewlett-Packard is another example of a business that mentors students; HP hosts an online math and science mentoring program for students in Grades 5 to 12.

We have discussed many different characteristics of effective teaching, and we have explored some of the goals of educational psychology. A review of these ideas is presented in Summary Table 1.1.


```
                    Research in
              Educational Psychology

  Why Research                    Research
  Is Important                   Challenges

  The Scientific        Program  Evaluation,
  Research               Action Research,
  Approach              and the Teacher-as-
                             Researcher

        Research
        Methods
```

RESEARCH IN EDUCATIONAL PSYCHOLOGY

Research can be a valuable source of information about teaching. We will explore why research is important and how it is done, including how you can be a teacher-researcher.

Why Research Is Important

It sometimes is said that experience is the most important teacher. Your own experiences and those experiences that other teachers, administrators, and experts share with you will make you a better teacher. Research can also make you a better teacher (Charles, 1997; Fraenkel & Wallen, 2000).

We all get a great deal of knowledge from personal experience. We generalize from what we observe and frequently turn memorable encounters into lifetime "truths." But how valid are these conclusions? Sometimes we err in making these personal observations or misinterpret what we see and hear. Chances are, you can think of many situations in which you thought other people read you the wrong way, just as they might have felt that you misread them. And when we base information on personal experiences only, we aren't always totally objective because we sometimes make judgments that protect our ego and self-esteem (McMillan, 2000).

We get information not only from personal experiences, but also from authorities or experts. In your teaching career, you will hear many authorities and experts spell out a "best way" to educate students. But the authorities and experts don't always agree, do they? You might hear one expert one week tell you about a reading method that is absolutely the best, yet the next week hear another expert tout a different method. One experienced teacher might tell you to do one thing with your students, another experienced teacher might tell you to do the opposite. How can you tell which advice to believe? One way to clarify the situation is to look at research that has been conducted on the topic.

Through the Eyes of Teachers

Never Stop Learning

I have always believed that if you are not a good learner, you won't be a good teacher. We grow and develop as persons through learning. Throughout my teaching career, I have attended conferences and workshops in an effort to keep my teaching current, interesting, and relevant for my students and for myself. I believe that I am a model for my students. If I stop learning—so will they. That is one example that I don't want to set.

Christine Bernardo-Kusyj
Elementary-School Teacher
Ontario

SUMMARY TABLE 1.1
The Goals of Educational Psychology

What is the historical background of educational psychology?	• William James, John Dewey, E. L. Thorndike, James Baldwin, and Samuel Ralph Laycock were important pioneers in North American educational psychology. • Dewey's ideas include the child as active learner, education of the whole child, a focus on children's adaptation to the environment, and the view that all children deserve a competent education.
Is educational psychology an art or a science?	• Educational psychology involves elements of both art and science. • Opinion is split about how much of teaching should be based purely on science and how much of it is an art.
What is the nature of teaching?	• Teaching is multidimensional. It involves many different domains including cognitive/academic, social, affective, moral, and health. • Teaching involves uncertainty. It is difficult to predict what effect a given action will have on a student. Teachers, therefore, need a tolerance for uncertainty and unpredictability. • Teaching involves social and ethical matters. Educational equity involves academic, social, and ethical dimensions. Every classroom action, including routine decisions such as which student to call on, can advantage or disadvantage certain students. • Teaching involves acknowledging students' diverse abilities and backgrounds. Linguistic, cultural, racial, and ethnic diversity is increasingly a defining characteristic of the Canadian school system.
What is effective teaching?	• Some of the key characteristics of effective teachers include a sense of humour, making classes interesting, subject-matter knowledge, fairness, respect, consideration of and equal treatment for all students, and the ability to explain things clearly. Ineffective teachers tend to have boring classes, don't explain things clearly, and show favouritism toward some students. • Subject-matter competence, the use of effective instructional strategies, goal setting, planning, classroom management, motivation, and cultural sensitivity are some of the knowledges and skills required by members of the teaching profession. • Caring about students as individuals and learners, having a positive attitude about teaching, and self-motivation are key elements for teaching. • Effective teaching involves life-long learning and continuous professional growth. Developing a positive self-identity, seeking advice from competent and experienced teachers, and developing and maintaining a database of resources and supports are all part of professional growth in teaching.

The Scientific Research Approach

Some people have difficulty thinking of educational psychology as being a science in the same way that physics or biology is a science. Can a discipline that studies the best ways to help children learn, or the ways poverty affects their behaviour in the classroom, be equated with disciplines that examine how gravity works or how blood flows through the body?

Science is defined not by *what* it investigates but by *how* it investigates. Whether you investigate photosynthesis, butterflies, Saturn's moons, or why some students think creatively and others don't, it is the way you investigate that makes the approach scientific or not.

Educational psychologists take a skeptical, scientific attitude toward knowledge. When they hear a claim that a particular method is effective in helping students learn,

In a world as empirical as ours, a youngster who does not know what he is good at will not be sure what he is good for.

Edgar Z. Friedenberg
U.S. Educator and Sociologist,
Contemporary

www.mcgrawhill.ca/college/santrock

they want to know if the claim is based on good research. The science part of educational psychology seeks to sort fact from fancy by using particular strategies for obtaining information (Johnson & Christensen, 2000; Kennedy, 1999).

Scientific research *is objective, systematic, and testable. It reduces the likelihood that information will be based on personal beliefs, opinions, and feelings.* Scientific research is based on the **scientific method**, *an approach that can be used to discover accurate information. It includes these steps: conceptualize the problem, collect data, draw conclusions, and revise research conclusions and theory.*

Conceptualizing a problem involves identifying the problem, theorizing, and developing one or more hypotheses. For example, a team of researchers decides that it wants to study ways to improve the achievement of students from impoverished backgrounds. The researchers have *identified a problem*, which at a general level might not seem like a difficult task. However, as part of the first step, they also must go beyond the general description of the problem by isolating, analyzing, narrowing, and focusing more specifically on what aspect of it they hope to study. Perhaps the researchers decide to discover whether mentoring that involves sustained support, guidance, and concrete assistance to students from impoverished backgrounds can improve their academic performance. At this point, even more narrowing and focusing needs to take place. What specific strategies do they want the mentors to use? How often will the mentors see the students? How long will the mentoring program last? What aspects of the students' achievement do they want to assess?

As researchers formulate a problem to study, they often *draw on theories* and *develop hypotheses.* A **theory** *is an interrelated, coherent set of ideas that helps to explain and make predictions.* A theory contains **hypotheses**, *which are specific assumptions and predictions that can be tested to determine their accuracy.* For example, a theory about mentoring might attempt to explain and predict why sustained support, guidance, and concrete experience should make a difference in the lives of students from impoverished backgrounds. The theory might focus on students' opportunities to model the behaviour and strategies of mentors, or it might focus on the effects of nurturing, which might be missing in the students' lives.

The next step is to *collect information (data).* In the study of mentoring, the researchers might decide to conduct the mentoring program for six months. Their data might consist of classroom observations, teachers' ratings, and achievement tests given to the mentored students before the mentoring began and at the end of six months of mentoring.

Once data have been collected, educational psychologists *use statistical procedures* to understand the meaning of their quantitative data. Then they try to *draw conclusions.* In the study of mentoring, statistics would help the researchers determine whether their observations are due to chance. After data have been collected, educational psychologists compare their findings with what others have discovered about the same issue.

The final step in the scientific method is *revising research conclusions and theory.* Educational psychologists have generated a number of theories about the best ways for students to learn. Over time, some theories have been discarded and others have been revised. This text presents a number of theories related to educational psychology, along with their support and implications. Figure 1.2 illustrates the steps in the scientific method applied to our study of mentoring.

Quantitative and Qualitative Methods in Research   The two philosophies that dominate scientific educational research are the *quantitative* and *qualitative* approaches. Educational research tends to be a blend of both quantitative and qualitative research methodologies. While **quantitative research methods** *are primarily experimental in nature and concerned with the causal relationships between dependent and independent variables,* **qualitative research methods** *are primarily non-experimental and concerned with identifying and describing themes underlying human experience or the experience of a particular phenomenon.*

Quantitative researchers tend to argue that both the natural and social sciences should focus on testable and confirmable theories that explain phenomena by showing
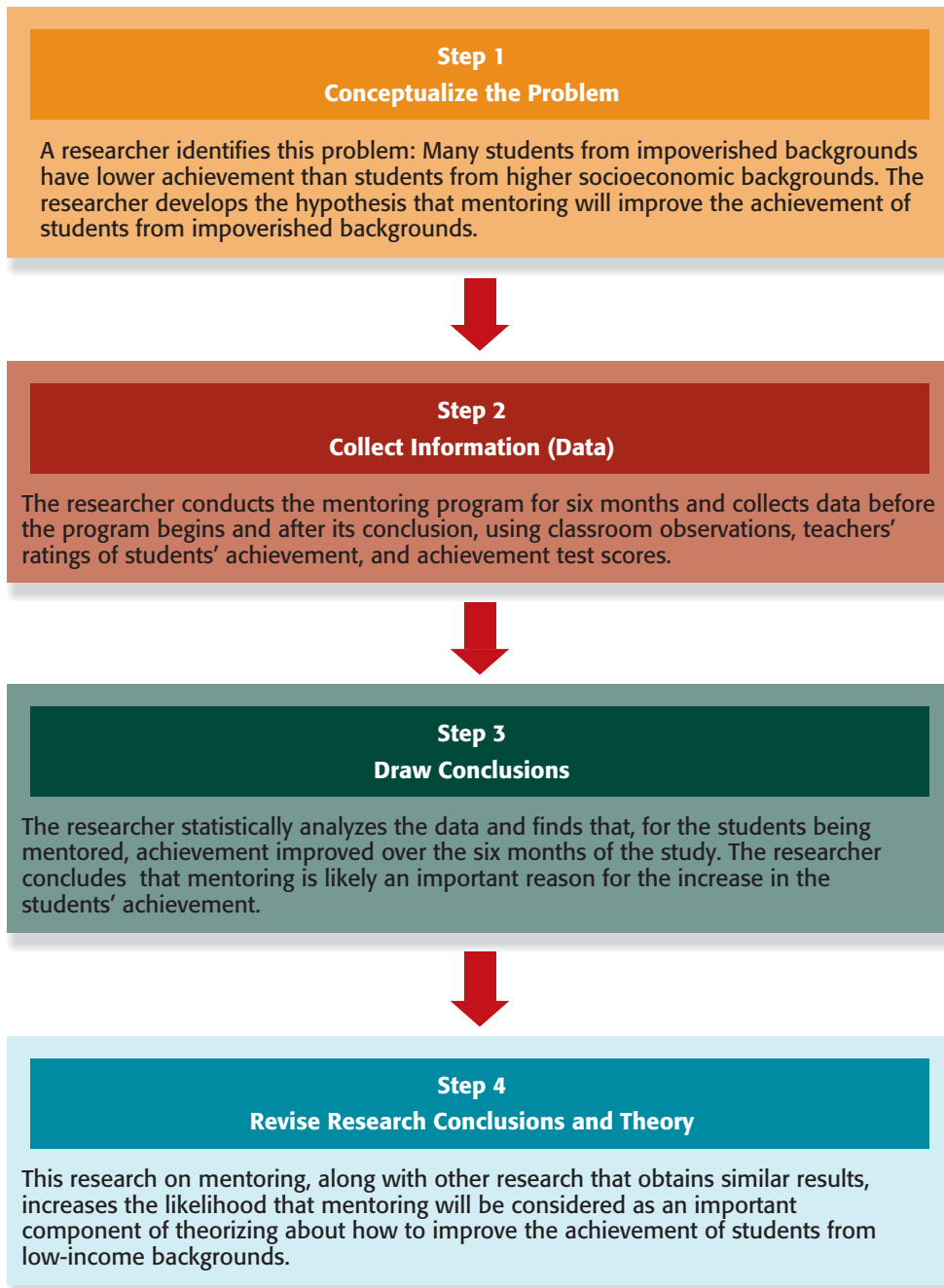
Science refines everyday thinking.

Albert Einstein
American Physicist,
20th Century

Truth is arrived at by the pains–taking elimination of the untrue.

Sir Arthur Conan Doyle
English Physician and Novelist
20th Century

Step 1

Conceptualize the Problem

A researcher identifies this problem: Many students from impoverished backgrounds have lower achievement than students from higher socioeconomic backgrounds. The researcher develops the hypothesis that mentoring will improve the achievement of students from impoverished backgrounds.

Step 2

Collect Information (Data)

The researcher conducts the mentoring program for six months and collects data before the program begins and after its conclusion, using classroom observations, teachers' ratings of students' achievement, and achievement test scores.

Step 3

Draw Conclusions

The researcher statistically analyzes the data and finds that, for the students being mentored, achievement improved over the six months of the study. The researcher concludes that mentoring is likely an important reason for the increase in the students' achievement.

Step 4

Revise Research Conclusions and Theory

This research on mentoring, along with other research that obtains similar results, increases the likelihood that mentoring will be considered as an important component of theorizing about how to improve the achievement of students from low-income backgrounds.

how they are derived from theoretical assumptions. Quantitative research methods, therefore, view social reality in similar terms to physical reality and attempt to tightly control the variable being studied to see how other variables are influenced. Qualitative researchers, on the other hand, tend to dislike the idea that social sciences (such as education) can be studied with the same methods as the natural or physical sciences and believe that human behaviour is always tied to the context in which it occurs. Thus behaviour should be studied in context rather than being manipulated.

In educational psychology, qualitative methods generally refer to non-experimental approaches that are used to describe or predict behaviour but do not always help identify the causes or underlying reasons for a particular behaviour. Qualitative methods can be used when an experiment isn't practical (i.e., for cost or time considerations), or justified—for example, when a predictor variable such as gender or age cannot be manipulated,

or when it is ethically inappropriate to conduct an experiment. Qualitative methods are also approaches to research that most people are familiar with in daily living (e.g., making observations and asking questions).

Quantitative and qualitative research methods are not exclusionary, and often borrow elements or techniques from each other. For example, program-evaluation research, action research, and teacher-as-researcher methods are forms of mixed educational research design that use elements of both quantitative and qualitative methodologies. In the following section we will look at some of the experimental and non-experimental methods that are currently used in educational research.

Research Methods

When educational psychology researchers want to find out, for example, whether watching a lot of TV detracts from student learning, eating a nutritious breakfast improves alertness in class, or getting more recess time decreases absenteeism, they can choose from many methods. We will discuss these methods separately, but recognize that in many instances more than one is used in a single study.

Observation   Sherlock Holmes chided his assistant, Watson, "You see but you do not observe." We look at things all the time. However, casually watching two students interacting is not the same as the type of observation used in scientific studies. Scientific observation is highly systematic. It requires knowing what you are looking for, conducting observations in an unbiased manner, accurately recording and categorizing what you see, and effectively communicating your observations (Cone, 1999).

A common way to record observations is to write them down, often using shorthand or symbols. In addition, tape recorders, video cameras, special coding sheets, one-way mirrors, and computers increasingly are being used to make observations more efficient.

Observations can be made in laboratories or in naturalistic settings. A **laboratory** *is a controlled setting from which many of the complex factors of the real world have been removed*. Some educational psychologists conduct research in laboratories at the universities where they work and teach. Although laboratories often help researchers gain more control in their studies, they have been criticized as being artificial. In **naturalistic observation**, *behaviour is observed out in the real world*. Educational psychologists conduct naturalistic observations of children in classrooms, at museums, on playgrounds, in homes, in neighbourhoods, and in other settings.

Interviews and Questionnaires   Sometimes the quickest and best way to get information about students and teachers is to ask them for it. Educational psychologists use interviews and questionnaires (surveys) to find out about students' and teachers' experiences, beliefs, and feelings. Most interviews take place face-to-face, although they can be done in other ways, such as over the phone or the Internet. Questionnaires are usually given to individuals in printed form. They can be filled out in many ways, such as in person, by mail, or via the Internet.

Good interviews and surveys involve concrete, specific, and unambiguous questions and some means of checking the authenticity of the respondents' replies. However, interviews and surveys are not without problems. One crucial limitation is that many individuals give socially desirable answers, responding in a way they think is most socially acceptable and desirable rather than how they truly think or feel. For example, some teachers, when interviewed or asked to fill out a questionnaire about their teaching practices, hesitate to admit honestly how frequently they chide or criticize their students. Skilled interviewing techniques and questions that increase forthright responses are crucial to obtaining accurate information. Another problem with interviews and surveys is that the respondents sometimes simply lie.

Standardized Tests   **Standardized tests** *are commercially prepared tests that assess students' performance in different domains*. Many standardized tests allow a student's per-

formance to be compared with the performance of other students at the same age or grade level, in many cases on a national basis (Aiken, 2000). Students might take a number of standardized tests, including tests that assess their intelligence, achievement, personality, career interests, and other skills. These tests could be for a variety of purposes, including providing outcome measures for research studies, information that helps psychologists and educators make decisions about an individual student, and comparisons of students' performance across schools, provinces, and countries. Chapter 13 discusses standardized testing in detail.

Case Studies   A **case study** *is an in-depth look at an individual.* Case studies often are used when unique circumstances in a person's life cannot be duplicated, for either practical or ethical reasons. For example, consider the case study of Brandi Binder (Nash, 1997). She developed such severe epilepsy that surgeons had to remove the right side of her brain's cerebral cortex when she was six years old. Brandi lost virtually all control over muscles on the left side of her body, the side controlled by the right side of her brain. Yet at age 17, after years of therapy ranging from leg lifts to mathematics and music training, Brandi is an A student. She loves music and art, which usually are associated with the right side of the brain. Her recuperation is not 100 percent—for example, she has not regained the use of her left arm— but her case study shows that if there is a way to compensate, the human brain will find it. Brandi's remarkable recovery also provides evidence against the stereotype that the left side (hemisphere) of the brain is solely the source of logical thinking and the right hemisphere exclusively the source of creativity. Brains are not that neatly split in terms of most functioning, as Brandi's case illustrates.

Although case studies provide dramatic, in-depth portrayals of people's lives, we need to exercise caution when interpreting them. The subject of a case study is unique, with a genetic makeup and set of experiences that no one else shares. For these reasons, the findings might not generalize to other people.

Brandi Binder is evidence of the brain's hemispheric flexibility and resilience. Despite having had the right side of her cortex removed because of a severe case of epilepsy, Brandi engages in many activities often portrayed as only "right-brain" activities. She loves music and art, and is shown here working on one of her paintings.

Correlational Research   In **correlational research**, *the goal is to describe the strength of the relation between two or more events or characteristics.* Correlational research is useful because the more strongly two events are correlated (related or associated), the more effectively we can predict one from the other. For example, if researchers find that low-involved, permissive teaching is correlated with a student's lack of self-control, it suggests that low-involved, permissive teaching might be one source of the lack of self-control.

However, a caution is in order. *Correlation by itself does not equal causation.* The correlational finding just mentioned does not mean that permissive teaching necessarily causes low student self-control. It could mean that, but it also could mean that the students' lack of self-control caused the teachers to throw up their arms in despair and give up trying to control the out-of-control class. It also could be that other factors, such as heredity, poverty, or inadequate parenting, caused the correlation between permissive teaching and low student self-control. Figure 1.3 illustrates these possible interpretations of correlational data.
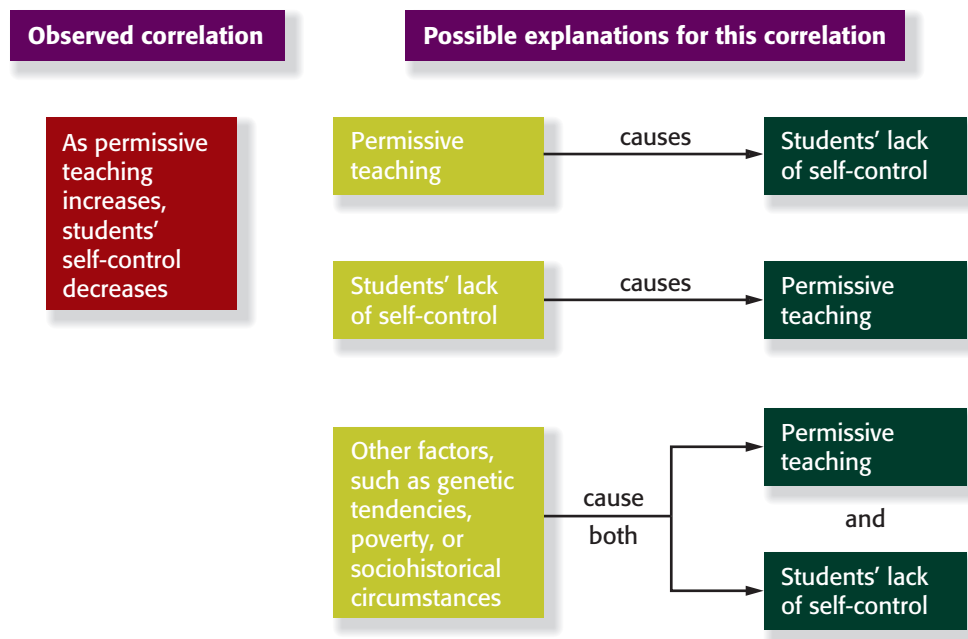
Experimental Research   **Experimental research** *allows educational psychologists to determine the causes of behaviour.* Educational psychologists accomplish this task by performing an **experiment**, *a carefully regulated procedure in which one or more of the factors believed to influence the behaviour being studied is manipulated and all other factors are held constant.* If the behaviour under study changes when a factor is manipulated, we say that the manipulated factor causes the behaviour to change. *Cause* is the event being

FIGURE 1.3   Possible Explanations of Correlational Data

An observed correlation between two events does not justify the conclusion that the first event caused the second event. Other possibilities are that the second event caused the first event or that a third, undetermined event causes the correlation between the first two events.

Observed correlation	Possible explanations for this correlation

manipulated. *Effect* is the behaviour that changes because of the manipulation. Experimental research is the only truly reliable method of establishing cause and effect. Because correlational research does not involve manipulation of factors, it is not a dependable way to isolate cause.

Experiments involve at least one independent variable and one dependent variable. The **independent variable** *is the manipulated, influential, experimental factor.* The label *independent* indicates that this variable can be changed independently of any other factors. For example, suppose we want to design an experiment to study the effects of peer tutoring on student achievement. In this example, the amount and type of peer tutoring could be an independent variable. The **dependent variable** *is the factor that is measured in an experiment.* It can change as the independent variable is manipulated. The label dependent is used because the values of this variable depend on what happens to the participants in the experiment as the independent variable is manipulated. In the peer-tutoring study, achievement is the dependent variable. This might be assessed in a number of ways. Let's say in this study it is measured by scores on a nationally standardized achievement test.

In experiments, the independent variable consists of differing experiences that are given to one or more experimental groups and one or more control groups. An **experimental group** *is a group whose experience is manipulated.* A **control group** *is a comparison group that is treated in every way like the experimental group except for the manipulated factor.* The control group serves as the baseline against which the effects of the manipulated condition can be compared. In the peer tutoring study, we need to have one group of students who get peer tutoring (experimental group) and one group of students who don't (control group).

Another important principle of experimental research is **random assignment**: *researchers assign participants to experimental and control groups by chance.* This practice reduces the likelihood that the experiment's results will be due to any pre-existing differences between the groups. In our study of peer tutoring, random assignment greatly reduces the probability that the two groups will differ on such factors as age, family status, initial achievement, intelligence, personality, health, alertness, and so on.

To summarize the experimental study of peer tutoring and student achievement, each student is randomly assigned to one of two groups: one group (the experimental group) is given peer tutoring; the other (the control group) is not. The independent variable consists of the differing experiences that the experimental and control groups
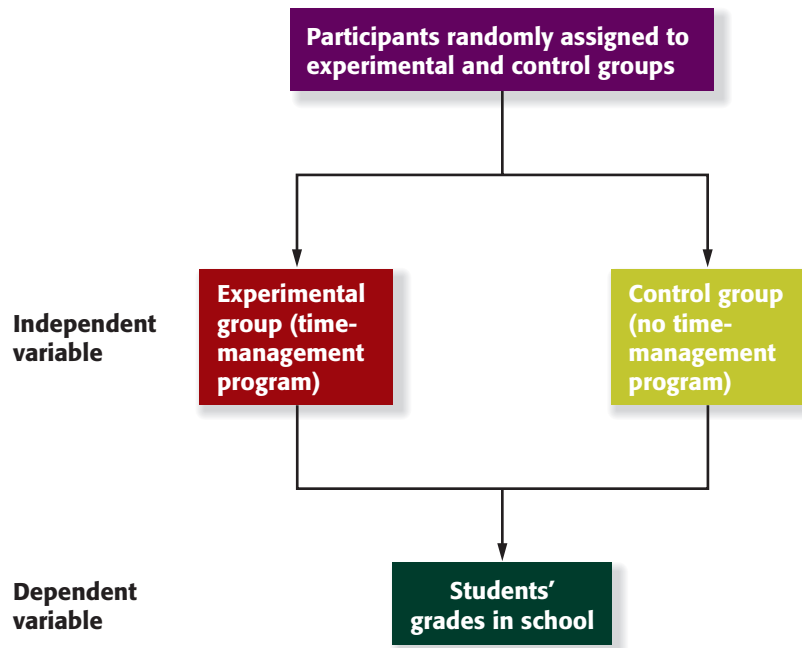
```
┌─────────────────────────────────────┐
│ Participants randomly assigned to   │
│ experimental and control groups     │
└─────────────────────────────────────┘
```

Independent variable

Experimental group (time-management program)   **Control group (no time-management program)**

Dependent variable

Students' grades in school

receive. After the peer tutoring is completed, the students are given a nationally standardized achievement test (dependent variable). For an illustration of the experimental research method applied to a different problem—whether a time-management program can improve students' grades—see Figure 1.4.

Time Span of Research   Another research decision involves the time span of the research. We have several options—we can study groups of individuals all at one time or study the same individuals over time.

 Cross-sectional research *involves studying groups of people all at one time*. For example, a researcher might be interested in studying the self-esteem of students in Grades 4, 6, and 8. In a cross-sectional study, the students' self-esteem would be assessed at one time, using groups of children in Grades 4, 6, and 8. The cross-sectional study's main advantage is that the researcher does not have to wait for the students to grow older. However, this approach provides no information about the stability of individual students' self-esteem, or how it might change over time.

 Longitudinal research *involves studying the same individuals over a period of time, usually several years or more*. In a longitudinal research study of self-esteem, the researcher might examine the self-esteem of a group of Grade 4 students, then assess the same students' self-esteem again in Grade 6, and then again in Grade 8. One of the great values of longitudinal research is that we can evaluate how individual children change as they get older. However, because longitudinal research is time-consuming and costly, most research is cross-sectional.

 At this point we have discussed a number of ideas about why research is important, the scientific research approach, and research methods. A review of these ideas is presented in Summary Table 1.2.

Program Evaluation, Action Research, and the Teacher-as-Researcher

In discussing research methods so far, we have referred mainly to methods that are used to improve our knowledge and understanding of general educational practices. The same methods also can be applied to research whose aim is more specific, such as determining how well a particular educational strategy or program is working (Graziano & Raulin, 2000). This more narrowly targeted work often includes program-evaluation research, action research, and the teacher-as-researcher.

The real voyage of discovery consists not in seeking new landscapes, but in having new eyes.

Marcel Proust
French Author, 20th Century

SUMMARY TABLE 1.2
Why Research *Is* Important, the Scientific Research Approach, and Research Methods

Why is research important for teachers?	• Teachers can improve their practice by reflecting on personal experiences and listening to advice from experts. • Research determines what strategies to keep and what to avoid. • Research avoids errors in judgment based on personal experience.
What is the scientific research approach?	• Scientific research is objective, systematic, and testable and reduces the probability that information will be based on feelings, opinions, or personal beliefs. • The scientific method involves conceptualizing the problem, collecting data, drawing conclusions, and revising research conclusions and theory. • Theories are coherent sets of ideas and hypotheses that help to explain events and to make predictions.
What are some research methods used by teachers?	• Quantitative methods are primarily experimental and focus on causation. • Qualitative methods are non-experimental (i.e., observation, case study, action research); they are concerned with describing underlying themes or experiences of particular phenomena, but do not always help identify causes. • Observation involves systematic study of behaviours or events in either a lab or a natural setting. • Interviews are a data-gathering method; they are usually conducted face-to-face but can also be done by phone or by video conference. • Case studies provide an in-depth look at an individual or event in a natural setting. Generalizing from case studies can be problematic. • Correlational research describes the strength of the relationship between two or more events or characteristics. • Experiments involve examining the influence of at least one independent variable (the manipulated, influential, or experimental factor) on one or more dependent variables (the measured factor). Experiments also involve random assignment of participants to experimental groups (the ones receiving the manipulation) and control groups (comparison groups treated identically except for the manipulated factor). • The time span of research is either cross-sectional, which studies various groups all at one time, or longitudinal, which studies the same group over time.

Program-Evaluation Research   The primary purpose of **program-evaluation research** in education is to examine a particular program or programs to establish effectiveness in meeting stated educational goals or objectives (Lam, 1995). The information or feedback gathered in program-evaluation research can be used to help improve an educational program, as well as adding to the general knowledge base about such programs or research methods. Program-evaluation research often focuses on a specific location or type of program. Because it often is directed at answering a question about a specific school or school system, the results of program-evaluation research are not intended to be generalized to other settings (Charles, 1997). A program-evaluation researcher might ask questions like these:

- Has a gifted program that was instituted two years ago had positive effects on students' creative thinking and academic achievement?
- Has a technology program that has been in place for one year improved students' attitudes toward school?
- Which of two reading programs being used in this school system has improved students' reading skills the most?

Action Research   **Action research** *is used to solve a specific classroom or school problem, improve teaching and other educational strategies, or make a decision at a specific location* (McMillan, 2000; Newman, 2000). The goal of action research is to improve educational practices immediately in one or two classrooms, at one school, or at several schools. Action research is carried out by teachers and administrators rather than educational-psychology researchers. However, the practitioners might follow many of the guidelines of scientific research that we described earlier, such as trying to make the research and observations as systematic as possible to avoid bias and misinterpretation (Mills, 2000). Action research can be carried out by individual teachers in their classrooms, in collaborative action groups involving volunteers, and school-wide through coordinated administration and teacher efforts (Calhoun, E.F., 1993; Calhoun, E.M., 1994). Action research serves to improve the conditions of a school; it also helps teachers in the early detection of problems, teaching problem-solving skills, and gauging the effectiveness of their teaching methods.

Teacher-as-Researcher   The concept of **teacher-as-researcher**, *or what is increasingly referred to as "teacher-researcher," suggests that teachers can conduct their own systematic studies to improve their teaching practice.* This is an important outgrowth of action research. Some educational experts believe that the most effective teachers routinely ask questions and monitor problems to be solved, collect data, interpret it, and share their conclusions with other teachers (Lytle & Cochran-Smith, 1990; Flake et al., 1995; Russell, 2000; Squire, 1998).

What methods can a teacher-as-researcher use to obtain information about students?

Through the Eyes of Teachers

Using Action Research to Change Classroom Practice

The best action-research project that I ever did involved asking my Grade 7 class to describe their ideal teacher. There was a general consensus that "good" teachers genuinely care about their students and display an interest in their well-being. They said that they learned best when their teachers expressed interest in them as individuals. The project made me curious about my students' perceptions of me as their teacher. I believed that I was a caring teacher, but was curious about whether I demonstrated this care in the classroom. I started an action-research project by asking my class, "How do you know when a teacher cares about you?" Students' responses included, "When the teacher smiles at you and calls you by name," "When the teacher bugs you about getting your homework done," and "When the teacher understands that you have a family or personal problem."

The next step was to try to determine how my students interpreted my behaviours as their teacher. With some fear and trepidation, I videotaped myself teaching. The experience was an enlightening one. I saw that I was very strict and formal, seldom smiling or showing my students that I cared about them. I scared myself to the point where I realized that I had to "lighten up" in class. I now monitor my classroom behaviours by remembering what I saw on that videotape. I smile more, my students smile more, and my classroom is the caring and happy place that I want it to be. My little action-research project helped me create balance between having control and expressing care—it helped me become a better teacher.

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To obtain information, the teacher-researcher uses methods such as systematic observation, interviews, and case studies. One widely used technique is the *clinical interview*, in which the teacher makes the student feel comfortable, shares beliefs and expectations, and asks questions in a nonthreatening manner. Before conducting a clinical interview with a student, the teacher usually will put together a targeted set of questions to ask. Clinical interviews not only can help you obtain information about a particular issue or problem, but also can provide you with a sense of how children think and feel.

Another popular teacher-as-researcher method is **participant observation**, *in which the observer-researcher is actively involved as a participant in the activity or setting* (McMillan, 2000). The participant-observer often will observe for a while and then take notes on what he or she has seen. The observer usually makes these observations and writes down notes over a period of days, weeks, or months and looks for patterns in the observations. For example, to study a student who is doing poorly in the class without apparent reason, the teacher might develop a plan to observe the student from time to time and record observations of the student's behaviour and what is going on in the classroom at the time.

In addition to participant observation, the teacher might conduct several clinical interviews with the student, discuss the child's situation with the child's parents, and consult with a school psychologist about the child's behaviour. Based on this work as teacher-researcher, the teacher will be able to create an intervention strategy that considerably improves the student's behaviour.

Thus, learning about educational research methods not only can help you understand the research that educational psychologists conduct, but also has another practical benefit. The more knowledge you have about research in educational psychology, the more effective you will be in the increasingly popular teacher-researcher role (Gay & Airasian, 2000).

Research Challenges

Research in educational psychology poses a number of challenges. Some of the challenges involve the pursuit of knowledge itself. Others involve the effects of research on participants. Still others relate to better understanding of the information derived from research studies.

Ethics   Educational psychologists must exercise considerable caution to ensure the well-being of children participating in a research study. Most universities and school systems have review boards that evaluate whether the research is ethical. Before research is conducted in a school system, an administrator or administrative committee evaluates the research plan and decides whether the research can potentially benefit the system.

The code of ethics adopted by the Canadian Psychological Association (CPA) instructs researchers to protect participants from mental and physical harm. The Medical Research Council of Canada, the Natural Science and Engineering Research Council of Canada, and the Social Sciences and Humanities Research Council of Canada prepared a joint report establishing the policy standard for research on human participants (Tri-Council Policy Statement, 1998). Essentially, the policy states that the best interests of the participants must always be foremost in researchers' minds. All participants who are old

enough to do so must give their informed consent to participate. If they are not old enough, parental or guardian consent must be obtained. When children and adolescents are studied, parental or guardian consent is almost always obtained. Informed consent means that the participants (and/or their parents or legal guardians) have been told what their participation will entail and any risks that might be involved. For example, if researchers want to study the effects of conflict in divorced families on learning and achievement, the participants should be informed that in some instances discussion of a family's experiences might improve family relationships, but in other cases might raise unwanted family stress. After informed consent is given, participants retain the right to withdraw at any time (Bersoff, 1999).

Because students are vulnerable and usually lack power and control when facing adults, educators always should strive to make their research encounters positive and supportive experiences for each student. Even if the family gives permission for a student to participate in a research study, if the student doesn't want to participate that desire should be respected.

Gender   Traditionally, science has been presented as nonbiased and value-free. However, many experts on gender believe that much educational and other research has been gender-biased (Anselmi, 1998; Chalmers, 1995; Doyle & Paludi, 1998). Educational researchers argue that for too long the female experience was subsumed under the male experience (Tetreault, 1997). For example, conclusions about females have been routinely drawn based on research done only with males. Similarly, with regard to socioeconomic bias, conclusions have been drawn about all males and all females from studies that do not include participants from all income backgrounds.

Ethnicity and Culture   We need to include more students from ethnic minority backgrounds in our research on educational psychology (Graham, 1992; Lee, 1992). Historically, ethnic minority children essentially have been ignored in research or simply viewed as variations from the norm or average. Their developmental and educational problems have been viewed as "confounds" or "noise" in data, and researchers have deliberately excluded these students from the samples they have selected to study (Ryan-Finn, Cauce, & Grove, 1995). Because ethnic-minority students have been excluded from research for so long, there likely is more variation in their lives than research studies have indicated in the past (Stevenson, 1995).

One research challenge involves ensuring that educational research does not involve gender bias. What are some of the questions scholars have raised about gender bias in educational research?

Another research challenge focuses on children from ethnic minority backgrounds. What are some of the ways research has been characterized by ethnic bias? How can this bias be reduced or eliminated?

Researchers also have tended to practise "ethnic gloss" when they select and describe ethnic minority groups (Trimble, 2000; Trimble, 1989). **Ethnic gloss** *means using an ethnic label (e.g., Asian, Italo-Canadian, Latino, or Native Canadian) in a superficial way that makes an ethnic group seem more homogeneous than it really is.* For example, a researcher might describe a sample simply as, "20 Asians, 20 Italo-Canadians, and 20 Native Canadians," when a more precise description of the groups would need to specify that "of the 20 Asian participants, 5 were Canadian-born Koreans from low-income families living in Vancouver; 10 were from homes where Korean is the dominant language spoken; and 10 were from homes where English is now the main spoken language. Five described themselves as Korean, 5 as Korean-Canadian, and 10 as Canadian." Ethnic gloss can cause researchers to obtain samples of ethnic groups that either are not representative or that conceal the group's diversity, which can lead to overgeneralization and stereotyping.

Also, historically, when researchers have studied individuals from ethnic minority groups, they have focused on their problems. It is important to study the problems such as poverty that ethnic minority groups may face, but it also is important to examine their strengths, such as their pride, self-esteem, problem-solving skills, and extended-family support systems.

Being a Wise Consumer of Information about Educational Psychology   We live in a society that generates a vast amount of information about education in various media, ranging from research journals to newspapers and television. The information varies greatly in quality. How can you evaluate the credibility of this information?

Be Cautious of What Is Reported in the Popular Media   Education is increasingly talked about in the news. Television, radio, newspapers, and magazines all frequently report on educational research. Many professional educators and researchers regularly supply the media with information. In some cases, this research has been published in professional journals or presented at national meetings and then picked up by the popular media. Most universities have a media relations department that contacts the press about current faculty research.

However, not all information about education that appears in the media comes from professionals with excellent credentials and reputations. Most journalists, television reporters, and other media personnel are not scientifically trained and do not have the skills to sort through the avalanche of material they receive in order to make sound decisions about which information to report.

Unfortunately, the media focus on sensational, dramatic findings. They want you to stay tuned or buy their publication. When the information they gather from educational journals is not sensational, they might embellish it and sensationalize it, going beyond what the researcher intended.

Another problem with media reports about research is that the media often do not have the luxury of time and space to go into important details about a study. They often get only a few lines or a few minutes to summarize as best they can what can be very complex findings. Too often this means that what is reported is overgeneralized and stereotyped.

Avoid Drawing Conclusions about Individual Needs Based on Group Research   **Nomothetic research** *is research conducted at the level of the group.* Most educational psychology research is nomothetic. Individual variations in how students respond is not a common focus. For example, if researchers are interested in the effects of divorce on children's school achievement, they might conduct a study with 50 children from divorced families and 50 children from intact, never-divorced families. They might find that the children from divorced families, as a group, had lower achievement in school than did the children from intact families. That is a nomothetic finding that applies to children of divorce as a group. And that is what is commonly reported in the media and in research journals as well. In this particular study, it likely was the case that some of the children from divorced families had higher school achievement than children from intact families—not as many, but some. Indeed, it is entirely possible that, of the 100 children in the

study, the two or three children who had the highest school achievement were from divorced families—and that this fact was never reported in the popular media.

Nomothetic research can give teachers good information about the characteristics of a group of children, revealing strengths and weaknesses of the group. However, in many instances teachers, as well as the child's parents, want to know about how to help one particular child cope and learn more effectively. **Idiographic needs** *are the needs of the individual, not the group.* Unfortunately, although nomothetic research can point to problems for certain groups of children, it does not always hold for an individual child.

Recognize How Easy It Is to Overgeneralize about a Small or Clinical Sample   There often isn't space or time in media presentations to go into detail about the nature of the sample of children on which the study is based. In many cases, samples are too small to let us generalize readily to a larger population. For example, if a study of children from divorced families is based on only 10 to 20 children, what is found in the study cannot be generalized to all children from divorced families. Perhaps the sample was drawn from families that have substantial economic resources, are of Western European heritage, live in a small town, and are undergoing therapy. From this study, we clearly would be making unwarranted generalizations if we thought the findings also characterize children who are from low- to moderate-income families, are from other ethnic backgrounds, live in a different geographical location, and are not undergoing therapy.

Be Aware That a Single Study Usually Is Not the Defining Word   The media might identify an interesting research study and claim that it is something phenomenal with far-reaching implications. As a competent consumer of information, be aware that it is extremely rare for a single study to have earth-shattering, conclusive answers that apply to all students and teachers. In fact, where there are large numbers of studies that focus on a particular issue, it is not unusual to find conflicting results from one study to the next. Reliable answers about teaching and learning usually emerge only after many researchers have conducted similar studies and drawn similar conclusions. In our example of divorce, if one study reports that a school counselling program for students from divorced families improved their school achievement, we cannot conclude that the counselling will work as effectively with all students from divorced families until many more studies are conducted.

Always Consider the Source of the Information and Evaluate Its Credibility   *Caveat emptor* is a Latin phrase that means "Let the buyer beware"; it should be the motto for the wise consumer of educational psychology. Studies are not automatically accepted by the research community. Researchers usually must submit their findings to a research journal, where they are reviewed by the researcher's colleagues, who make a decision about whether or not to publish the paper. Although the quality of research in journals is far from uniform, in most cases the research has undergone far more scrutiny and careful consideration of the work's quality than is the case for research or any other information that has not gone through the journal process.

At this point we have studied many ideas about program evaluation, action research, teacher-as-researcher, and research challenges. A review of these ideas is presented in Summary Table 1.3. In the next chapter, we will explore the physical and cognitive aspects of children's development.

Both skepticism and wonder are skills that need honing and practice. Their harmonious marriage within the mind of every schoolchild ought to be a principal goal of public education.

Carl Sagan
U.S. Astronomer and Author, 20th Century

SUMMARY TABLE 1.3
Program Evaluation, Action Research, the Teacher-as-Researcher, and Research Challenges

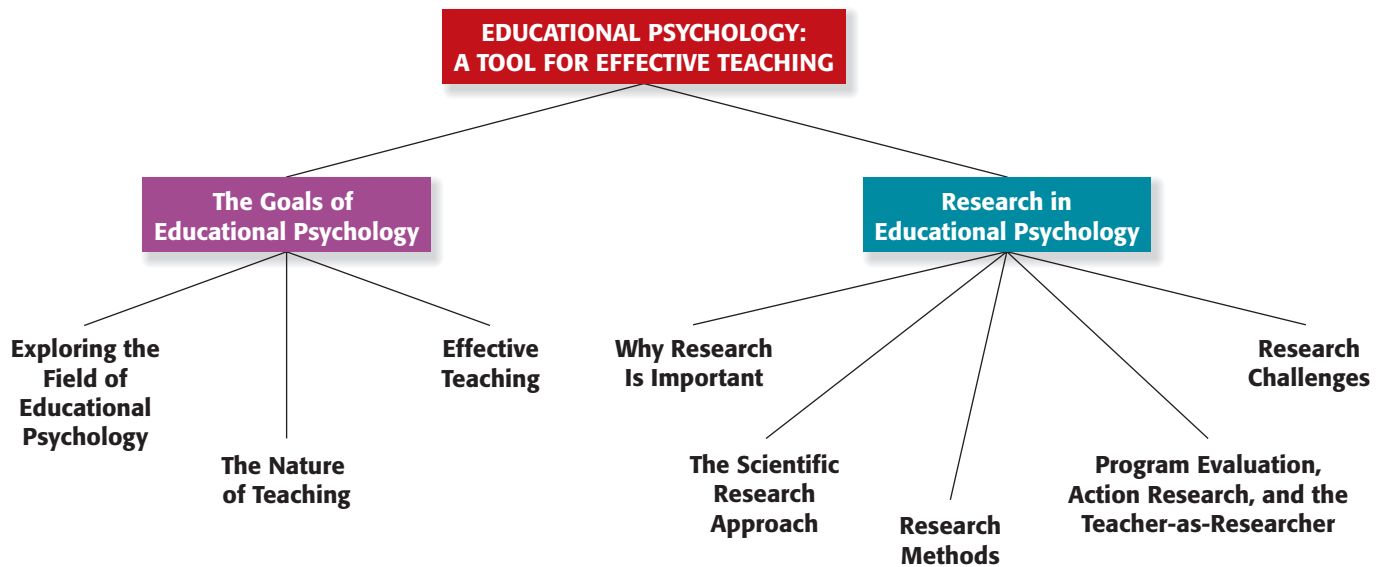|	
What are program evaluation, action research, and the teacher-as-researcher?	• Program evaluation is research designed to make decisions about the effectiveness of a particular program or programs. • Action research is used to solve specific classroom or social problems, improve teaching practice, or make decisions about specific locations. • Teachers-as-researchers conduct classroom studies to improve their practice using such techniques as clinical interviews and participant observation.
What challenges are associated with the study of education?	• It is critical to keep the participants' interests in mind. • Every effort should be made to make research equitable for both males and females since research has for too long been biased against females. • More children from minority backgrounds and cultures need to be included in educational psychology research. • Avoid drawing conclusions about individual needs based on group research, don't over-generalize from one sample or study. • Remember that correlational studies are not causal studies. • Always consider the source of information in evaluating its credibility. *Caveat emptor* (or, "Let the buyer beware") is the motto of the wise educational psychology consumer.

Mrs. Vandelaar, an elementary-school principal, felt frustrated when her teachers tried to teach their students about being good citizens. The school and school board lacked appropriate curriculum and materials to assist them with this task. She was aware that there were many programs available that addressed these issues, and she hoped to be able to purchase one for implementation at her school. She worried, however, that the school board might not see the value of such a citizenship program and would refuse to support its purchase or implementation. Mrs. Vandelaar believed that she and her teachers would be called upon to demonstrate the need for such a program, as well as the benefits associated with implementing it.

Some teachers didn't agree with Mrs. Vandelaar's perspective. One believed that it was futile to attempt to change student behaviour because they couldn't change parent behaviour: "After all, the apple doesn't fall far from the tree." Another teacher wanted a "ready-to-use" program that could be applied to all students across Grades 1 to 8. He had read an article in a popular magazine endorsing this program. Yet another teacher wanted to purchase a new version of an old program that she had used when she was a student. Mrs. Vandelaar knew that she had one school year to review existing programs and make a convincing case to the school board for funding.

- How would you carry out the background research necessary to make a sound decision about program selection?
- What issues would need to be considered? Why?
- What type(s) of research would be appropriate? Why?
- What design would you use? Why? Could you use an experimental design? Why or why not?

CHAPTER REVIEW

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                    EDUCATIONAL PSYCHOLOGY:
                   A TOOL FOR EFFECTIVE TEACHING

        The Goals of                            Research in
    Educational Psychology                 Educational Psychology

 Exploring the          Effective      Why Research                      Research
   Field of            Teaching        Is Important                     Challenges
  Educational
  Psychology                                       The Scientific        Program Evaluation,
                                                     Research            Action Research, and the
        The Nature                                   Approach            Teacher-as-Researcher
        of Teaching                      Research
                                         Methods
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To obtain a detailed review of this chapter, study these three summary tables:

⊚ KEY TERMS

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constructivism 9

scientific research 16

scientific method 16

theory 16

hypotheses 16

quantitative research
   methods 16

qualitative research
   methods 16

laboratory 18

naturalistic observation 18

standardized tests 18

case study 19

correlational research 19

experimental research 19

experiment 19

independent variable 20

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random assignment 20

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longitudinal research 21

program-evaluation
   research 22

action research 23

teacher-as-researcher 23

participant observation 24

ethnic gloss 26

nomothetic research 26

idiographic needs 27

PROFESSIONAL DEVELOPMENT/PORTFOLIO ACTIVITIES

1. What Kind of Teacher Do You Want to Be?

As a teacher candidate, you may be imagining what kind of teacher you aspire to become. As well, you may be setting learning objectives as the means to achieve your goal. These learning objectives often become evident during your teacher training. Write a letter to a friend describing your expectations with respect to your teacher training and the kind of teacher that you want to become. What strengths do you want to develop? What do you believe will be your most significant challenges? Place your letter in an envelope and put it away until the end of the first term. After a few months, read it again; consider what you have learned, and redefine and confirm your goals.

2. Planning for Problems

Teaching environments are fast-paced and complex. Anticipating what might happen and planning ahead will help you to prepare for potential challenges. Try this activity. Make two columns on a piece of notepaper. Consider the grade level and the students that you want to teach. On one side of the paper, brainstorm and list some of the challenges that might happen in the classroom. On the other side, write a strategy for how you might cope with these challenges.

3. Your Teaching Philosophy

Understanding why you are teaching a subject is as important as understanding how you teach that subject. Imagine that you are about to begin your first teaching position in a few weeks. Prepare a letter of introduction for parents that outlines your plans for the class. In this letter, describe your philosophy or approach to teaching. As you explain your philosophy, consider the following questions: Is your focus on the development of basic skills? Will you encourage your students to be "higher-order" thinkers? Will you stress personal growth as a goal for your students? What will you do in your classes to help your students reach the learning objectives? Place this letter in your portfolio.

INTERNET ACTIVITIES

1. Building a Web-Resource Database

The Internet and World Wide Web are powerful resources for teachers, but it takes time and patience to sift through the volume of material available online. Start building a resource database with your colleagues. You could develop a set of criteria for evaluating the educational potential of online resources or Websites. Consider what makes a good educational Website. How can you verify the validity or accuracy of the information you find? Explore three educational Websites or Internet resources; critique them using the criteria that you have developed, and prepare a synopsis. By keeping a log of these Websites and critiques, you are developing a database of online resources for use in your own classroom.

2. Educational Psychology in Different Media

Information about educational psychology appears in journals, magazines, newspapers, and on the Internet or World Wide Web. How do these different media sources compare with respect to how they present information? Find an interesting article in a research journal such as *Educational Psychology Review* or *Phi Delta Kappan*. Search for the same topic on the Internet and compare the content of the information from the two sources. What similarities and differences do you see? What did you learn from this comparison?

Connect to the Online Learning Centre at www.mcgrawhill.ca/college/santrock to explore possible answers.

Visit the *Educational Psychology* Online Learning Centre at
www.mcgrawhill.ca/college/santrock
to access Websites related to the above Internet Activities as well as chapter quizzes,
a searchable glossary, and other learning and study tools.