emphasis is on the learners first, not on the special challenges they face (Meece, 2002). Other examples might include:

A girl with special educational needs	NOT	An SEN girl
A person with epilepsy	NOT	An epileptic
A child with a physical disability	NOT	A crippled child
Children diagnosed with autism	NOT	Autistic children or autistics

Disorders, disabilities and handicaps

One more distinction in language is important. A disorder is a broad term – a general disturbance in physical or mental functioning, for example, a communications disorder. A disability is just what the word implies – an inability to do something specific such as pronounce words or see or walk. A handicap is a disadvantage in certain situations. Some educators have suggested that we drop the word 'handicap' altogether because the source of the word is demeaning. *Handicap* came from the phrase 'cap-in-hand', used to describe people with disabilities who once were forced to beg just to survive (Hardman, Drew and Egan, 2005).

Disorder
A broad term meaning a general disturbance in physical or mental functioning.

Disability
The inability to do something specific such as walk or hear.

Handicap
A disadvantage in a particular situation, sometimes caused by a disability.

Some disabilities lead to handicaps, but not in all contexts. For example, being blind (a visual disability) is a handicap if you want to drive a car but blindness is not a handicap when you are composing music or talking on the telephone. Stephen Hawking, the renowned physicist, sufferers from Lou Gehrig's disease and can no longer walk or talk. He once said that he is lucky that he became a theoretical physicist 'because it is all in the mind. So my disability has not been a serious handicap'. It is important that we do not *create* handicaps for people by the way we react to their disabilities.

Disabilities are part of the human condition. We can think of all human characteristics as being on a continuum, from very acute hearing to complete deafness for instance. We all fall somewhere on that continuum and we change over our lifetimes. As we age, for example, there are likely to be changes in hearing, vision, even some aspects of intellectual ability, as you will see later in this chapter. This relates to the points raised earlier about the complex nature of intelligence.

Intelligence is a widely used label in education and life in general. Let us begin with a basic question.

What does intelligence mean?

STOP AND THINK

Who was the most intelligent person in your secondary school? Write down a name and the first four or five words that come to mind when you see that person in your mind's eye. What made you pick this individual?

The idea that people vary in what we call intelligence has been with us for a long time. Plato discussed similar variations over 2,000 years ago. Most early theories about the nature of intelligence involved one or more of the following three themes: (1) the capacity to learn; (2) the total knowledge a person has acquired; and (3) the ability to adapt successfully to new situations and to the environment in general.

Intelligence
Ability or abilities to acquire and use knowledge for solving problems and adapting to the world.

During the past century, there was considerable controversy over the meaning of intelligence. In 1986, at a symposium on intelligence, 24 psychologists each offered a different view about the nature of intelligence (Neisser *et al.*, 1996; Sternberg and Detterman, 1986). More than half of the experts mentioned higher-level thinking processes such as abstract reasoning and problem solving as important aspects of intelligence and they added metacognition (being able to reflect upon your own thinking) and executive processes (monitoring your own thinking) to earlier views. The interaction of knowledge with mental processes, and the cultural context – what is valued by the culture – as elements of intelligence were also agreed upon but the psychologists disagreed about the structure of intelligence – whether it is a single ability or many separate abilities (Gustafsson and Undheim, 1996; Louis *et al.*, 2000; Sattler, 2001; Sternberg, 2004). Let us think about that question for a while.

Intelligence: one ability or many?

Some theorists believe intelligence is a basic ability that affects performance on all cognitively oriented tasks, from computing mathematical problems to writing poetry or solving riddles. Evidence for this position comes from study after study finding moderate-to-high positive correlations among all the different tests that are designed to measure separate intellectual abilities (Carroll, 1993; McNemar, 1964). What could explain these results? Charles Spearman (1927) the first psychologist to approach intelligence research scientifically, suggested there is one mental attribute, which he called *g* or general intelligence, used to perform any mental test, but each test also requires some specific abilities in addition to *g*. For example, memory for a series of numbers probably involves both *g* and some specific ability for immediate recall of what is heard. Spearman assumed that individuals vary in both general intelligence and specific abilities, and that together these factors determine performance on mental tasks.

Are these children/young people using both general and specific abilities as they perform?

Another view that has stood the test of time is the Cattell-Horn theory of fluid and crystallised intelligence (Cattell, 1963; Horn, 1998). Fluid intelligence is mental efficiency that is essentially culture-free and non-verbal such as the individual's ability to think and act quickly, solve novel problems and store short-term memories. This aspect of intelligence increases until adolescence because it is grounded in brain development, then declines gradually with age. Fluid intelligence is sensitive to injuries. In contrast, crystallised intelligence, the ability to apply culturally approved problem-solving methods, can increase throughout the life span because it includes the learned skills and knowledge such as vocabulary, facts and how to read a timetable, sew on a button or study effectively at undergraduate level. By *investing fluid intelligence* in solving problems, we *develop our crystallised intelligence*, but many tasks in life such as mathematical reasoning draw on both fluid and crystallised intelligence (Finkel *et al.*, 2003; Hunt, 2000). Thus they require a mixture of nature (fluid intelligence) and nurture (crystallised intelligence).

Fluid intelligence
Mental efficiency, non-verbal abilities grounded in brain development.

Crystallised intelligence
Ability to apply culturally approved problem-solving methods.

The most widely accepted view today is that intelligence, like self-concept, has many facets and is a hierarchy of abilities, with general ability at the top and more specific abilities at lower levels of the hierarchy (Sternberg, 2000). Earl Hunt summarised the current thinking about the structure of intelligence this way:

> *After almost a century of such research, that structure is pretty well-established. There is considerable agreement for the bottom two levels of a three-tiered lattice model of intelligence. At the bottom are elementary information-processing actions, and immediately above them are eight or so secondary abilities. These are more broadly defined capabilities, such as holding and accessing information in short- and long-term memory and, most importantly, the trio of 'intellectual' abilities: crystallized intelligence, fluid intelligence, and visual-spatial reasoning ability [which] may be just the most visible of several abilities to manipulate information coded in a particular sensory modality (2000: 123).*

Look at Figure 4.1 to see an example of this three-level view of intelligence. John Carroll (1997) identifies one general ability, a few broad abilities (such as fluid and crystallised abilities, learning and memory, visual and auditory perception, processing speed) and at least 70 specific abilities such as language development, memory span and simple reaction time. General ability may be related to the maturation and functioning of the frontal lobe of the brain, which plays a part in impulse control, judgement, language, memory, motor function, problem solving, sexual behaviour, socialisation and spontaneity. The frontal lobes assist in planning, coordinating, controlling and executing behaviour while specific abilities may be connected to other parts of the brain (Byrnes and Fox, 1998). Some theorists, however, suggest that there are a number of separate types of intelligence or 'multiple intelligences' rather than a hierarchical structure.

Multiple intelligences

In spite of the correlations among the various tests of different abilities, some psychologists insist that there are several separate mental abilities (Gardner, 1983; Guilford, 1988). According to Gardner's (1983, 2003) theory of multiple intelligences, there are at least eight separate intelligences: linguistic (verbal), musical, spatial, logical-mathematical, bodily-kinesthetic (movement), interpersonal (understanding others), intrapersonal (understanding self) and naturalist (observing and understanding natural and human-made patterns and systems) (see Table 4.1). Gardner stresses that there may be more kinds of intelligence – eight is not a magic number. Recently, he has speculated that there may be an existential intelligence – the abilities to contemplate big questions about the meaning of life (Gardner, 2003).

Theory of multiple intelligences
In Gardner's theory of intelligence, a person's eight separate abilities: logical-mathematical, linguistic, musical, spatial, bodily-kinesthetic, interpersonal, intrapersonal and naturalist.

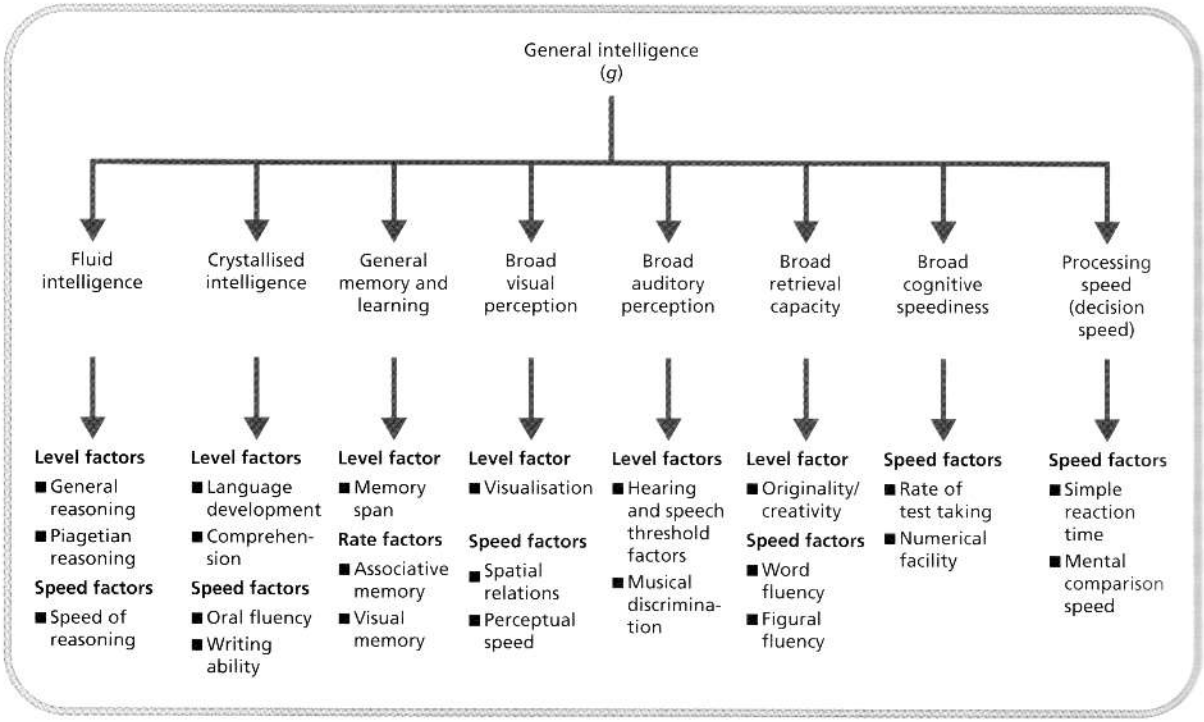

Figure 4.1
An example of a hierarchical model of intelligence

The specific abilities at the third level are just some of the possibilities. Carroll identified over 70 specific abilities.

Source: From 'The three-stratum theory of cognitive abilities' by J. B. Carroll. In D. B. Flanagan, J. L. Genshaft and P. L. Harrison (eds), *Contemporary Intellectual Assessment: Theories, Tests and Issues*. Copyright © 1996 by Guilford Publications, Inc.

Gardner bases his notion of separate abilities on evidence that brain damage (e.g. from a stroke) often interferes with functioning in one area, such as language, but does not affect functioning in other areas. It is also true that individuals may excel in one of these eight areas, but have no remarkable abilities in the other seven.

What are these intelligences?

Gardner (1998, 2003) contends that an intelligence is the ability to solve problems and create products or outcomes that are valued by a culture. Varying cultures and eras of history place different values on the eight intelligences. A naturalist intelligence is critical in farming cultures, whereas verbal and mathematical intelligences are important in technological cultures. In addition, Gardner believes that intelligence has a biological base. An intelligence is 'a biological and psychological potential; that potential is capable of being realised to a greater or lesser extent as a consequence of the experiential, cultural, and motivational factors that affect a person' (1998: 62). So an individual may or may not develop her or his potential intelligence depending upon environmental experiences.

Gardner's multiple intelligences theory has not received wide acceptance in the scientific community, even though it has been embraced by many educators. Some critics suggest that several intelligences are really talents (bodily-kinesthetic skill, musical ability) or personality traits (interpersonal ability). Other 'intelligences' are not new at all. Many researchers have identified verbal and spatial abilities as elements of

Table 4.1 Eight intelligences

Howard Gardner's theory of multiple intelligences suggests that there are eight kinds of human abilities. An individual might have strengths or weaknesses in one or several areas.

Intelligence	End states	Core components
Logical-mathematical	Scientist Mathematician	Sensitivity to, and capacity to discern, logical or numerical patterns; ability to handle long chains of reasoning.
Linguistic	Poet Journalist	Sensitivity to the sounds, rhythms and meanings of words; sensitivity to the different functions of language.
Musical	Composer Violinist	Abilities to produce and appreciate rhythm, pitch and timbre; appreciation of the forms of musical expressiveness.
Spatial	Navigator Sculptor	Capacities to perceive the visual-spatial world accurately and to perform transformations on one's initial perceptions.
Bodily-kinesthetic	Dancer Athlete	Abilities to control one's body movements and to handle objects skilfully.
Interpersonal	Therapist Salesman	Capacities to discern and respond appropriately to the moods, temperament, motivations and desires of other people.
Intrapersonal	Person with detailed, accurate self-knowledge	Access to one's own feelings and the ability to discriminate among them and draw on them to guide behaviour; knowledge of one's own strengths, weaknesses, desires and intelligence.
Naturalist	Botanist Farmer Hunter	Abilities to recognise plants and animals, to make distinctions in the natural world, to understand systems and define categories (perhaps even categories of intelligence).

Source: From *Education, Information and Transformation: Essays on Learning and Thinking,* 1st Edition, edited by J. Kane. Published by Prentice Hall 2002. Reprinted by permission of Dr Howard Gardner.

intelligence. In addition, the eight intelligences are not independent; there are correlations among the abilities. In fact, logical-mathematical and spatial intelligences are highly correlated (Sattler, 2001). So, these 'separate abilities' may not be so separate after all. Recent evidence linking musical and spatial abilities has prompted Gardner to consider that there may be connections among the intelligences (Gardner, 1998) so the theory is still developing.

Gardner (1998, 2003) has responded to critics by identifying a number of myths and misconceptions about multiple intelligences theory and schooling. One is that intelligences are the same as learning styles. (Gardner doesn't believe that people actually have consistent learning styles.) Another misconception is that multiple intelligences theory disproves the idea of '*g*'. Gardner does not deny the existence of a general ability, but does question how useful *g* is as an explanation for human achievements. Let us now see how Gardner's theory relates to education.

Multiple intelligences go to school

An advantage of Gardner's perspective is that it expands teachers' thinking about abilities and avenues for teaching, but the theory has been misused. Some teachers embrace a simplistic version. They include every 'intelligence' or ability in every lesson, no matter how inappropriate. Table 4.2 lists some misuses and positive applications of Gardner's work.

Even though many teachers and schools are enthusiastic about Gardner's ideas, there is not yet strong research evidence that adopting a multiple intelligences approach will enhance learning. In one of the few carefully designed evaluations, Callahan, Tomlinson and Plucker (1997) found no significant gains in either achievement or self-concept for students who participated in a multiple intelligences approach in the US to identifying and promoting talent in students who were at risk of failing. Learning is still hard work, even if there are multiple paths to knowledge. Professor John White speaking at the Institute of Education, London voices similar concerns

Table 4.2 Misuses and applications of multiple intelligence theory

Recently, Howard Gardner described these negative and positive applications of his theory. The quotes are his words on the subject.

Misuses:

1. **Trying to teach all concepts or subjects using all intelligences:** 'There is no point in assuming that every subject can be effectively approached in at least seven ways, and it is a waste of effort and time to attempt to do this.'
2. **Assuming that it is enough just to apply a certain intelligence, no matter how you use it:** For bodily-kinesthetic intelligence, for example, 'random muscle movements have nothing to do with the cultivation of the mind'.
3. **Using an intelligence as a background for other activities,** such as playing music while pupils solve maths problems. 'The music's function is unlikely to be different from that of a dripping faucet or humming fan.'
4. **Mixing intelligences with other desirable qualities:** For example, interpersonal intelligence 'is often distorted as a license for cooperative learning,' and intrapersonal intelligence 'is often distorted as a rationale for self-esteem programmes'.
5. **Direct evaluation or even grading of intelligences without regard to context:** 'I see little point in grading individuals in terms of how "linguistic" or how "bodily-kinesthetic" they are.'

Good uses:

1. **The cultivation of desired capabilities:** 'Schools should cultivate those skills and capabilities that are valued in the community and in the broader society.'
2. **Approaching a concept, subject matter, discipline in a variety of ways:** Schools try to cover too much. 'It makes far more sense to spend a significant amount of time on key concepts, generative ideas, and essential questions and to allow students to become familiar with these notions and their implications.'
3. **The personalisation of education:** 'At the heart of the MI perspective – in theory and in practice – [is] taking human difference seriously'.

Source: Extracts from 'Reflections on multiple intelligences: myths and messages' by H. Gardner, 1998. In A. Woolfolk (ed.), *Readings in Educational Psychology* (2nd ed.), pp. 64–66, Boston: Allyn and Bacon. Copyright © 1998 by Phi Delta Kappan.

about Gardner's theories, concluding that there is no evidence for the existence of eight or nine intelligences. He questions therefore the assumptions which form the basis for school reforms (including 'shrink-wrapped' versions of multiple intelligences such as visual, auditory, kinesthetic approaches) although the reforms themselves might have positive effects:

> *One question which intrigues me here is: what should be done if the theory is flaky but the use to which teachers put it seems to produce the goods – to give children more self-confidence and desire to learn? (White, 2004: 17–18).*

Emotional intelligence

STOP AND REFLECT

Have you heard the term 'emotional intelligence'? If so what do you understand by it? Do you think it is possible to be emotionally intelligent but lack academic skills?

Howard Gardner's theory of multiple intelligences includes intrapersonal and interpersonal intelligences, or intelligence about self and others. Here we look at a related perspective – emotional intelligence.

We all know people who are academically or artistically talented, but unsuccessful. They have problems in school, in relationships and at work, and can't seem to improve the situations. According to some psychologists, the source of the difficulties may be a lack of emotional intelligence, first defined by Peter Salovey and John Mayer as the ability to process emotional information accurately and efficiently (Mayer and Cobb, 2000; Mayer and Salovey, 1997; Roberts, Zeidner and Matthews, 2001). Daniel Goleman (1995) popularised the idea of emotional intelligence (E-IQ or EQ) in his best-selling book *Emotional Intelligence* based on the work of Salovey and Mayer.

What is EQ?

At the centre of emotional intelligence (EQ) are four broad abilities: perceiving, integrating, understanding and managing emotions (Mayer and Cobb, 2000). If you can't *perceive* what you are feeling, how can you make good choices about jobs, relationships, time management or even entertainment (Baron, 1998)? Individuals who can *perceive* and *understand* emotions in others (usually by reading the non-verbal cues) and respond appropriately are more successful in working with people and often emerge as leaders (Wood and Wood, 1999). If you can't *integrate* your emotions into your thinking about situations and *understand* your own emotions, how can you communicate your feelings to others accurately? Friends keep asking, 'What's wrong?' and you keep saying, 'Nothing!'

Emotional intelligence (EQ)

The ability to process emotional information accurately and efficiently.

Finally, you must *manage* your emotions, particularly negative emotions such as anger or depression. The goal is not to suppress feelings, but not to be overwhelmed by them either. Managing emotions includes the ability to focus energy, persist, control impulses and delay immediate gratification. Emotional management is critical in school. For example, compared to four-year-old children who act on their impulses immediately, four-year-old children who can delay instant gratification become much more successful learners later (Shoda, Mischel and Peake, 1990).

Some researchers have criticised the notion of EQ, saying that emotional intelligence is not a cluster of capabilities, but rather a set of personality traits or the

Children need to develop emotional as well as cognitive intelligence if they are to be successful in life

application of general intelligence to social situations (Izard, 2001; Nestor-Baker, 1999). British researchers (Petrides, Frederickson and Furnham, 2004) suggest that the roots of emotional intelligence (EI) can be traced back to Thorndike's (1920) concept of 'social intelligence', which describes the ability of people to understand and manage others. They find that EI is related to scholastic achievement and deviant behaviour at school, suggesting that the inclusion of EI measures in assessments and intervention programmes might be useful to inform future research and social provision. So the question which remains from these differing views is does intelligence inform emotion so we are clever about managing our feelings and impulses, or does emotion inform intelligence so we make good decisions and understand other people? Probably both are true. The major point is that success in life requires more than cognitive skills, and teachers are important influences in helping pupils develop all of these capabilities.

EQ goes to school

Research in the US suggests that programmes designed to help children build their emotional competencies have beneficial effects, including an increase in cooperative behaviours and a reduction in anti-social activities such as the use of insults and bullying. For example, Norma Feshbach (1998, 1997) developed a 36-hour programme to help elementary (primary school) children become more empathetic or able to put themselves in the position of another and understand how they are feeling. The programme included exercises such as deciding what each person in your family would like most as a birthday present or determining how the world would appear to you if

you were a cat. Children also retold stories from the perspective of the different characters in a story, then played the role of each character in videotaped performances of the stories. Children learned to analyse how people looked and sounded as they played each role. Sandra Graham's (1996) programme for helping aggressive boys learn to read the intentions of others also included role plays and practice in reading the emotions of others. The educational advantages of decreased pupil aggression and increased empathy are obvious, but these skills also prepare children and young people for life outside the classroom.

Cautions

One of the problems with innovations in educational psychology is that they are often inadvertently misinterpreted or ill-described in the popular media by writers and reporters who have limited backgrounds in both psychology and education. The concept of emotional intelligence is one innovation that seems to be facing that fate. Many reports use the term loosely or inaccurately, causing misunderstanding. Make sure that the sources you read are based on careful research not popular opinion.

Connect and Extend

See Petrides, K.V. *et al.* (2004), 'The role of trait emotional intelligence in academic performances and deviant behaviour at school', *Personality and Individual Differences, 36,* pp. 277–293, for an examination of the relationship between EI, academic ability and deviant behaviour in British secondary schools.

Intelligence as a process

As you can see, the theories of Spearman, Cattell and Horn, Carroll, and Gardner, which define and measure intelligence, tend to describe how individuals differ in the *content* of intelligence – different abilities. Recent work in cognitive psychology has emphasised instead the thinking *processes* that may be common to all people. How do humans gather and use information to solve problems and behave intelligently? New views of intelligence are growing out of this work.

Robert Sternberg's (1985, 2004) triarchic theory of successful intelligence suggests that there are three aspects involved and is a cognitive process approach to understanding intelligence. 'Successful intelligence', according to Sternberg includes 'the skills and knowledge needed for success in life, according to one's own definition of success, within one's own sociocultural context' (Sternberg, 2004: 326). Sternberg prefers the term successful intelligence to stress that intelligence is more than what is measured by mental abilities tests – intelligence is about success in life. As you might guess from the name, this theory has three parts – analytic, creative and practical (see Table 4.3).

Triarchic theory of successful intelligence

A three-part description of the mental abilities (thinking processes, coping with new experiences and adapting to context) that lead to more or less intelligent behaviour.

Analytic/componential intelligence involves the mental processes of the individual that lead to more or less intelligent behaviour. These processes are defined in terms of components – elementary information processes that are classified by the functions they serve and by how general they are. *Metacomponents* perform higher-order functions such as planning, strategy selection and monitoring. Executing the strategies selected is handled by *performance components.* Gaining new knowledge is performed by *knowledge-acquisition components,* such as separating relevant from irrelevant information as you try to understand a new concept (Sternberg, 1985).

Some components are specific; that is, they are necessary for only one kind of task, such as solving analogies (e.g. graceful is to clumsy as hot is to?). Other components are very general and may be necessary in almost every cognitive task. For example, metacomponents are always operating to select strategies and keep track of progress. This may help to explain the persistent correlations among all types of mental tests. People who are effective in selecting good problem-solving strategies, monitoring progress, and moving to a new approach when the first one fails are more likely to be successful on all types of tests. Metacomponents may then be a modern-day version of Spearman's g – general intelligence.

Table 4.3 Sternberg's triarchic theory of intelligence

Sternberg suggests that intelligent behaviour is the product of applying thinking strategies, handling new problems creatively and quickly, and adapting to contexts by selecting and reshaping our environment.

	Analytic	**Creative**	**Practical**
	Componential intelligence	***Experiential intelligence***	***Contextual intelligence***
Definition	Ability to think abstractly, process information; verbal abilities.	Ability to formulate new ideas and combine unrelated facts; creativity – ability to deal with novel situations and make new solutions automatic.	Ability to adapt to a changing environment and shape the environment to make the most of opportunities – problem solving in specific situations.
Examples	Solving analogies or syllogisms, learning vocabulary.	Diagnosing a problem with a car engine; finding resources for a new project.	Switching your mobile off or putting a 'do not disturb' sign on the door to limit distractions while studying.

Insight

The ability to deal effectively with novel situations.

Automaticity

The result of learning to perform a behaviour or thinking process so thoroughly that the performance is automatic and does not require effort.

The second part of Sternberg's triarchic theory, *creative/experiential intelligence*, involves coping with new experiences. Intelligent behaviour is marked by two characteristics: (1) insight or the ability to deal effectively with novel situations; and (2) automaticity – the ability to become efficient and automatic in thinking and problem solving. Thus, intelligence involves solving new problems as well as quickly turning new solutions into routine processes that can be applied without much cognitive effort.

The third part of Sternberg's theory, *practical/contextual intelligence*, highlights the importance of choosing to live and work in a context where success is likely, adapting to that context and reshaping it if necessary. Here, culture is a major factor in defining successful choice, adaptation and shaping. For example, abilities that make a person successful in a rural farming community may be useless in the inner city or in a suburban area. People who are successful often seek situations in which their abilities will be valuable and then work hard to capitalise on those abilities and compensate for any weaknesses. Thus, intelligence in this third sense involves practical matters such as career choice or social skills. In a field study in a Russian city, Elena Grigorenko and Robert Sternberg (2001) found that adults with higher practical and analytical intelligence coped better both mentally and physically with the stresses caused by rapid changes in that part of the world.

Tacit knowledge

Knowing how rather than knowing that – knowledge that is more likely to be learned during everyday life than through formal schooling.

Practical intelligence is made up mostly of action-oriented tacit knowledge. This tacit knowledge is more likely to be learned during everyday life than through formal schooling – it is 'knowing how' rather than 'knowing that' (Sternberg *et al.*, 1995). Recently, however, Sternberg and his colleagues have designed a programme for developing practical intelligence for school success by teaching learners effective strategies for reading, writing, doing homework and taking tests (Sternberg, 2002; Williams *et al.*, 1996). As you will see shortly, adaptive skills (similar to practical intelligence) are considered when identifying individuals with intellectual disabilities (British Psychological Society (BPS), 2000).