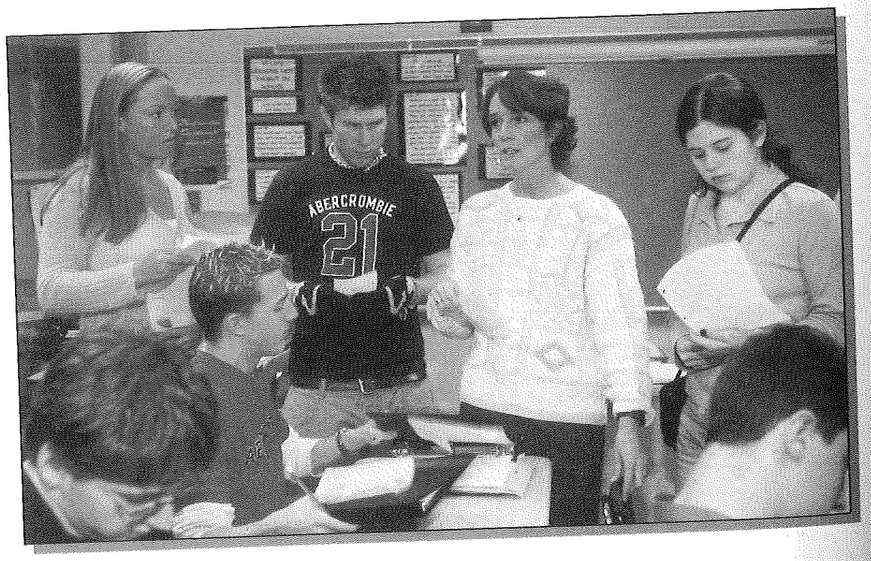
CHAPTER 2

Understanding Students and Learning

CHAPTER OVERVIEW

Our understanding of our responsibilities as teachers is best reflected in how we tend to our commitments to our students. Only when we are successful in helping them to further develop as active learners are we really teaching. Said another way, a primary factor for improving student achievement is to raise teachers' expectations for students' learning. Understanding our students—what they know, what they care about, how they learn best, and how their knowledge relates to our content—is key to this process. It is equally important to understand our own experiences as students and to reflect on the ways they influence how we think about our students.

This chapter focuses on students, the ways they differ as individuals, and the factors that affect their learning. It also provides activities that encourage you to reflect on your assumptions about students, how they learn, and how you might best approach working with them as their teacher. By considering the ways in which students' characteristics impact their responses to learning activities, teachers can plan lessons around the needs of the most important people in the classroom: the students.



Opening Activity

Throughout this chapter we will follow an imaginary middle school teacher, Ken Cowan, as he develops a unit on life in Zimbabwe: A World's View from Africa. Assume for a moment that Ken has decided to use a textbook reading and a lecture to inform his eighth-grade students about life in Zimbabwe. While he is teaching, he is getting little response from his students. They seem to be bored. Sue is staring out the window, and three students in the back are whispering. Ken has planned his lecture carefully and provided much detail about the events, but the students seem uninterested.

Practice Point

What is going on here? Consider some of the factors that might be contributing to the students' lack of attention. Think about what influences your own learning. List as many factors as you can.

You may have thought of some of the following possibilities: The teacher never got the students' attention at the beginning of the lesson, he did not make the material relevant to their everyday lives, or the material was too abstract and complex for the students. Perhaps they were sleepy because it was right after lunch, or perhaps the content was presented in a disorganized and confusing way, the lecture lasted too long, no visual aids were used, students were not directly involved through interaction with the teacher or with others, or the presentation lacked variety.

REFLECTING ON THE IDEAS

Think about what motivated you to want to learn in the classroom, specifically when you were a middle or high school student. What factors were important to you?

Many reasons might explain why students are inattentive during a learning activity. If Ken wants to redesign this activity so that it will be more effective the next time he uses it, he will need to know why it did not work very well. This chapter presents information about students and the ways they learn that can help you with such decisions.

Teacher Reflection and Decision Making

Reconsider the theme of this book: teachers' decision making. In order to plan learning experiences, make modifications while teaching, and redesign activities so they are more effective in the future, teachers need to do some very complex thinking. Recall the discussion of the five factors involved in reflective teaching decisions in Chapter 1. Figure 2.1 shows how teachers reflect on instructional decisions by taking into account student needs; content (ideas) to be learned; teachers' knowledge of learning theories, methods, and assessment (pedagogy); the conditions (context) surrounding the learning; and teacher characteristics. These same factors are considered in selecting and implementing learning activities.

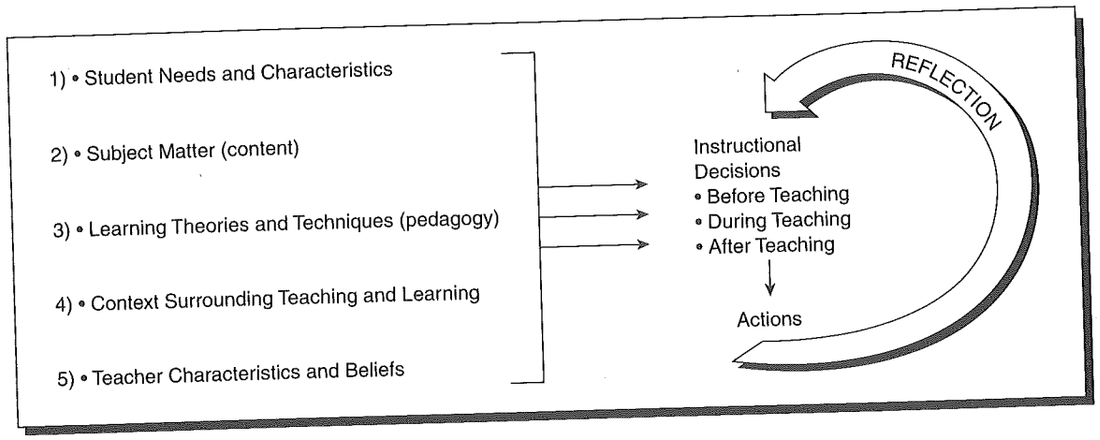


Figure 2.1 Factors Influencing Teaching Decisions
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To decide which method to use with which content and with which students, you need to understand quite a bit about student characteristics and how students learn. The first section of this chapter examines the types of information you will want to consider about individual students. The second section explores various learning theories and their practical applications more generally, as they may affect any student in your classroom.

SECTION 1. THE LEARNER: STUDENTS' PERSONAL CHARACTERISTICS

Section 1 Objective

After you have completed this section, you will be able to describe characteristics of students that may influence teaching decisions.

All instructional decisions involve students. The most carefully conceived objectives or well-designed lessons have meaning only when they affect particular students. You will have to consider the ways the students' strengths, weaknesses, needs, desires, and interests will affect the teaching and learning process. The more you know about the individual differences among your students, the more effectively you can adapt instruction to your particular class and to each new group of students you encounter throughout your teaching career. It will also be helpful for you to be continually reflective about your own assumptions about students, their abilities and interests, and your communication style as you work with them.

Gathering Information

In many ways, a good teacher's information gathering about students parallels the diagnostic skills we expect in physicians. A good physician is a careful observer, using a variety of skills to understand what is happening in a patient's body, but knowing the immediate symptoms is not enough. The physician must know a great deal about a patient's history, allergies, and lifestyle in order to determine the best course of action. Teachers have a similar challenge in understanding students' intellectual and emotional growth. You must understand what students know and how they are learning, both immediately and in a broader context, to make good decisions about instruction.

Probably your most vital skill as a teacher is the ability to gather, understand, and use information about your students. Information will come in many forms. Some information about students' families, health, and past educational experiences will come with students' records. If, for example, you are a math teacher and you noticed that Peter was having trouble with math, it would be helpful to know that until last year his math grades were above average. With that knowledge you would need to consider what might have occurred last year and how that knowledge should affect your planning. Certainly you will need to make sure Peter learns the math skills he did not learn last year. You may find that by concentrating on the specific skills taught during that time you can bring Peter up to speed more quickly than with a general review of last year's material.

Information about your students will come from a variety of sources including:

- **standardized tests**, particularly if the test is aligned with your curriculum and if test results are broken down into specific areas, skills, or knowledge
- observations of your students' behavior both within and outside of the classroom
- analysis of their work, tests, and presentations
- individual conversations with students
- communication with parents, guardians, and community members

Gathering this information can be invaluable in understanding the community and cultures within which your students learn. All these types of information will be important as you assess what students know before teaching and strive to understand their responses during learning activities.

Gathering this information is only part of the process of understanding students. It is also important to reflect on it and analyze how it might influence your decision making as a teacher. Teachers must use care and caution when creating profiles of students' characteristics, needs, and abilities, realizing that such profiles are never fixed, static, or unchanging. A teacher who understands her students realizes that they are in a perpetual stage of development, growth, and maturation. Finally, teachers should use discretion when speaking about their students with others.

Culture

One of the most fundamental ways in which students may differ from one another is in their culture (Banks, 1987, 1999). **Culture** has been defined as "the ideation, symbols, values, and beliefs that are shared by a human group" and include the ". . . institutions,

or other components of human societies that are created . . . to meet their survival needs" (Banks, 1999, p. 115).

Each of us has been raised in a particular culture. We have spoken at least one common language; celebrated particular holidays; understood specific family structures; appreciated certain kinds of food, music, art, and literature; and shared values with people around us.

Students' cultures influence their way of perceiving, evaluating, behaving, and doing, just as teachers' cultures impact their decision making in the classroom. Cultures affect the way students communicate, the structure of their family, the art and music they value, their social relationships, and many other important factors in their lives. Cultural influences have multiple layers, some more easily visible than others (Pang, 2001). Cultures vary in their means of communication (language, symbols, artifacts), means of interaction (customs, practices, interactional patterns) and values (values, norms, beliefs, expectations). It is much easier to observe differences in dress and dialect than it is to understand the value orientations that impact your students' lives. Such cultural differences make students' school lives unique and affect their lifestyles, values, attitudes, and school performance.

The dominant culture (**macroculture**) in the United States is Anglo–Western European. The formal institutions, official language, dominant social values, and other aspects of life in this society were shaped by the experiences of early settlers from Western Europe. For example, the individualism that has been a traditional American value has its roots in Judeo-Christian ethics, and our government was modeled on the English parliamentary system. Yet, the United States is, in actuality, a multicultural society and consists of many microcultures.

A **microculture** may be defined as a smaller culture within a macroculture that has its own unique cultural patterns. As this nation has grown, many groups of immigrants have arrived, each bringing its own cultural traditions. Some groups who joined our society came voluntarily in search of a better life. Other groups were involuntary immigrants brought against their will; for example, many African Americans (Ogbu, 1983). All of these groups have made valuable contributions to the United States. In fact, one of the greatest riches of our country is the diversity of its people and the strengths and influences each culture has contributed to the whole. The "melting pot" metaphor of the United States poorly represents our multicultural perspective, because it does not adequately address many groups' interest in and practice of maintaining their cultural identity within and outside of their homes.

At various times in our history, specific cultural groups have been deemed less desirable, less intelligent, or less valued because of their differences from the larger culture. For example, during the late 19th century, the Chinese and the Irish were considered undesirable and were subject to social and economic prejudice. Shops seeking employees sometimes posted signs reading, "No Irish need apply." Such exclusionary practices, while different in form, still persist today. It is still true that African American, Hispanic, and students for whom English is not their first language are more likely to be placed in lower ability classes than white students (Oakes & Lipton, 1999). Schools can have an influence in reversing this trend. If educators increase their knowledge of the differences among and within cultures, the schools can better serve the diverse needs of students and affirm their many cultural heritages.

Culturally relevant teaching (Ladson-Billings, 1994, 1995; Pang, 2001; Wlodowski & Ginsberg, 1995) requires that teachers be knowledgeable about and responsive to the cultural differences among their students. It recognizes that teaching for varied cultures is not as simple as using diverse pictures on the bulletin board or presenting units on different countries, although it would include both of those practices. Note that students' responses to learning tasks are affected by their culture's understandings of importance, opportunity, novelty, and value. Culturally competent teachers (Ford, 1996; Ladson-Billings, 1994, 1995) learn from their students what the students value, how they feel, and how they interact most comfortably. Such teachers recognize the ways in which their own culture, language, background, and experiences impact their relationships with students in the classroom. Only by knowing students well and by providing students the opportunities to learn from every person in that classroom can teachers plan activities that will allow them to learn effectively and create a learning community that respects diversity.

Some students come not only from a culture whose traditions and values differ from those of the mainstream, but from homes in which Standard English is not the primary language or is not spoken at all. According to one report, one out of every seven students grows up speaking a language other than Standard English (Oakes & Lipton, 1999). Some students are truly bilingual, that is, they speak English and a second language. Others speak little or no English. In fact, some "bilingual" students have had such limited or confusing language experiences that they are not proficient in either language. Although many districts provide support for large bilingual populations in the form of special classes or tutoring, many students for whom Standard English is not the preferred language may be in your classes with little or no additional support. In order to serve the needs of this special population, it is important to consider both the characteristics of bilingual students and the strategies that help them succeed in English-language schools.

No single profile exists for bilingual students. Their behaviors and achievements may vary enormously, depending on their previous educational experiences, familiarity with English, and cultural background. Some bilingual students display low academic achievement because of the difficulties in learning created by language barriers. Others have difficulties conveying in an unfamiliar language information they have learned in school, in their native country, or at home. Still other students feign lack of knowledge in order to avoid embarrassment or questions that they may not understand.

The insecurities that accompany this striving to communicate in a new language may be expressed in multiple ways. Imagine yourself in a foreign country, unable to speak the language in which others are communicating. People around you think you are ignorant because you express your ideas so poorly or do not express them at all. How might you react? Some students react to such situations by acting out, sometimes even creating their own cultural stereotypes: "We are tough in my country. We do not mix with weaker people." It is much easier to reject first than to feel rejected. Others respond by withdrawing, avoiding any circumstance that might demand communication.

Some students, especially as they gain experience in the mainstream culture, can become confused or uncertain about their identity. These students may be unwilling to speak their native language and reluctant to invite non-English-speaking relatives to school functions or to provide the necessary translation. The struggle to define a personal identity can be particularly acute for students who come from underrepresented

groups within their native countries or from countries in which the media are suppressed. Such students have difficulty defining their identity or role in either country.

Culturally diverse and bilingual students find themselves in the often uncomfortable position of straddling two or more cultures: the dominant culture and their own culture. Their cultural identity is directly influenced by their level of acculturation or acceptance of the dominant culture (Cross, 1995). Some students find strength in their home cultures, perhaps by wearing their traditional clothing and bringing lunches containing their native foods. Other students may exaggerate behaviors they associate with the United States; they hide their home culture by imitating the dominant culture in food choices, clothing choices, or other areas. Students from culturally diverse backgrounds also can indicate their feelings about the macroculture and their native culture through their choice of hairstyle and preferences in music and dance. Teachers of students from diverse cultures or whose primary language is not English will be most successful when they work to get to know the individual students and their learning needs and experiences, rather than making decisions based on assumptions, stereotypes, or prior experiences.

All cultures have clearly defined gender roles that affect students' performance or behavior in schools (Cline, 1998). In some cultures, a young girl's honor requires that she remain apart from young men, often beginning at an early age. In others, girls are expected to marry, or at least leave school and wait to marry, in their early teens. Such values create conflict for young women whose identities span two cultures and for the young men who might feel obligated to protect them. Tensions can also occur when female school personnel interact with students or parents whose traditions preclude women from occupying positions of authority.

Other, less obvious differences in cultures can also cause misunderstandings. How might a student whose culture sees owls as symbols of bad luck view a Halloween decoration? How might a teacher for whom eye contact is a sign of integrity respond to a student whose culture requires lowered eyes in the presence of authority? Clearly, both language and cultural differences can affect students' interaction in school and, hence, their achievement. More information on teaching culturally diverse students is presented in Chapter 10.

REFLECTING ON THE IDEAS

Create a "culture box" to share with your peers: Think about your own culture. Choose one to three items that would best reflect who you are and what you value. Bring these items to class, and share them with your peers as you discuss how they reflect you and your culture.

Prior Knowledge and Experience

Students' prior experiences at home, at school, and in the community affect their interpretations, responses, and performance in many areas. Cognitive psychology has informed us that learning is not a passive event, like filling a cup, but an active process in which each individual builds knowledge, linking new bits of information or experience

to internal circuits (or structures) called **schemata**. Students and teachers are able to make sense of and interpret what they are experiencing and learning through the use of schemas (Borko & Putnam, 1996).

In what ways might students' prior experiences affect their learning? If, for example, students have never seen the ocean or a movie of the ocean, they may have difficulty understanding lessons on wave motions, tide pools, or *Moby Dick*. Students who have never traveled outside their hometown have fewer schemata available to provide the basis for a discussion of variation in climates.

It is important to assess your students' familiarity with major concepts that underlie your instruction. For example, students who have not experienced segregation or seen or heard about its effects are less prepared for meaningful learning regarding civil rights than those whose experiences provide ties to the subject. You might begin a lesson on the civil rights movement by asking students to interview someone who was somehow involved in or influenced by the movement. For another example, you might begin a lesson on the digestive system by beginning with an exercise that asks students to work with a partner and explain the process by drawing it on a sheet of paper.

Some students' prior experiences, either at home or in school, have not provided them with the expected concepts or skills for their grade level. Effective instructional planning must include careful diagnosis of prior knowledge, experience, and skills related to your topic.

If some students lack important knowledge and skills, you must decide whether remediation or compensation would be more appropriate. A **remedial approach**, or **remediation**, entails teaching prerequisite knowledge and skills before proceeding with planned instruction. For example, before teaching a lesson on solving problems using area and perimeter, one teacher identified several students who were unable to solve equations with two variables. Based on this finding, she divided the class into two groups and allowed one group to concentrate further on single-variable equations before introducing additional variables. Since solving for two variables is dependent on skills developed in solving single-variable equations, she believed that further instruction in these skills was necessary before that group could go on successfully to the more advanced material. If the necessary knowledge and skills can be attained in a reasonable length of time, remediation is the logical choice.

Sometimes, however, remediation is not possible or would represent an unreasonable use of class time. In such cases, a teacher may choose **compensatory instruction** instead. Compensation involves choosing an instructional approach that circumvents areas of weakness. For example, a teacher in an urban school might choose to alter a lesson on ecosystems to focus on systems found in parks and vacant lots, rather than the woodland communities emphasized in the text. This would allow the teacher to proceed with the content (ecosystems) without spending time elaborately developing concepts about woodlands. If a student is strong in math but has weak reading skills, the teacher might provide reading assistance to the student in interpreting a math story problem rather than delaying instruction in problem solving until the student's reading skills can be remediated. In each case, a compensatory approach would allow meaningful instruction to take place, despite weaknesses in prerequisite experiences or skills.

In addition to experiences, knowledge, and skills, students bring attitudes, values, and social patterns that have been shaped by prior experiences. Some students come from homes in which school success is highly valued. In other home environments, students may be encouraged to value street smarts, athletic success, or social status. Some families reward problem solving or independent thinking, whereas some emphasize conformity and the memorization of facts. Some homes are language-rich and encourage a variety of expression; other homes prefer children to be seen and not heard.

Students who come from homes that support the types of learning emphasized in school have intellectual and emotional advantages. Some do not. Careful observation and attention to student and parent comments can help you identify students who need extra support in balancing values from home and school. High expectations for all students, rewards for varied accomplishments, ties to personal experiences, and family involvement all set a classroom tone that balances recognition of the variety of values students bring to school with the encouragement of attitudes likely to promote achievement. Being aware of such student values and interests will allow you to tap those interests through lesson planning or individualized activities.

Interests

Understanding students' interests is perhaps one of the least considered aspects of preparing to teach. Certainly most teachers would agree that students are more likely to learn material if they are interested in it. Interests affect what we learn, how we pay attention, how much we persist in the face of difficulty, and how extensively we study particular subjects. However, using students' interests in teaching does not necessarily mean we will plan units solely around the latest pop culture phenomenon or current event, although such studies may sometimes be appropriate. It may mean using examples from students' interests to explain key ideas or practice essential skills. Understanding students' interests can help teachers tie curriculum to students' needs, identify fruitful areas for enrichment or independent study, and design powerful application projects.

Some of the interests and concerns of students at a given age are predictable. Strong, Silver, and Robinson (1995) referred to a "curiosity connection," in which teachers tie curriculum to key adolescent issues. For example, a study of the American Revolution is more interesting if the key question "When is rebellion justified?" is tied to students' concerns about personal independence and separation. However, other student interests may be idiosyncratic to a particular place, time, or individual(s). Identifying such interests can make the difference between students who are engaged in the lesson and those whose thoughts and concerns are anywhere but in the classroom.

Teachers have many informal ways of identifying students' interests. Certainly it would be difficult to miss the latest media/marketing craze attached to every fast-food meal, the hot issues in the school paper, or the fact that everybody teases Juanita about studying plants rather than wanting to go to the movies. However, there may be times when you want to assess student interests in a more systematic manner.

In this type of formal data gathering, you may use **open-ended questions**, **closed-ended questions**, or a combination of the two. In an open-ended response inventory you might ask questions such as these:

If I were stuck alone on a desert island and could have only three items for recreation, they would be _____.
When the news comes on, I usually listen to stories about _____.
If I could invite anyone, living or dead, to visit our classroom, I would invite _____.

By examining the responses to several such questions, it is possible to identify themes and trends in students' concerns. Such analysis can provide a wealth of information and insight into the worlds of individual students. The parallel disadvantage is, of course, that open-ended questions are not easily tallied and may be time consuming to analyze for large groups.

Another alternative is to present students with a closed-ended set of responses. One way to do this is to use a list of possible topics and interests and ask students to circle the ones they find most interesting. Also consider allowing students to decide how they might best share their interests, hobbies, or talents with you and the class. Students who have been studying dance may want to perform for the class, or students who are interested in working with computers may design a web page for the class. Others might use their knowledge of video by creating a "movie" of the class, using video clips—set to music—of their peers as they present their interests to the class.

The **KWL** strategy is a helpful means for gathering information on students' interests in a topic. To use KWL, you introduce a topic of an upcoming lesson or unit and record on a three-column chart what students know (K), what they want to know (W), and later what they have learned (L) about that subject. The KWL strategy provides reflective teachers with a rich source of useful information. It serves as an informal **preassessment** of students' prior knowledge and gives them a chance to share their interests. It is important to use this information in planning later activities; otherwise, students will not continue to raise questions or share their interests if they never have a chance to investigate them.

Students' responses to class assignments may indicate areas of interest. Students who are asked to list names, birth dates, and death dates for two generations of a family tree and respond with six generations including maiden names, occupations, and places of birth may have an interest in genealogy. Likewise, students whose five-page essays turn into a twelve-page treatise, or who constantly turn class discussions toward a favorite topic, give you clues to areas of interest.

Sometimes identifying student interests leads students to independent investigations. For example, a tenth-grade student became interested in the high school greenhouse, which had not been used in many years. Through an individual contract with the biology teacher, the student was allowed to complete some class assignments at her own pace and eliminate others while she investigated the operation of greenhouses and the possibilities for making the facility operational. As a result of her project, the student became the resident expert on greenhouses, the greenhouse became operational, and the student learned that her interests were valued by her teacher.

Other times student interests can form the basis for short- or long-term class activities. A teacher who knows that many students are preparing to get their driver's license may use car loans, insurance rates, and gas mileage to study mathematical or marketing principles. If students are involved in a school or community controversy, a history teacher may use the opportunity to draw parallels to important historical

events. Students fascinated with motion pictures may hone their writing skills developing (and possibly filming) a screenplay. You might consider asking students about their hobbies, community volunteering, or part-time jobs to determine how you might incorporate them into your curriculum and classroom assignments. In each case, the ties to students' interests would facilitate their involvement in content.

Intellectual Abilities

In every class you will find a range of general and specific intellectual abilities. General intellectual ability is traditionally indicated by IQ scores derived from a test originally developed to predict success in school. Although IQ tests frequently provide information on the ease with which individuals approach school tasks, they have been called into question as measures of total intellectual potential. Since the early 20th century, psychologists have debated the importance of general intelligence versus sets of specific academic abilities. Are individuals generally either "smart" or "less smart," or do they differ in more complex ways? Might a person be intelligent in math and less intelligent in literature? What kinds of important intellectual abilities might not be measured by paper-and-pencil tests or a test given in one day?

Contemporary learning theorists continue to debate the nature of intelligence itself. Two examples will suffice, as a complete description of theories of intelligence is beyond the scope of this book.

Sternberg (1985, 1997) developed a theory of intelligence that includes three basic components: the componential system, or workings, of the mind in processing information; the response to novelty; and the ability of the individual to react to the environment, an ability we might call practical intelligence, or street smarts. Individuals who have strengths in one of these three areas might show very different abilities. Persons whose componential systems are particularly strong might be a whiz at taking in and processing information. They might have little trouble analyzing a complicated math formula or remembering factual information for a test. Individuals who deal well with novelty might come up with original ideas or be excellent problem solvers. They might write unique stories, invent interesting experiments in chemistry class, or constantly suggest alternatives to class assignments. You have probably known someone with particular ability to interact with the social environment, someone who always knows the way to get things done—someone with practical intelligence. When students were taught in ways that emphasize all three types of intelligence, student achievement improved (Sternberg, Grigorenko, & Jarvin, 2000; Sternberg, Torff, & Grigorenko, 1998).

Gardner (1983, 1991, 1993) believes that we all have **multiple intelligences**. His original work identified seven independent intelligences: linguistic, musical, logical-mathematical, spatial, bodily-kinesthetic, interpersonal, and intrapersonal. According to this theory, each person has a unique profile of intelligences, strong in some, weaker in others. Fine dancers might have exceptional bodily-kinesthetic intelligence but not necessarily be outstanding in mathematics or music. Persons with unusual interpersonal intelligence might make particularly fine counselors, teachers, or friends. More than ten years after the original model was developed, Gardner identified an eighth intelligence: naturalist intelligence (Checkley, 1997). Gardner believes that as he continues his work,

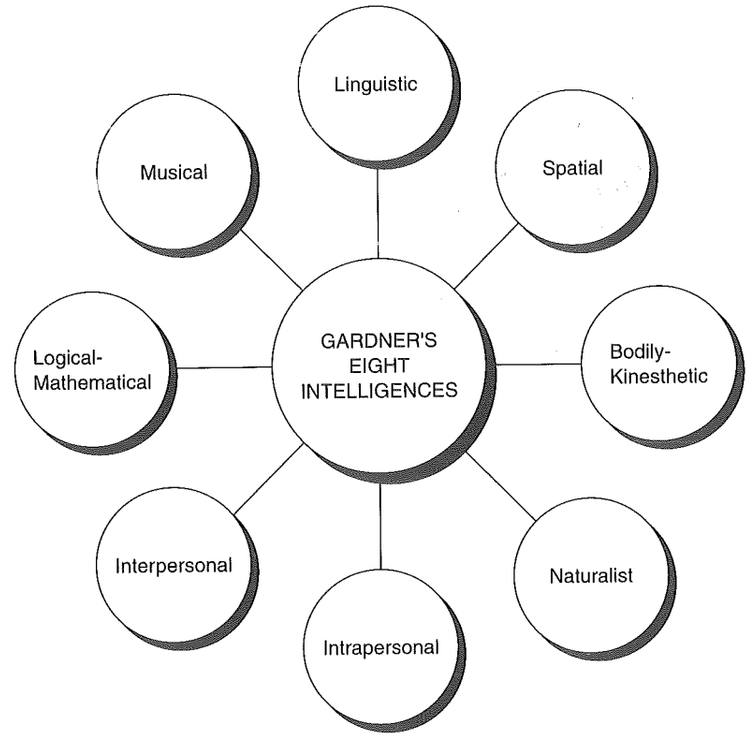

Figure 2.2 Gardner's Eight Intelligences
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other intelligences will be identified. Schools traditionally have focused their attention on only two of Gardner's seven intelligences: linguistic and logical-mathematical. Some educators now are trying to identify the intelligences through which individual students learn best; they are also working to develop all types of intelligence in classroom settings (Armstrong, 1994; Gardner, 1993) (see Figure 2.2).

The roles of general and specific ability or the validity of test scores will continue to be debated. Yet, several things are clear from a practical standpoint. Students' intellectual abilities differ in complex ways. They can be thought of as having profiles of intelligence, with strengths in some types of thinking and relative weaknesses in others. Some students learn traditional school tasks quickly and easily. They can solve problems, think abstractly, and remember information more readily than others. Other students may have other intellectual strengths, but have not had many successes in school. These students need more assistance in learning, extended opportunities for practice, and a careful linking of new and prior experiences.

Most students demonstrate strengths in some areas and weaknesses in others. It is important to provide appropriate instruction for such students, challenging their abilities with a depth and pace of instruction that would not be appropriate for all students. If students show advanced ability in language but difficulty in mathematics, it is important to investigate such patterns and vary instruction to meet them. Teachers may also wish to consider how to nurture less traditional forms of intelligence and become more aware of students' strengths and weaknesses in spatial, kinesthetic, or interpersonal learning. It is much more important to match instruction to students' needs than to worry about whether students' particular patterns of abilities mean the students are or are not "intelligent."

Finally, teachers must be cautious about interpreting any test that attempts to assess intellectual ability. A test score represents performance on a particular day. The score may be influenced by factors as diverse as illness on the day of the test, familiarity with the language of the test, and prior experience with the vocabulary and materials of testing. Cultural and language differences have a significant impact on traditional test performance. Students who have been exposed to key test vocabulary words clearly have an advantage over those who have not or those for whom the English language is unfamiliar. Students who have worked with computers before are likely to be more comfortable in a testing task involving computers than those for whom using computers is a new experience. Are those students less "smart" than students whose previous experiences have enabled them to be more successful test takers? To provide instruction that is appropriate to student needs and abilities, teachers must take into account IQ and standardized test information as well as observations of performance under a wide range of circumstances.

REFLECTING ON THE IDEAS

List at least four ways in which students in an eighth-grade class might differ from one another. How might each of these differences affect how you might teach a curriculum unit in your content area?

Learning Styles

In addition to intellectual strengths and weaknesses, students vary in the ways they learn best, or their **learning styles.** Hunt (1979) said that learning style "describes a student in terms of those educational conditions under which he is most likely to learn. Learning style describes how a student learns, not what he has learned" (p. 27).

One principle underlies the many theories of learning styles: All individuals do not learn best in the same way. Circumstances or methods that may promote learning for one individual may not be helpful for others. Some learning styles are not better or stronger than others, merely different. An approach may seem logical to a teacher and work well for some students—the students whose styles are similar to that of the teacher—but not be effective for other equally intelligent students whose styles are different.

Perhaps the simplest variation in learning styles may be found along sensory channels. Some individuals learn most effectively through visual information; they process

information best if they acquire it through their eyes. Others learn best auditorily, processing information most efficiently if they acquire it through their ears. Still others benefit most from information presented kinesthetically, involving the sense of touch or whole-body movement. These differences do not reflect the relative acuity of eyes, ears, or other senses. Although students with poor eyesight certainly would have trouble with information presented to them only visually, persons with 20/20 eyesight may still not process visual information well. The connection between the eyes and the brain simply may not function as well as the connection between the ears and the brain. For example, students who are strong auditory learners may best experience the civil rights movement by listening to the teacher or other speakers talk about people, events, and issues. Strong visual learners would absorb the lesson most successfully through a combination of pictures, video, and text. Kinesthetic learners would benefit from opportunities to role-play a dramatization of key events.

Some learning styles theories are based on other ways individuals absorb and process information (Guild & Garger, 1998). For example, Gregorc (1982) derived a theory of learning styles based on the ways individuals organize and process information from all the senses together. His model is based on two opposing dimensions of learning processes: perception and organization. *Perception* refers to the means by which an individual acquires information. Most people have the ability to perceive both concrete information (accessible to the senses) and abstract information (ideas, feelings), although one way or the other may be more comfortable for them.

Individuals also vary in how they *organize* information. Some individuals organize information best in a sequential or linear way, with each bit of information leading to the next in a straight-line manner. Others are more comfortable with an organization Gregorc calls *random,* a nonlinear, holistic approach characterized by leaps of logic and the processing of several bits of information simultaneously. Each individual can have preferences somewhere on the continuum between the two extremes.

Gregorc combines the perceptual and organizational abilities into four learning styles associated with particular behaviors and characteristics; concrete sequential, abstract sequential, abstract random, concrete random. Each style has a unique and organized view of the world and operates from a particular point of view. Although no individual operates in only one style, many people have strong preferences for one or more channels. Such preferences can be identified through a learning styles inventory or more informal observations of behavior, language, and habits.

Individuals with a dominant *concrete sequential* (CS) style prefer to work with concrete information processed in a sequential manner. Such individuals might be characterized as practical, structured, down-to-earth, and organized. CS adults balance the checkbook carefully, organize closets, and rarely forget appointments. CS teachers are naturals at keeping complete records, arranging classroom materials, and developing logical units of study. CS students learn best when information is presented in a systematic fashion, with practical applications and hands-on activity.

Persons with a dominant *abstract sequential* (AS) style prefer learning abstract information and organizing it sequentially. Such persons may be seen as studious and intellectual. Adults with AS style are happiest when searching for new knowledge, analyzing problems, or evaluating issues through logic and reason. They may not be

concerned with such concrete issues as whether two socks match or the outdoor temperature. Further, AS teachers may present brilliant lectures or carefully structured research projects, and AS students may debate logically, analyze literature critically, and forget their lunch.

Individuals with an *abstract random* (AR) style prefer abstract information, but process it in a holistic, nonlinear fashion. These persons may be seen as sensitive, emotional, and artistic. AR individuals may write poetry, counsel friends, and be expert at relationships, whether between individuals or academic disciplines. They may have moments of personal or professional insight without being able to explain them. AR teachers love interdisciplinary teaching, thematic units, and a classroom full of art (including on the ceilings). AR students may be the life of the class, have an eye for beauty, and possess a wonderful imagination, but have little idea how to transfer ideas into concrete reality.

Finally, *concrete random* (CR) individuals process concrete information in nonlinear ways. CR individuals are natural problem solvers, explorers, and inventors. CR individuals love to tinker with gadgets, appliances, or ideas. Their garages and cupboards may overflow with spare parts and unusual tools for future experimentation. As teachers, they have classrooms full of experiments and emphasize creative problem solving and independence, and CR students flourish in such an atmosphere, often finding solutions to problems through intuitive leaps they cannot explain. Like AR learners, CR students have trouble when asked to show their work (Butler, 1986; Gregorc, 1982).

In this brief overview, you may have caught a glimpse of yourself or someone you know. In examining how these characteristics might affect teaching and learning, you might consider what would happen if teachers of one style taught students of another style, or vice versa. The mismatch between teaching style and learning style could create difficulties for both student and teacher. None of the styles are "right"; they are just different.

Schools should not try to match teachers' and students' styles in assigning classrooms. Aside from the logistical difficulties of such a proposal, it would be a disservice to allow students to function in only their preferred mode. Students need to learn to adapt to different situations, taking on various styles as needed. However, teachers can make sure that at least some of the activities for each topic or unit allow students to function in preferred ways. In addition, teachers can provide special support to students assigned work outside their preferred styles.

Kathleen Butler (1995, 1996) has developed materials to teach adolescents about their learning styles. She believes that helping students understand their personal style can help them study more effectively and interact more productively with teachers and peers. You may want to consider whether teaching your students about style difference may be an effective way to enhance their learning. You may also want to examine your own experiences as a learner and reflect on how these experiences have caused you to feel more comfortable, successful, or capable in the learning of some subject areas or classrooms than others. Knowing this information about yourself will help you when reflecting on how to approach the different styles of your future students.

Dunn and Dunn (1975; Dunn, 1996, 1997) have a different approach. They describe learning styles as "the manner in which 18 different elements of four basic stimuli affect a person's ability to absorb and to retain information, values, facts or concepts" (1975, p. 74). The four types of stimuli are environmental, emotional, sociological, and

physical. For example, under environmental stimuli, students may prefer bright or dim places, warm or cool places, a specific noise level, or a particular physical arrangement. Emotional stimuli include variation in motivation, persistence, responsibility, and amount of structure preferred. Sociological variables include preferences for working individually, in pairs, in teams, or in groups. Physical variables include perceptual (sensory modalities) differences and preferences for food and time of day. Each variable interacts with culture and prior experiences in complex ways. The fact that students vary in their responses to such a large number of variables helps to explain the number of individual differences found in each classroom. Dunn and others (1995) found that despite these limitations, matching individual style preferences can have a positive impact on student learning.

One of the more interesting questions in learning styles research is whether styles vary along one or more dimensions across cultural groups (Dunn & Griggs, 1995; Shade, 1997; Smith, 1998). Gay (1994) notes that culture and ethnicity have a strong impact on shaping learning styles, but that it is essential to use caution in interpreting research. An emerging research base suggests that patterns of learning styles differ across cultures. Boykin (1994), for example, examines learning styles in African American students; Swisher and Doyle (1992) review style patterns among Native Americans; and Shade (1997) provides a helpful summary across populations. As you learn about the cultural groups you teach, it may be helpful to consult literature on style differences. The gender and socioeconomic background of your students also may have an impact on their learning styles. However, it is essential to remember that generalizations across an entire population are of limited value when applied to a specific individual. Each student in your classroom must be considered as an individual, not as a representative of a particular group.

REFLECTING ON THE IDEAS

Imagine you are teaching a unit on fractions. List three activities that would appeal to varying learning styles. You may use any of the learning style frameworks presented above. Label each with the learning style(s) to which it would appeal. For example, "Create a model that represents the following fractions: 1/3, 5/6, and 17/15—visual."

Which of the activities listed are most appealing to you? Think about how your own learning style may affect your teaching. In what ways might it be helpful? In what ways might it cause difficulties for your students?

SECTION 2. LEARNING: HOW DOES LEARNING OCCUR?

Section 2 Objective

After you have completed this section, you will be able to explain how the mind constructs meaning and its implications for teaching.