This file discusses briefly (1) the four dimensions underlying the Myers-Briggs Type Indicator (MBTI), and (2) several teaching approaches that will appeal to different MBTI profiles.

The 126 item Myers-Briggs Type Indicator (MBTI), Form G, is the most reliable method for assessing student learning style. The MBTI provides data on four sets of preferences. These preferences result in 16 learning styles, or types. A type is the combination of the four preferences. The most common MBTI type for business undergraduates is the ESTJ, the Extraverted-Sensing-Thinking-Judger.

The MBTI instrument should be administered in the first or second class period by the counseling center at your school. It takes about 45 minutes to complete the instrument. The counseling center can score the MBTI and share the data with the students. Students enjoy learning about themselves and find the MBTI data informative.

Extraversion (E) versus Introversion (I)

This preference tells us how people "charge their batteries." Introverts find energy in the inner world of ideas, concepts, and abstractions. They can be sociable but need quiet to recharge their batteries. Introverts want to understand the world. Introverts are concentrators and reflective thinkers. Their motto is: Ready, Aim, Aim, ..... For the introvert, there is no impression without reflection.

Extraverts find energy in things and people. They prefer interaction with others, and are action oriented. Extraverts are interactors and "on-the-fly" thinkers. Their motto is: Ready, Fire, Aim. For the extravert, there is no impression without expression.

The majority of undergraduate students are extraverts. Based on data from the Center for Applied Psychological Type (CAPT) between 56% and 58% of over 16,000 freshman students at three state universities were extraverts. Interestingly, over 83% of college student leaders were extraverts, while over 65% of Phi Beta Kappas were introverts. Our own data base indicates that over 65% of business students are extraverts. It is not surprising that almost two-thirds of undergraduate business students are extraverts. Students may major in business administration because the business world appreciates and rewards action which coincides with the extraverts' strength.

The majority of university faculty are introverts. CAPT reported that almost 55% of 2,282 faculty are introverts. Our own data base for business faculty indicates that over 60% are introverts.
Student Learning and the Myers-Briggs Type Indicator

Teaching Extraverted Students

Extraverted students learn by explaining to others. They do not know if they understand the subject until they try to explain it to themselves or others. Extraverted students have told us that they thought they knew the material until they tried to explain it to a fellow student. Only then did they realize they did not understand the subject.

Extraverted students enjoy working in groups. Consider in-class or outside-of-class group exercises and projects. We recommend the

- Thinking Aloud Paired Problem Solving (TAPPS) method and
- Nominal Group Method.

Both support learning through explaining, but provide quiet time for introverted students.

**TAPPS**

- Teacher poses question and provides quiet time for students.
- Teacher designates the explainer and listener within each dyad.
- Explainers explains ideas to listeners. Listeners can (1) ask questions of clarification, (2) disagree, or (3) provide hints when explainers becomes lost
- Teacher critiques some explainers' answers and provides closure

**Nominal Group Method**

- Teachers pose question and provide quiet time for students.
- Each team member shares ideas with others in a round-robin fashion.
- Teams discusses ideas and reaches closure.
- Teacher critiques some team's answers and provide closure.

Teaching Introverted Students

In a seminal study, George Miller noted that people can hold $7 + 2$ chunks of knowledge in their minds at any given time. If each knowledge chunk contains a specific fact, then the amount of knowledge possessed is limited. But if each chunk contains many interconnected facts, a network or framework of facts, then the amount of knowledge is almost unlimited.

Introverted students want to develop frameworks that integrate or connect the subject matter. To an introvert, disconnected chunks are not knowledge, merely information. Knowledge means interconnecting material and seeing the "big picture."

Faculty should teach their students how to chunk, or group and interconnect, knowledge. Introverted
students will appreciate it, extraverted students may not. Nevertheless, cognitive psychologists tell us that through chunking, students master the material. We recommend that faculty teach students how to build a compare/contrast table, flowchart, or concept map.

**Sensing (S) versus Intuition (N)**

Some of us choose to rely on our five senses. Some prefer taking in information through our "sixth" sense. Sensing people are detail oriented, want facts, and trust them. Joe Friday from the TV show Dragnet epitomizes the extreme sensing detective. All he ever wanted was "just the facts".

Intuitive people seek out patterns and relationships among the facts they have gathered. They trust hunches and their intuition and look for the "big picture." The quintessential intuitive was Albert Einstein whose fanciful thought experiments revolutionized the 20th century. He could see patterns where others saw randomness or chaos.

The majority of undergraduates are sensing students. Based on data from the Center for Applied Psychological Type (CAPT) between 56% and 72% of over 16,000 freshmen at three state universities were sensing students. Interestingly, almost 83% of national merit scholarship finalists and 92% of Rhodes Scholars were intuitive students. Our own data base indicates that over 65% of *business* majors are sensing students.

The majority of university faculty are intuitive. CAPT reported that almost 64% of 2,282 faculty are intuitive. We obtained the same percentage from our business faculty data base.

**Teaching Sensing Students**

Sensing students prefer organized, linear, and structured lectures. We recommend three methods for organizing a lecture: (1) the what must be known organizing strategy, (2) the application-theory-application organizing strategy and (3) the advance organizer.

In the **what must be known (WMBK)** method, we first ask: What is (are) the topic's most essential general principle(s) or goals? Place the answer in a goal box. We then ask: What topic(s) must be known such that students could achieve the goal? Place these subgoal boxes below the goal box and show an arrow leading from each subgoal box to the goal box. Continue to ask WMBK questions until you interface with material previously covered. You would then present the lecture by starting at the bottom of the diagram and work up towards the goal box.

The A-T-A method begins with a faculty member presenting an (A)pplication (problem or mini-case) to the class. The students attempt to analyze and solve the case or problem **without** the benefit of the upcoming chapter's theory or ideas. Applications *motivate* sensing students to learn the material. Applications answer the question that sensing students often ask, "why am I learning this material?"
After the class has struggled with the problem (and sometimes emerged victoriously), the teacher presents the chapter's (T)heory or ideas, and then applies it to the original application. Afterwards the teacher presents additional (A)pplications and has the students apply the theory.

An opening application problem or mini-case should (1) be familiar to students, (2) engage their curiosity, (3) be almost solvable from previous text material or student experiences, and (4) be baffling, or counter-intuitive, if possible. A familiar problem assures sensing students that their experiences have prepared them to address the problem. The third attribute minimizes students' frustrations. The application should be "just beyond a student's reach". However, previously learned material or experiences should help students make a reasonable solution attempt. An application that is too significant a leap will cause frustration, and the feeling that the teacher is playing games with the students.

David Ausubel's advance organizer is a brief lecture or demonstration during the introduction of the lecture that provides a mental scaffolding to anchor the new material. The advance organizer provides a set of highly general concepts that subsume the material about to be learned. An advance organizer taps into students' existing knowledge structures. It helps cross-list new information with already existing information and thus aids learning and knowledge retrieval. It makes the unfamiliar more familiar; it makes the abstract more concrete.

Note how the following advance organizer taps into existing knowledge that the students should have already acquired.

- Subject:------- Gandhi's march to the sea
- Organizer:---- King's march on Washington mini-lecture
- Audience:---- African-American high-school students
- Goal:---------- Connects Indian history to an existing civil rights knowledge base.

The advance organizer is not an overview. An overview would have introduced the students to the lecture's key ideas: Gandhi, salt monopoly, British policy, boiling sea water, etc..

The advance organizer provides a familiar setting to anchor new, and potentially strange, material. The organizer works because at a very general level, the marches of King and Gandhi dealt with charismatic leaders in a struggle against oppressive forces. For an African-American audience, the MLK organizer transformed an abstract lecture into a familiar and more concrete setting.

Faculty can develop advance organizers by answering the following questions:

- 1. What do students know that at a very general level is similar to the subject matter about to be taught?
- 2. How can I demonstrate the connections between what is known and what is to be learned?
Teaching Intuitive Students

Intuitive students prefer either the traditional Theory-Application-Theory approach or the A-T-A approach using discovery learning. We illustrate the A-T-A approach using discovery learning in teaching the central limit theorem in a basic statistics course. The teacher selects 50 numbers from a random numbers table, and develops a frequency histogram. The data are not bell-shaped. The teacher then selects 30 samples of size eight numbers (replacing each number after it is drawn) from the 50 numbers, computes the 30 means, and develops a frequency histogram for the means. The histogram is now roughly bell-shaped. The teacher concludes the demonstration by asking why is the histogram of means nearly bell-shaped. Using the discovery method, students hopefully will discover the reasons underlying the central limit theorem.

The discovery method, or the why method, will appeal to intuitive students and will teach sensing students how to uncover general principles. In using this method, sensing and intuitive students should be combined in learning groups. The intuitive student can help the sensing student to discover the theory; the sensing student can help identify and marshal the facts of the exercise.

Intuitive students must have the big picture, or an integrating framework, to understand a subject. The big picture shows how the subject matter is interrelated. Intuitive students can develop reasonably correct concept maps or compare and contrast tables. Fortunately, sensing students can be taught to do the same.

Thinking (T) versus Feeling (F)

Some of us choose to decide things impersonally on analysis, logic, and principle. Some of us make decisions by focusing on human values. Thinking students value fairness. What could be fairer than focusing on the situation's logic, and placing great weight on objective criteria in making a decision. Mr. Spock, science officer of the starship Enterprise, had an extreme preference for thinking.

Feeling students value harmony. They focus on human values and needs as they make decisions or arrive at judgments. They tend to be good at persuasion and facilitating differences among group members. Dr. McCoy, Spock's colleague aboard the Enterprise, demonstrated a preference for feeling.

Unlike the two previous sets of preferences, CAPT reports that on this dimension, the proportion of males and females differ. About 64% of all males have a preference for thinking, while only about 34% of all females have a preference for thinking.

Our own data base indicates that over 70% of male and female under-graduate business students are thinking students. It is not surprising that the majority of business majors are thinking students. Business is, after all, the domain of logic and analysis.
The majority of university faculty have a preference for thinking. CAPT reported that almost 54% of 2,282 faculty are thinking. Seventy percent of business faculty have a preference for thinking. Thus, on the thinking versus feeling preference, business faculty and students are similar.

**Teaching Thinking Students**

Thinking students like clear course and topic objectives. Clear course or topic objectives avoid vague words or expressions such as "students will appreciate or be exposed to." Rather, objectives are precise and action-oriented. By precise we mean that teachers can write objectives at three meta-levels of learning: rote, meaningful and integrated, and critical thinking. By action oriented we mean that the verbs describe what students must do, not what faculty will do. The Bloom et al. taxonomy provides guidelines for writing clear and meaningful objectives.

**Teaching Feeling Students**

Feeling students like working in groups, especially harmonious groups. They enjoy the small group exercises such as TAPPS and the Nominal Group Method. To promote harmonious groups, we sometimes provide students with the following guidelines on how to facilitate small group meetings inside or outside of class:

- Make process suggestions to regain session focus.
- Keep individuals from *personally* attacking one another.
- Monitor time remaining within a session and gently remind members.
- Encourage equal participation among members in discussion phase.
- Demonstrate collaborative-seeking (WIN-WIN) behaviors.
- Assure that recorder writes legibly.
- Respond to group member's questions to you by restating the question and asking other group members to respond (the boomerang method).
- Recognize that all the objectives and goals within a session may not completed. Get group to do the possible given the time constraints.
- Use light-hearted (or self-deprecating) humor to break tension.
- Keep group enthusiasm high and sell ideas to members.

**Judging (J) versus Perceptive (P)**

Some of us like to postpone action and seek more data. Others like to make quick decisions. *Judging* people are decisive, planful and self-regimented. They focus on completing the task, only want to know the essentials, and take action quickly (perhaps too quickly). They plan their work and work their plan. Deadlines are sacred. Their motto is: just do it!

Perceptive people are curious, adaptable, and spontaneous. They start many tasks, want to know
everything about each task, and often find it difficult to complete a task. Deadlines are meant to be stretched. Their motto is: on the other hand ... .

The majority of undergraduate students are judging students. Based on data from the Center for Applied Psychological Type (CAPT) between 46% and 60% of over 16,000 freshmen at three state universities were judging students. Interestingly, almost 64% of Rhodes Scholars were perceptive students. Our own data base indicates that over 70% of undergraduate business students are judging students.

The majority of university faculty also have a preference for judging. CAPT reported that almost 65% of 2,282 faculty prefer judging. We obtained the same percentage from our business faculty data base.

Teaching Judging Students

We have found that the following hints on note taking and test taking help judging students learn more effectively.

**Speedwriting**
Most students can learn speedwriting in several minutes. Just omit all (or most) vowels. Or develop your own shorthand method. For example, mst stdnts cn lrn spdwrtng in svrl mnts. Jst omt ll or mst vwls.

**Split Page**
Draw a line down center of a notebook page. On the left-hand side, record the lecture (use speedwriting or your own shorthand notation). After class, write a commentary on the right-hand side. Include restating ideas in your own words, finding sources of confusion, identifying key points, looking for links to earlier learned material, and asking what does this mean to me (the student).

**Color Coding**
Use different colors to record ideas presented in class and found in the text or readings. For example, use blue to code major ideas and green to code links to previously learned material.

**AOR Model**
In answering an essay question, first Analyze the question and jot down key ideas, Organize the ideas into a logical sequence, and only then write the essay (Respond).

**Reverse Question**
To review an essay question, first read your answer. Then construct a essay question based on your answer. Now compare your question to the teacher's question. If different, revise your answer. This strategy ensures that students answer the teacher's question.

**Treating Objective Questions as Essay Question**
Read the question's stem (the portion that contains the question) and write a brief answer. Then compare your answer to the four or five choices, and select the answer most similar to your mini-essay.
Your universities' learning resource center is an especially good source for additional hints on note and test taking. Include several hints in each course syllabus. Spend a few minutes explaining these hints in the first class period. Occasionally remind the students of the hints (especially before the first exam).

Judging students often reach too-quick closure when analyzing cases. Thus we recommend a second-look meeting. After completing the case, the group reviews their analysis. A student plays a "gentle" Devil's Advocate (DA) and challenges the group's conclusions. The DA should be prepared to recommend an alternative solution. This will force the group to consider the pros and cons of both approaches. The DA can also ask team members to state assumptions about stakeholders (those who are affected by or will affect the case solution) which must be true for the group's solution to be effective. The DA can then challenge the group to provide evidence that the assumptions are true. Guidelines for a second-look meeting should be included in the case preparation hints provided to students.

Teaching Perceptive Students

Perceptive students often postpone doing an assignment until the very last minute. They are not lazy. Quite to the contrary, they seek information to the very last minute (and sometimes beyond). We recommend decomposing a complex project or paper into a series of sub-assignments and providing deadlines for each sub-assignment. The deadlines may keep the perceptive students on target.

Decomposing a major project into sub-assignments provides the opportunity for continuous feedback to the student. Have students hand-in an audio tape with their sub-assignments. The teacher can then provide detailed audio (we speak faster than we can write) comments on content and grammar. When we have used the audio feedback approach, final papers are clear and readable, and thus less aggravation to read. Moreover, without the teacher's interim feedback, students lose an opportunity to improve their writing skills during the semester.

Additional Readings

The MBTI instrument is available from Consulting Psychological Press in Palo Alto, California.


George Miller, "The Magical Number Seven, Plus or Minus Two," Psychological Review, April 1956, pp.81-97.


Benjamin Bloom, M. Englehart, E. Furst, W, Hill and D. Krathwohl, Taxonomy of Educational