The Future of Christian Education

I. A Vision for a New Millennium

Introduction

When we walk into a classroom in 2009, what do we see? Too often the same thing we would have seen in 1979, or 1949, or 1919. The professor stands at the front of the room, copying a derivation from his notes onto the board and repeating aloud what he writes. The students sit passively, copying from the board, reading, working on homework from another class, or daydreaming. Once in a while the professor asks a question: the student in the front row who feels compelled to answer almost every question may respond, and the others simply avoid eye contact with the professor until the awkward moment passes. At the end of the class students are assigned several problems that require them to do something similar to what the professor just did. The next class is the same, and so is the next one, and the one after that.

The Technological Personality of the 21st Century

Seven challenges of the coming century.

1. **Information: Proliferating.** The Internet, virtual environments, and CD-Rom discs.
2. **Technological development: Multidisciplinary**. The key to better technological development lies in cooperation among the previously separate disciplines to attack problems that have no recognizable disciplinary boundaries—theology, philosophy, psychology, anthropology, and sociology.
3. **Markets: Globalized.** Succeeding internationally requires cultural and economic understanding no less than technological expertise.
4. **The Environment:** Endangered. Industry will require that profitability be achieved within the context of not harming people or their habitat.
5. **Social Responsibility: Emerging.** Potential social consequences of the decisions that are made will be seriously considered.
6. **Corporate Structures: Participatory**. Greater participation of individuals in the decision-making process. The elimination of middle management.
7. **Change: Rapid**. Changes of a magnitude that not long ago would have taken years now occur on a time scale of months or weeks, as anyone who purchased a computer over one year ago realizes.

The education that succeeds will be the one that facilitates lifelong learning, equipping students with the skills they will need to *adapt* to change.

Three Components of Education: Knowledge, Skills, and Attitudes/Values

1. Knowledge—the facts they know and concepts they understand.

The volume of information that students are called upon to know is increasing far more rapidly than the ability of curricula to "cover it." The focus in education must shift away from the simple presentation of knowledge and toward the integration of knowledge and the development of critical skills needed to make appropriate use of it.

2. Skills—managing and applying their knowledge, such as analysis, synthesis, evaluation, communication, leadership, and teamwork.

(1) **Independent, interdependent and lifetime learning skills.**
Students routinely work with peers to identify key resources and to step through the superabundance of available information to identify what is really important, formulate learning objectives, assess the extent to which they can believe what they read, and learn from and communicate newly-acquired information to others. In working with others, the students learn to recognize their own learning styles, strengths, and weaknesses, and to take advantage of the synergy that comes from people with a diversity of backgrounds and abilities working together toward a common goal. If we can help them become independent learners, developing and relying on their own reasoning ability rather than accepting information presented by others at face value, and interdependent learners, using the strength of the group to compensate for and overcome their own limitation, we will be equipping them with the lifelong learning skills they will need for success throughout their post-graduate careers.

(2) **Problem solving, critical thinking, and creative thinking skills**.
To be considered effective problem solvers our students should be able to draw upon a wide range of analytical, synthetic, and evaluative thinking tools, problem-solving heuristics, and decision-making approaches. When given a problem to solve, they should be equipped to identify the goal and put it in context; formulate a systematic plan of attack that incorporates a suitable blend of analysis, synthesis, evaluation, and problem-solving heuristics; locate sources of information; identify main ideas, underlying assumptions, and logical fallacies, and evaluate the credibility of the identified sources; create numerous options and classify and prioritize them; make appropriate observations and draw sound inferences from them formulate and implement appropriate measurable criteria for making judgments; develop cogent arguments in support of the validity or plausibility of a hypothesis or thesis; generate new questions or experiments to resolve uncertainties; and monitor their solution process continuously and revise it if necessary.

(3) **Interpersonal and teamwork skills**.
Ministry is by its nature a cooperative enterprise, done by teams of people with different backgrounds, abilities, and responsibilities. The skills associated with successful teamwork—listening, understanding others' viewpoints, leading without dominating, delegating and accepting responsibility, and dealing with interpersonal conflicts that inevitably arise—may be more vital than technical expertise. Being aware of others' needs and taking them into consideration when making decisions—

the essence of teamwork—is surely a prerequisite to functioning professionally and ethically.

(4) **Communication skills**.
The teamwork necessary to confront the technological and social challenges facing tomorrow's leaders will require communication skills that cross disciplines, cultures, and languages. Graduates will have to communicate clearly and persuasively in both speaking and writing with others. Effective communication is a skill that can be taught, but doing so requires a conscious effort from those who design curricula.

(5) **Self-assessment skills**.
"Whoever owns the assessment, owns the learning" The more we can empower students to assess accurately the knowledge and skills of others and their own knowledge and skills accurately, the more effective and confident they will become as learners.

(6) **Integrative and global thinking skills.**
This requires both generic problem solving skills and integrated and structured knowledge of the curriculum. Material should not be taught as separate, self-contained subjects.

(7) **Change management skills.**
The one certainty in the coming decades is that it will change, because everything else will change. The growth of technology will lead to rapid product obsolescence. Students must learn the capacity to adapt.

3. Attitudes—that dictate the goals toward which their skills and knowledge will be directed—personal values, concerns, preferences and biases.

The most lasting effect of education on students is the maturation of their values and ethical sense. Students should be inculcated with the values of (1) willingness to participate, (2) concern for the preservation of the environment, (3) coequal commitment to quality and productivity, and (4) involvement in service to others. The fallacious assumptions of those who designed the curricula of the past half-century seems to have been that including several humanities courses should be sufficient to produce responsible and ethical graduates. The failure of the curricula to address attitudes and values systematically has had unfortunate consequences. Graduates often make decisions without feeling a need to take into account any of the social, ethical, and moral consequences of those decisions.

Obstacles to Change

- In the traditional approach to teaching, the professor lectures and assigns readings and well-defined convergent single-discipline problems, and the students listen, take notes, and solve problems individually.

- **Active pedagogical techniques have repeatedly been shown to be more effective:** cooperative (team-based) learning, inductive (discovery) learning, the assignment of open-ended questions, multidisciplinary problems and problem formulation exercises, the routine use of in-class problem-solving, brainstorming,

and trouble-shooting exercises, and other methods designed to address the spectrum of learning styles to be found among students in every class.

- The superiority of the alternative methods at achieving desired both cognitive and affective educational outcomes has been demonstrated in thousands of empirical research studies and is heavily supported by modern cognitive science. Nevertheless, straight lecturing and convergent problems continue to predominate in most institutions. A substantial number of professors are still unaware of alternative educational methods, and many who are aware of them choose not to incorporate them into their approach to teaching. There are several likely reasons for this inertia, aside from the inevitable human resistance to change.

1. Most professors begin teaching without so much as five minutes training on how to do it.
2. Straight lecturing is the only instructional strategy most professors have ever seen.
3. It is hard to predict what might happen in a student-centered class.
4. Because of initial student resistance, professors courageous enough to try the new teaching methods are likely to become discouraged, give up, and revert to straight lecturing.

Factors Supporting Change

1. The demands of industry for higher quality teaching programs.
2. Growing competition for students.
3. The presence of hard evidence to support claims of improvement in learning.

The Critical Questions

1. Revisions in Curriculum and Course Structures

- How to incorporate applications, inductive presentations, discovery learning, and problem-based learning?
- How to integrate class material across courses and disciplines, so that students become accustomed to thinking along interdisciplinary lines in their approach to problem-solving.
- How can “clusters of concepts” be presented systematically throughout the curriculum?

2. Teaching Methods

- What forms of in-class activities, homework assignments, laboratory exercises, and testing and grading policies and procedures, have been found most effecting at increasing knowledge and critical skills and at promoting and reinforcing positive professional attitudes?
- What is an appropriate balance between teacher-centered and student-centered instruction?
- Between cooperative and individual learning?
- Between active experimentation and reflective observation?
- Between abstract concepts and concrete information?
- Between routine drill and high-level thinking problems, and between convergent (closed-ended) and divergent (open-ended) problems?
- How can students be motivated to be self-directed learners?

- How can they be helped to overcome the resistance many of them feel to approaches that make them take more responsibility for their own learning?
- How might we overcome faculty reluctance to try something new in the classroom?

3. Instructional Development.

- What material should instructional development (teacher training) programs cover?

If you get only one idea from this paper: The key idea is that traditional instructional methods will probably not be adequate to equip graduates with the knowledge, skills, and attitudes they will need to meet the demands likely to be placed on them in the coming decades, while alternative methods that have been extensively test offer good prospects of doing so.

II. Teaching Methods that Work

Introduction

Deficiencies in education have been exhaustively enumerated in recent years. Professors have been told by countless commissions that we must strengthen our courage of fundaments; teach more about "real-world" operations, including quality management; cover more material; offer better instruction in both oral and written communication skills and teamwork skills; provide training in critical and creative thinking skills and problem-solving skills; produce graduate who are conversant with ethics and the connections between technology and society; *and reduce the number of hours* in the curriculum so that the average student can complete it in four years.

This is an impressive wish list—especially when the last item is included—that cannot possibly be fulfilled using the traditional single-discipline lecture approach. Even if nothing new is added to the existing curriculum, confining it to four years will be almost impossible unless more efficient and effective ways to cover the material can be found.

The reality is that better teaching methods exist. The literature in general education, technical education, and educational psychology is replete with methods that have been shown to facilitate learning more effectively than the traditional single-discipline lecturing approach.

1. **The following instructional methods are relevant to theological education.** Many innovative instructional methods have been developed for nontechnical courses and emphasize free discussion and expressions of student opinions, with minimal teacher-centered presentation of information. We believe that involvement of students is critical for effective classroom learning; however, much of the basic content of theological courses is not a matter of opinion. Educational approaches that emphasize process exclusively to the detriment of content will not be considered.
2. **They can be implemented within the context of the ordinary classroom.**
3. **Most professors should feel reasonably comfortable with them after a little practice.**
4. **They are consistent with modern theories of learning and have been tried and found effective by many educators.**

1. Formulate and Publish Clear Instructional Objectives

Explanation

1. **Instructional objectives are statements of what students should be able to do to demonstrate their mastery of course material and desired skills.**

2. **The behavior specified in an instructional objective must be directly observable by the instructor and should be as specific an unambiguous as possible.** For this reason, verbs like know, learn, understand, and appreciate

are unacceptable. There are critically important goals, but they are not directly observable.

1. **Knowledge**—repeating memorized information
2. **Comprehension**—paraphrasing text, explaining concepts.
3. **Application**—applying course material to solve straightforward problems.
4. **Analysis**—solving complex problems, developing simulations, troubleshooting.
5. **Synthesis**—designing experiments.
6. **Evaluation**—choosing from among alternatives and justifying the choice, resolving ethical dilemmas.

Levels 1-3 are known as lower-level skills and Levels 4-6 are higher-level skills.

Recommendation

1. **At all levels of the curriculum—including the first year—include some higher level problem-solving skills** (e.g. multidisciplinary analysis, design, critical thinking) and the soft skills (e.g. oral and written communication, teamwork, social and ethical awareness).
2. **Make class exercises, homework assignments, and test consistent with the objectives**. Give the objectives to the students to use as study guides.

Justification

1. Instructional objective reveal which course topics are most important and deserve the greatest coverage, and which ones the students can do little with but memorize and so merit only cursory attention or possible elimination from the curriculum.
2. Objectives enable instructors to design consistent homework assignments that provide practice in all the desired skills and tests that assess mastery of the skills.
3. Objectives make ideal study guides for the students: the more explicit you are about what you want the students to be able to do, the more likely they will be to succeed at doing it.
4. Objectives provide an excellent outline of the content of a course to instructors teaching the course for the first time and instructors of subsequent courses.
5. Objectives collectively reveal both gaps and redundancies in the curriculum.

2. Establish Relevance of Course Material and Teach Inductively

Explanation

1. Instructors often start a course by presenting totally new material without putting it in any context. They make no attempt to relate the material to things the students already know from their own experience or from prior courses, nor do they preview how it will be needed to solve problems of the types the students will encounter later in the curriculum or in ministry.
2. Students tend to study hardest and learn best what they are interested in and believe they have a need to know.

Recommendation

1. Begin teaching each course and each new topic within it by describing the concept to be studied and the types of problems to be solved. Discuss several realistic situations in which graduates are required to understand the

topic and solve the problems. A good way to begin is to divide the class into groups of three or four and have the groups generate as many examples as they can think of in a brief period of time, adding your own to supplement whatever they come up with.

Example: State, For the next two weeks we are going to be discussing ____. In groups of four, come up with as many situations as you can that involve this subject—three people talking, one writing down the ideas. You have three minutes—go!
Stop them and collect ideas, listing them without criticism. At least come groups will come up with biblical worldview, character development, counseling, ministry skills, conflict resolution, relationship building, church growth, leadership training, deacon ministry, evangelism, etc. Supplement their list with your own.
You might then continue as follows: Ok, you are now a church staff designing a program to minister to cancer patients and their families/college students/newly weds. What will you need to know or figure out? Same groups, three minutes—go!
It may occur to some of the groups that they will need to know how to interpret the Bible correctly, listen to those they are trying to reach, apply Biblical solutions, etc. Give hints if necessary, and add items to their lists. Spending ten minutes on such an exercise at the beginning of a new topic can go a long way toward motivating the students to pay attention to what will be taking place in the subsequent two or three weeks.

2. The flow of information in the presentation of course material should generally follow that of the scientific method: begin with induction, proceeding by inference from specifics (facts, observations, data) to generalities (rules, theories, correlations, models), and then switch to deduction, using the rules and models to generate additional specifics (consequences, applications, predictions).

Justification

1. Our goal in teaching is to get information and skills encoded in our students' **long-term memories**. Cognitive research tells us that people learn new material contextually, fitting it into existing cognitive structures, [13-15] and new information that cannot be linked to existing knowledge is not likely to be retained. Moreover, once information is stored in long-term memory, cues are required for us to recall and use it. Linking the new material to familiar material provides a natural set of cues.

2. The motivational and learning benefits of prov**iding context, establishing relevance, and teaching inductively** are supported throughout the literature on cognitive and educational psychology and effective pedagogy. [15,16] Establishing relevance is one of the factors that induce students to adopt a "deep" (as opposed to superficial) approach to learning. [12, 17]

3. **Inductive teaching** (wherein the information flow generally proceeds from specifics to generalities) takes several forms in the literature, variously known as **(1) discovery learning, (2) inquiry learning, (3) problem-based learning, (4) just-in-time learning, and (5) the case study method.** Problem-based learning (PBL), which involves students working in teams on projects built around realistic problems, has been extensively described and shown to be effective in science, engineering, and medicine. [18-23]

4. The literature on **learning styles** also supports establishing the relevance of new material before going into the details.[24-33] Kolb[27-29] suggests "teaching around the cycle." Starting with a concrete experience, documenting our observations, creating an abstract model, and then experimenting and testing the model. This cycle can be used to design a college-wide instructional program.

3. Balance Concrete and Abstract Information in Every Course

Explanation of the Problem

1. Material in courses may be categorized as being concrete—facts, observations, data, applications—or abstract—concepts, theories, formulas and models. Most courses contain material in each category, but the balance varies considerable from one course to another and from one instructor to another in a given course.
2. In recent decades the balance between the two categories in the curriculum has been shifting toward abstraction. The problem with introducing abstraction that is not firmly grounded in the student's knowledge and experience (as described in the preceding section) is that the new material is not linked to existing cognitive structures and so is unlikely to be transferred to long-term memory.

Recommendation

The challenge is generally to provide sufficient concrete material for those who need it. Some ideas for doing so follow.

1. **Establish relevance**.
2. **Intersperse concrete illustrations and applications** throughout a theoretical development.
3. **Tie the examples back to the "real-world" of ministry**.
4. **Provide visual illustrations and demonstrations** of course-related material as possible. Most students get a great deal more out of visual information than verbal information.
5. **Show pictures, sketches, schematics, plots and flow charts**.
6. One way to help students gain a deeper understanding of course material is to ask questions that require such an understanding, first in class problems and homework and then on tests.
7. **Teach around the cycle**: when presenting a new concept, start with a real-world example, model the results, test the model through active experimentation and explore its implications.
8. **Have students measure their own learning styles and talk about the implications**. The more they understand their preferences, the more they can capitalize on the strengths of their preferred styles and work to build their capabilities in their less preferred styles. Felder and Soloman's Index of Learning Styles[38] and Keirsey's Temperament Sorter[39] are accessible on-line.

Example: Explain sanctification in terms a high school senior could understand.

Justification

1. Piaget[40] suggests that human capabilities evolve in stages, beginning with the sensory-motor stage (about age 2) and proceeding through pre-operational (ages 4 through 7) and concrete operational (about age 12) stages to the formal

operational stage. Concrete operational thinkers can think logically in terms of objects but have difficulty replacing objects by symbols. They can acknowledge different viewpoints and cause-effect logic but they have trouble generalizing through verbal or proportional reasoning. Formal operational thinkers can replace objects and symbols, generalize and work with abstract concepts, use verbal and proportional reasoning, and derive cause-effect relationships from results of experiments.

2. Piaget stated that the shift from concrete operational to formal operational thinking should occur by age 12; however, more recent observations suggest that many first-year college students have not yet made it. Williams and Cavallo,[42] working with freshmen in physics courses, found that most of their subjects were concrete operational, incapable of grasping abstract concepts that were not firmly embedded in concrete experience. By including concrete examples in our teaching and explicitly showing how they can be generalized, we can help students make the shift from concrete to formal operational thinking.[43]
3. Learning style differences also provide justification for establishing a good concrete/abstract balance in every course. [24,25,26,32,33] Sensing learners tend to be practical and methodical; Intuitors tend to be imaginative and quick-thinking. Sensors are more comfortable with concrete information (facts, data, "real-world phenomena) than with abstractions (theories, concepts and models), and the converse is true of Intuitors.
4. Most undergraduates are sensors while most professors are intuitors.[44,45] Most intuitive professors and even many of the sensing professors teach in an intuitor-oriented manner, emphasizing theories, models and abstract prose to students who respond best to concrete examples, well-established problem-solving procedures, and material that has a clear connection to the "real-world" (a classic sensor's phrase). This mismatch has several unfortunate consequences for the sensing learners. Faced with an incessant barrage of material that seems remote and abstract, they have difficulty absorbing the material, become bored in class, tend to do poorly on tests (frequently running out of time on them) and tend to get lower grades than their intuitive counterparts, even though both types do equally well as graduates.
5. Making courses overwhelmingly abstract is also a disservice to the Intuitors. They need to strengthen their sensing skills (observation of and attention to details, careful methodology), and they will not do so if they are not challenged to do so in their courses.

4. Promote Active Learning in the Classroom

Explanation

1. In the traditional approach to higher education, the professor dispenses wisdom in the classroom and the students passively absorb it. Research indicates that this mode of instruction can be effective for presenting large bodies of factual information that can be memorized and recalled in the short term.
2. If the objective is to facilitate long-term retention of information, however, or to help the students develop or improve their problem-solving or thinking skills or to stimulate their interest in a subject and motivate them to take a deeper approach to studying it, instruction that involves students actively has consistently been found more effective that straight lecturing.[2,3,46,47] The challenge is to involve

most or all of the students in productive activities without sacrificing important course content or losing control of the class.

Recommendation

1. **Several times during each lecture period, ask the students to form into groups of 2-4 where they are sitting and give them brief exercises that last anywhere from 30 seconds to 3 minutes.** The exercises may involve answering questions of the type instructors routinely ask the class as a whole or they may call for problem solving or brainstorming.

> **Example**: Outline a strategy for solving the problem just posed.
> Draw a flowchart (schematic) for the process just described.
> Think of as many practical applications as you can of this doctrine.
> Get started on the solution of the problem and see how far you can get with it in two minutes.
> Prove or verify this interpretation.
> What questions do you have about this material?

2. **The groups should generally be given a very short time to reason**—long enough to think about the question and to begin to formulate an answer but not necessarily to work out complete solutions.
3. **Vary the format of these exercises to prevent their becoming as tedious and ineffective as straight lecturing.** Assign some to pairs, some to groups of three or four, and some to individuals. Sometimes ask students to work on a problem individually and them compare their answer with a partner ("think-pair-share"). Sometimes give a rapid succession of such exercises, and sometimes lecture for 10-15 minutes between exercises.
4. **To maximize the likelihood that most or all the students will be actively involved and that they will remain on task, call on several individuals or groups to give their responses when the allotted time period has elapsed.** If you only call for volunteers to share responses, the students will know that the answer will eventually be forthcoming and will have no incentive to participate in the activity, and many will not; however, if they know that any of them could be called on, fear of embarrassment will induce most of them to do the work so that they will be ready with something if they are chosen.
5. **Active learning methods make classes much more enjoyable for both students and instructors**. Even highly gifted lecturers have trouble sustaining attention and interest throughout a 50-minute class. After 10-20 minutes in most classes, the students' attention starts to drift, and by the end of the class boredom is rampant. Even if the instructor asks questions in an effort to spark some interest, nothing much happens except silence and avoidance of eye contact. Tests of information retention support this picture of what happens in terms of recall. Immediately after a full lecture, students were able to recall about 70% of the content presented in the first ten minutes, but only 20% of the content of the last ten minutes
6. When active learning exercises are interspersed throughout a lecture, the picture changes. **Once a class accustomed to group work gets started on a problem, the classroom atmosphere is transformed: discussions, arguments, and occasional laughter can be heard, all sounds of learning taking place.** Even students who may not be doing much talking are engaged in thinking about the question at hand instead of mechanically transcribing notes. Just five minutes of such activities in a 50-minute class can be enough to keep the students attentive for the remaining 45 minutes of lecturing. Many references

offer specific suggestions for incorporating active learning exercises in the classroom.[46-50] Felder[51,52] and Woods[53] discuss the implementation of active learning in large classes; and Felder[51] discusses how to incorporate active learning without sacrificing content coverage.

7. Several authors have developed more formal active learning approaches. One is TAPPS (Thinking-Aloud Pair Problem Solving), an activity in which pairs of students work their way through a problem solution[54]; and another is the Osterman Feedback Lecture, wherein two 20-minute mini-lectures are separated by a 10 minute activity, the latter usually being a short problem that requires the students to have learned certain material before class[18]; and still another is Team Learning, a more formal cooperative learning structure in which student teams work on structured learning projects in every class session.[55] All of these techniques require more time and training to implement than the brief turn-to-your-neighbor exercises described previously, but the potential return in depth of learning is greater.

Have students present a PBS-type panel discussion; write a magazine article, write a letter to the editor, to a friend who believes differently, prepare a Sunday School lesson, preach a mini-sermon, prepare for persecution.

Justification

1. The literature supporting the notion that active, student-centered learning is superior to passive, teacher-centered instruction is encyclopedic.[13,14,46-48] People acquire knowledge and skills through practice and reflection, not by watching and listening to others tell them how to do something.
2. Straight lecturing may succeed at promoting short-term factual recall, but active approaches have consistently been shown to be superior for promoting long-term retention of information, comprehension, problem-solving skills, motivation to learn and subsequent interest in the subject.
3. Active learning is one of the seven, evidenced-based recommendations for improving learning summarized by Chickering and Gamson[56], and the active learning exercises described above also provide prompt feedback, another of the recommendations.

5. Use Cooperative Learning

Explanation

Cooperative Learning (CL) is an instructional approach in which students work in teams on a learning task structured to have the following features[48]:

1. **Positive independence**. There must be a clearly defined group goal that requires involvement of every team ember to achieve. If anyone fails to do his/her part, everyone is penalized in some manner.
2. **Individual accountability**. Each student in the team is held responsible for doing his/her share of the work and for understanding everyone else's contribution.
3. **Face-to-face interaction**. Although some of the group work may be parceled out and done individually, some must be done interactively, with team members providing one another with questions, feedback, and instruction.
4. **Appropriate use of interpersonal and teamwork skills**. Students should be helped to develop leadership, communication, conflict resolution, and time management skills.

5. **Regular self-assessment of team functioning**. Teams should periodically be required to examine what they are doing well together and what areas need improvement.

Recommendation

The following suggestions are based on material in Johnson, Johnson, and Smith,[48] Felder and Brent, [57,58] and Millis and Cottell.[59]

1. **Explain to students what you are doing and why**. As with in-class active learning methods, cooperative homework may not be welcomed enthusiastically by all students. Twenty minutes on the first day spent giving some of the reasons for using the approach (e.g., it prepares students to function in the environment in which ministers work) and the proved educational benefits to students (e.g., higher grades and lower dropout rates) can go a long way toward overcoming the resistance. Another option is to run a mini-workshop on managing change.[18,19]
2. **Assign some homework to team of 3-4 students**. In teams of two, one person tends to dominate and there is usually no good mechanism for resolving disputes.
3. **Form the groups yourself**. Considerable research shoes that instructor-formed teams on average function better than self-selected teams. The ideal team is heterogeneous in ability. A diagnostic test given early in the course may be used for the purpose of forming teams.
4. **Form teams that are heterogeneous in ability level**. Weaker students gain from seeing how better students study and approach problems, and the stronger students usually gain deeper understanding of the subject through their attempts to explain the material, a phenomenon familiar to every professor.
5. **Assign team roles that rotate with each assignment**. (1) Manger (keeps the group on task), (2) recorder (writes the final report), (3) checker (proofreads the final report, and (4) skeptic (suggests alternative possibilities.
6. **Promote positive interdependence and individual accountability**.
7. **Get teams to assess how well they are functioning**. Periodically ask the students to spend five to ten minutes at the end of their work session assessing their performance, identifying their strengths and setting goals for improvement.[19,62,63] A summary of the outcome might be included with the group work or in the journals.
8. **Consider doing some testing of pairs or groups**. Dekker and Stice[64] recommend giving test to pairs of students as an alternative to individual tests and offer ideas for structuring such tests.
9. **Do not re-form groups too often**. A team should remain together so that they are forced to confront and overcome the interpersonal problems that commonly arise in team development by establishing norms, developing strategies for coping creatively with conflict, and taking advantage of and valuing individual talents and learning styles.
10. Provide an escape mechanism for teams having severe difficulties.
11. Do not assign course grades on a curve. If students recognize that by helping someone else they could be hurting themselves, they may be inclined to avoid cooperation. If they are guaranteed a given grade if they meet a specified standard, they have every incentive to help their teammates.
12. Start small and build.

Justification

1. **Most ministry is done cooperatively, not individually, and technical skill is often less important than interpersonal skill in getting the job done**. In survey after survey, representatives of industry place communication and teamwork at the top of their lists of desirable skills for new graduates. If teamwork is such a critical part of what graduates do, surely our schools should provide some guidance in how to do it.
2. **Cooperative learning** may be the most thoroughly research instructional method in all of education, and a vast and still rapidly growing body of research supports the effectiveness of the approach.[48,57,59,65-68]
3. Studies have shown that relative to students taught traditionally (that is, primarily with lectures and individual homework), cooperatively taught students tend to have better and longer information retention, higher grades, more highly developed critical thinking and problem-solving skills, more positive attitudes toward the subject and greater motivation to learn it, better interpersonal and communication skills, higher self esteem, lower levels of anxiety about academics and, if groups are truly heterogeneous, improved race and gender relations.
4. A variety of factors account for the observed benefits of cooperative learning. Weaker students working individually are likely to give up when they get stuck; working cooperatively with stronger students to assist them, they keep going to completion. Many strong students tend to do the minimal work required to complete the assignment, which may not require deep understanding of concepts; when faced with the task of explaining and clarifying material to weaker students, they often find gaps I their own understanding and fill them. Students working alone may tend to delay completing assignments or skip them altogether; when they know others are counting on them, they are often driven to do the work on time.

6. Give Challenging but Fair Tests

Explanation

1. Although we might wish it were otherwise, **for many of our students, tests are the primary motivation to study.** The students may attend every class and complete all the assignments, but it is their preparation for the tests that determines the breadth and depth of their learning. The burden is on the instructor to make the tests sufficiently comprehensive and challenging to push each student to learn to the greatest extent of which he or she is capable.
2. But just as tests can motivate students to learn at a deep level, **they can also lead to student demoralization and hostility if they are perceived by the students as being unfair.** The two most common types of tests in this category are tests that are too long and tests that contain surprises—skills that were never taught in class or required on homework assignments.
3. **Some students--**sensing learners on the Myers-Briggs Type Indicator and the Felder-Silverman Learning Styles Model[24-26,32,33] **–work more systematically and slowly than the intuitive learners who are their counterparts.** Nothing infuriates students more than studying hard and being well prepared for a test and then getting a low grade because they lacked sufficient time to demonstrate their understanding.

4. **Students also resent surprises on test.** The functions of tests are to motivate and help students to learn what the instructor wants them to learn and to enable the instructor to assess the extent to which they have succeeded in doing so. When students understand the material but do poorly because they cannot figure out a "tricky" problem on the spot, they see themselves—rightfully—as having been cheated by the instructor.
5. **Thinking and problem-solving skills—and speed in problem solving, for that matter—are only developed through practice and feedback**: testing students on skills they have not had an opportunity to practice is unfair. Long and tricky tests do not help students become better problem solvers.

Recommendation

1. Gi**ve the students instructional objectives for each test in the form of a study guide**: "In order to do well on this test, you should be able to…" Make the list comprehensive and challenging. Include everything you might call on them to do on the test.[5]
2. **When writing the test, consult the instructional objectives and make sure that 10-15% of the test covers the more challenging material in the study guide (which will allow discrimination between the A-level and B-level students**). **Give the students the study guide at least two-weeks before the test.** The test will be just as challenging or more so than it would otherwise have been, except that now the challenge is to the students' conceptual understanding rather than to their speed or puzzle-solving ability.
3. **Always work a test out yourself from scratch when you have finished writing it, timing how long it take to do it.** This burdensome exercise is the only way to discover the overspecified and underspecified problems, the erroneous or ambiguous problem statements, and the appropriateness or inappropriateness of the level of difficulty of the entire test. The alternative is for these problems to show up when the test is being given, which leads to disasters of the type all instructors and students have experienced and do not wish to experience again.
4. **Minimize speed as a factor in performance on tests.**
5. **Do not test skills that students have not had a chance to practice.** Do not give all homework problems at Bloom level 3 and then put level 4 questions on the test. If picking important material from long readings is a still you want your students to develop, give them training and practice in it—do not just tell them that they are responsible for everything in their 500-page text and make them guess what you plan to ask them to do.
6. Even if you curve grades, if the average is in the 50-60 range or below consider the possibility that it was a poor test or that you did a poor job of preparing the students for it.

Justification

1. **Education should not be viewed as a mystery religion**. There is no pedagogical value in making students guess what they are supposed to know and understand or in testing them on skills in which they have received no training.
2. When students know explicitly what is expected of them—whether it be straightforward or higher-level or ill-defined problem solving, critical or creative or multidisciplinary thinking, or anything else—and they are **given practice and**

feedback in the specified skills, the odds that they will be able to meet the expectations go up.

3. **Even though the tests may be harder, the average student performance will be better than it would have been if the tests were exercises in speed and guessing ability**, student morale and motivation will increase, and the students who get low grades will be much more inclined to take responsibility for their poor performance than to blame the test or the instructor.

7. Convey a Sense of Concern about the Students' Learning

Explanation

1. The social environment in a class—the nature and quality of interactions between the students and the instructor and among the students—can have a profound effect on the quality of learning that takes place in the class.[56,70-75] In his monumental study *What Matters in College*,[70] Alexander Astin found that the quality of interactions between students and instructors in and out of class was the factor that correlated most highly with almost every positive learning and attitude outcome he considered.
2. **If students believe that an instructor is concerned about them and has a strong desire for them to learn the course material, the effects on their motivation to learn and their attitudes toward the course, the subject, and the instructor can be profound.**

Recommendation

1. **Learn the student's names.** Taking the trouble to learn names and use them in and out of class conveys a sense of respect for the students as individuals. The motivation to do well in your course is likely to increase considerably once they realize that you know who they are.
2. **Come to class a few minutes early to answer any questions the students may have or just to chat.** Make yourself available. Encourage your students to contact you by e-mail at least once during the first four weeks of the course. .
3. **If you use nontraditional methods like cooperative learning, explain how what you are doing has been shown to lead to improved learning and/or improved preparation for their ministries[60]**.
4. **Celebrate the students' achievement**. When a class does well on a test or you get a number of creative solutions to homework problems, offer commendations. When you students win awards or write articles in the school paper, congratulate them publicly. Offer at least one commendation per class.
5. **Collect midterm evaluations**, using either simple open-ended questions (What has been helping you learn in the course? What has been detracting from your learning? What changes would improve the course for you?) or a more formal instrument like the Course Perceptions Questionnaire.[75]
6. **Periodically collect "minute papers"--at the end of a class**, have individual students or pairs take a minute to write (anonymously) (1) the one or two main ideas presented in the lecture, and (2) the muddiest point or concept.
7. **Let students participate in learning and performance assessment**. Give choices on assignments and tests (e.g. solve any three of the following four problems). Have students critique one another's drafts of assignments before the final versions are turned in to you. Let them create potential examination

questions, and use them on the actual exam. Have them assess their own performance and the performance of their colleagues in team-based projects.[61]

8. **Maintain a sense of respect for the students, individually and collectively**. Avoid belittling or sarcastic remarks about their responses to questions, performance on tests, behavior in class, or anything else. If you are disappointed with any or all of them, express your disappointment calmly and respectfully.

Justification

1. **The term "caring" or its synonym "concern" show up in virtually every published study of what students consider to be effective teaching.** In a review of nearly 60 studies of students' descriptions of effective teachers, Feldman[78] found eight core characteristics in most lists: 1) concern for students, (2) knowledge of subject, (3) stimulation of interest, (4) availability, (5) encouragement of discussion, (6) ability to explain clearly, (7) enthusiasm, and (8) preparation.
2. No matter what you teaching style may be—flashy or congenial or scholarly—if students believe you care about them, most will be motivated to learn what you are teaching.

If you get one idea from this paper: Writing formal instructional objectives and using active and cooperative instructional methods offers a good prospect of equipping your students with the knowledge and skills you which them to develop.

III. Developing Critical Skills

Introduction

Research suggests that the development of any skill is best facilitated by giving students practice and not by simply talking about or demonstrating what to do.[4-6] The instructor's role is primarily that of a coach, encouraging the students to achieve the target attitudes and skills and providing constructive feedback on their efforts.

Eight Basic Activities to Promote Skill Development

Identify the skills your students need to develop, include them in the course syllabus and the college catalog, and communicate their importance to the students. If developing problem-solving and teamwork skills are among your objectives for a course, include "problem solving" and "teamwork" in the lists of course topics in the syllabus and catalog course description and allocate time for activities that will provide practice in them.[7,21] Be sure the students understand the relevance of the skills to their ministry skills.

Use research, not personal intuition, to identify the target skills, and share the research with the students.[22-24] Target skills have been identified for communication,[25-28] teamwork, [11,16,29-36] self-assessment, [29,37,38] lifelong learning, [4,39-47] and change management.[4,48-52]

Make explicit the implicit behavior associated with successful application of the skills. Illustrate objectives and assessment methods for most skills can be downloaded from the World Wide Web.[7,51]

Provide expensive practice in the application of the skills, using carefully structured activities, and provide prompt constructive feedback of the students' efforts using evidence-based targets. People acquire skills most effectively through practice and feedback. No matter how many times students see a skill (such as Bible study or preaching) demonstrated, they rarely master it until they have attempted it repeatedly and received guidance in how to improve their performance after each attempt.

Encourage monitoring. Monitoring is the metacognitive process of keeping tack of the learning process as one learns. As students are working, ask them to pause periodically and write responses to questions to deepen their problem-solving approach and improve their understanding. For example, why am I doing this? What really is the problem? What are the constraints? If I was unsuccessful, what did I learn? Am I finished with this stage? What options do I have? Which is most likely to succeed? Can I write down these ideas? Can I use charts, graphs or equations to represent ideas? Have I spent enough time defining the problem? What other kinds of problems can I solve now that I have solved this one correctly?

Encourage reflection. Reflection is the metacognitive process of thing about past actions. Fore each problem that the students solve, communication they write, or team task they accomplish, ask them periodically to write reflections on how they approached the task.[23,53-56]

Grade the process, not just the product. Grade the reflections using target skills as the criteria, including problems solving[57] and teamwork.[35]

Use a standard assessment and feedback from across the curriculum.

Target Skill Development

1. **Problem-Solving Skills**
    a. **Use the six-stage McMaster Problem Solving Strategy**: (1) Engage, (2) Define the stated problem, (3) Explore, (4) Plan, (5) Do it, and (6) Look Back, across all courses in the curriculum.
    b. **Solve some problems in depth**. If you would normally work through four problems in a given period of time, take the same amount of time to solve just one problem and hand out illustrative solutions for the other three. Enrich the experience for the students when you work out the problem: for example, purposely make wrong assumptions so that all eventually realize that "this is not working out.' Take time to explore questions like "What went wrong?" "What have we learned?" "Now what?" Display anonymously on transparencies students' attempts to carry out specific steps such as identifying the underlying doctrinal error, defining the problem, draying a diagram, and creating symbols.
    c. **Help students make connections between the problem statement, the identification of required technical knowledge, and the problem solution**. Ask them to identify the key words in the problem statement that helped to identify the information needed to solve the problem. Explicitly make such connections helps build problem-solving expertise.[21,59]

2. **Writing Skills**
    a. **Give assignments that require writing**. Long essays are not required: single paragraphs can be effective at facilitation the development of writing skills. Brent and Felder[60] offer suggestions for brief writing assignments that address a variety of different instructional objectives.
    b. **In-class writing exercises are particularly valuable in that they provide snapshots of what the students actually do.** Encourage them to brainstorm ideas about the topic and about the target audience and to try to find a match between the audience needs and the topic. Encourage them to free-write without critiquing themselves and subsequently to discard sections that don't work.
3. **Teamwork Skills**
    a. If promoting teamwork skills is an objective, use a structured approach to teamwork like **cooperative learning**[11,13,15] in addition to the basic eight activities. The team assignments should be structured to assure positive interdependence, individual accountability for all the work done on the project, face-to-face interaction, development and appropriate use of interpersonal skills, and regular self-assessment of team functioning.
    b. Assign a coordinator for every meeting to keep everyone on task.
    c. Ask students to agree on a checklist of 17 norms.[7]
    d. **Ask students to complete inventories** such as the Myers-Briggs Type Indicator [61], FIRO B,[31,62] Johnson's conflict inventory,[63] or the Index of

Learning Styles.[64] Suggest that team members share their results, discuss the implications, and make them aware that the most effective groups include people with different styles. Although the differences might lead to apparent conflict, they can be used to bring a synergy to group activities that might otherwise be unattainable.

e. Incorporate formal team-building exercises as part of your implementation of cooperative learning.[16]

4. Self-Assessment Skills

a. Have the students write **resumes** as a self-assessment.
b. Include self-assessment as part of what you do to help develop any other skill. Combine writing, reflection, and self-assessment by requiring students to submit their analysis of evidence of skill mastery gathered from classwork and other applications of the skills. Examples of such reports are available on-line.[7]

5. Lifelong Learning Skills and Problem-Based Learning

The learning process may be broken down into the following tasks:[66]

a. First, sense problem or need
b. Second, identify learning issues
c. Third, create learning goals and assessment criteria
d. Fourth, select resources
e. Fifth, carry out the learning activities
f. Sixth, design a process to assess the learning
g. Seventh, do the assessment
h. Eighth, reflect on the learning process

In traditional instruction, the student is responsible only for the fifth of these task (carry out the learning activities), the last task (reflection) is usually omitted, and the instructor takes responsibly for the remaining tasks.

Cooperative groups could be asked to "identify the learning issues" in a problem. Have students teach the material to a small group—the student speaker becomes the teacher.

- Perhaps the most ambitions option for promoting the development of skills in most of the tasks is called problem-based learning, PBL.[47,66,67]. Problems and projects can be incorporated into a course in a variety of ways. At one extreme is the traditional approach in which problems are given at the end of each chapter in a text and homework is assigned after the professor has lectured on the subject. The role of the problems is to help students deepen their understanding of previously-acquired knowledge.
- In contrast, **when PBL is used the problem is posed before the students have acquired the knowledge needed to solve it.** This **inductive** ordering simulates the research environment: the students begin with a problem and then proceed to figure out what the need to know, create hypotheses, read the literature and/or search the Web, talk to experts with related knowledge, acquire critical information through modeling, experimenting and discovering, and finally solve the problem. The approach may be applied in any educational setting including lecture classes, laboratory courses, and design courses.68
- Once a problem has been posed, different instructional methods may be sued to facilitate the subsequent learning process: lecturing, instructor-facilitated discussion,51 guided decision-making,8-10 or cooperative learning.3,11,13-16 Studies demonstrate that students who

participated in a PBL program exhibited a greater tendency to adopt a deep (as opposed to surface or rote) approach to learnig,74-77 a greater mastery of interpersonal and lifelong learning skills, and greater satisfaction with the learning experience.

6. **Change-Management Skills.** People inevitably encounter unexpected and stressful changes in their lives. Successful people are able to cope with the changes in such a way that they emerge with renewed or even greater strength in performance, self-confidence and interpersonal relationships, even if they initially experience loses in these domains. Perry's Model of Intellectual Development40,67,78,79 (or an equivalent model such as King and Kitchener's Model of Reflective Judgment80) provides a good framework for helping students cope with the expectations of the new learning environment. When students are helped to prepare for change, it may not eliminate their unhappiness about it but they are likely to tolerate it long enough to begin to see the benefits.
   - In class or in your office, tell students about the **stages of reaction to stressful change**: shock, denial, strong emotions, resistance and withdrawal, acceptance, struggle, better understanding, and integration.66,81 Students undergoing this process may find it helpful to know how the process works, and more to the point, that it eventually ends. You might also take a few minutes to elaborate on how the students can use the same stage model to help them manage other stressful situations such as death of a friend or the loss of a job. Doing so is another way to demonstrate concern about their lives beyond the confines of the classroom, which is one of the hallmarks of effective teaching.3
   - When using **student-centered instruction**, acknowledge to the students that is may be stressful to some of them but make it clear that you are doing it for good reasons. If possible, get them to come up with **benefits** themselves. For example, in this course we will be using extensive cooperative learning, following the rules and procedures in the syllabus that we just outlined. Hundreds of research studies have shown that this approach leads to some real benefits for students. Form groups of three and make a list of what those benefits might be. Then I'll tell you what the research shows and we'll see how many of them you get."
   - Run a **workshop on the management of change**, 4,7

Summary

Transmitting knowledge is the easiest part of teaching; for more challenging is the task of equipping students with the critical skills they will need to succeed as professionals and responsible members of society.

If You Get One Idea From This Paper: **F**ocusing lectures, assignments, and tests entirely on technical course content and expecting students to develop critical process skills automatically is an ineffective strategy. Instructors who wish to help students develop **problem-solving, communication, teamwork, self-assessment, and other process skills** should explicitly identify their target skills and adopt proven instructional strategies that promote those skills. See Table I and 2.

IV. Learning How to Teach

Introduction

- **With rare exceptions, no one teaches college teachers to teach!** Every skills craft provides formal instruction and/or mentorship for its new practitioners…except college teaching, which expects its newcomers to learn everything themselves by trial-and-error.
- **Teachers need training in effective presentation, teamwork, assessment of learning, time management, dealing with student-related problems, interpersonal skills, and learning styles.**
- **We never see our own shortcoming in our mental telescope.**

Professional Development Course: Fifteen Must-Know Topics for Growing Professors

1. The Kolb Learning Style Inventory
2. The Myers-Briggs Type Indicator
3. Effective Instructional Design
4. Writing a Syllabus: Instructional Objectives
5. Effective Overhead Transparencies
6. Microteaching
7. Testing and grading
8. Student characteristics
9. Teaching by lecture
10. Teaching by discussion
11. Learning theory
12. Theories of Jean Piaget
13. Individualized Instruction
14. Teaching problem solving: analytical thinking
15. Teaching problem solving: creativity

Professional Development: Mentorships

- In most skilled professions, novices are mentored by experienced practitioners who provide guidance and constructive feedback on the novices' initial efforts.
- **Each new faculty members is assigned a teaching mentor**. The teaching mentor and the new professor co-teach a course in the latter's first module. The mentor initially take most of the responsibility for planning lectures, class activities, assignments, test, and conducting classes; the mentee observes and takes notes; and the two discuss the class in a weekly debriefing meeting. In the second module, the mentee takes responsibility for the instruction and the mentor becomes more of an observer, refraining from intervening in the class and troubleshooting the problem at the next debriefing. In the third module, the

mentee teaches a course and the mentor functions only as an occasional observer in the class and consultant at periodic debriefings.

- Several hours of mentor training should be provided by the instructional development staff, and all mentors should be compensated in some manner for their efforts.

Professional Development: Networking

- In *The New Faculty Member*,25 Robert Boice reports on studies he has conducted of the early careers of many professors. Boice found that about 13% of this subjects were "**quick starters**" who reached high levels of teaching effectiveness in the first 1-2 years on faculties, as opposed to the 4-5 years required by most new faculty members.
- Prominent among the factors that differentiated quick starters from their more numerous counterparts was that the quick starters spend between two and four hours per week **networking with faculty colleagues**—going to lunch or a cup of coffee with them or visiting them in their offices—and talking about research and teaching.
- Boice strongly recommends that new faculty members force themselves to engage in such activities and that senior faculty members proactively and frequently initiate conversations with new colleagues in their first year.

Professional Development: Books

McKeachie's *Teaching Tips*30 is probably the best known general reference on college teaching.

If You Get One Idea from this paper: Schools that are serious about teaching must begin training their professors how to teach through courses, workshops, seminars, mentorships, and books.

V. Assessing Teaching Effectiveness and Educational Scholarship

- The instructional component of the mission of every educational institution is to produce graduates with satisfactory levels of knowledge, skills, and attitudes.1

- **Educational scholarship** encompasses developing or systematically improving teaching methods and methods of assessing learning outcomes, writing textbooks and courseware, and publishing scholarly papers and monographs and giving worships and seminars on education-related topics.

- Formative assessment has improvement of teaching as its objective.

- Summative assessment produces information that can be used to make decisions about instructional personnel or programs.

Criteria for Effective Course Instruction

1. The course contributes toward **published program goals**.
2. The course has calmly stated **measurable learning objectives**.
3. The assignments and **tests are tied to the learning objectives** and are fair, valid, and reliable.
4. Appropriate methods have been devised to **monitor the effectiveness of the instruction**.
5. The learning environment is appropriate.2,3
6. The instructor has appropriate expertise in the course subject.
7. The instructor **communicates high expectations of students** and a belief that they can meet those expectations, interacts extensively with them inside and outside class, conveys a strong desire for them to learn and motivates them to do so.
8. The instructor seeks to provide an education in the broadest sense of the work, not just knowledge of the content.
9. The instructor integrates teaching with research.
10. The instructor continually **attempts to improve the course by updating the content** and making use of **new instructional materials and methods** (including applications of instructional technology).
11. The students achieve the learning objectives.

Assessment and Evaluation of Teaching Effectiveness

1. An assessment plan should involve assembling several types of evidence to determine the degree to which the foregoing criteria are being met.
2. Learning outcomes assessments: student performance on standardized tests.
3. Student end-of-course ratings.
4. Student surveys, focus groups, or interviews directed at specified criteria.
5. Pre-graduation retrospective student ratings of courses and instructors.
6. Alumni ratings of courses and instructors.

7. Peer ratings of classroom instructions, learning objectives, assignments and tests.
8. Evaluations submitted by external referees/instructional technologists.
9. Self-evaluations by instructors.

Assessment of Learning. The ultimate assessment of teaching is assessment of learning. Assessment can only be done meaningfully in the light of clearly stated goals and measurable objectives. Assessment tools:

1. **Tests** (knowledge, conceptional understanding, problem-solving skills)
2. **Reports, oral presentations** (knowledge, conceptional understanding, analysis, creative thinking, critical thinking, teamwork, written and oral communication skills, social awareness, lifelong learning skills).
3. **Resumes, letters, memos** (written communication skills, professional or ethical awareness).
4. **Critiques of technical reports, papers, letters, and memos** (analysis, critical thinking, written communication skills). It is often easier to see weaknesses in someone else's work than in one's own. Revising work based on feedback helps them develop critical thinking skills.
5. **Self-evaluation, learning logs, journals** (skills or attitudes).

A comprehensive picture of student learning is provided by assembling student portfolios—longitudinal records of student learning assessment results.18

Peer Ratings Lecture Observation Checklist

- **Organization**. The instructor
  - Begins class on time
  - Reviews prior material
  - Previews the lecture content
  - Presents material in a logical sequence
  - Summarizes main points at the end of the period
  - Ends class on time
- **Knowledge**. The instructor…
  - Has a good understanding of the course material
  - Integrate ideas from current research into the lectures.
  - Answers questions clearly and accurately.
- **Presentation**. The instructor…
  - Speaks clearly
  - Holds the students' attention throughout the period.
  - Highlights important points
  - Presents appropriate examples
  - Encourages questions
  - Seeks active student involvement beyond simple questioning.
  - Attains active student involvement.
  - Explains assignments clearly and thoroughly.
- **Rapport**. The instructor…
  - Listens carefully to student comments, questions, and answers and responds constructively.
  - Checks periodically for students' understanding.
  - Treats all students in a courteous and equitable manner.

Examination of instructional objectives, lecture notes, assignments, tests, and representative students products may provide a better picture of teaching effectiveness than classroom observation.

The Teaching Portfolio Format

1. **Preamble**. Context of the portfolio, time period covered, and outline of the contents.
2. **Reflective statement of teaching philosophy, goals, and practices.** The instructor's answers to such questions as: "What is my mission as a teacher?" "What skills and attitudes should I be helping my students develop?" "What methods am I using in and out of class to fulfill my mission and enable my students to develop the desires skills and attitude?" "What am I doing to motivate and equip them to succeed, academically, professionally, and personally?"
3. **Summary of teaching and advising responsibilities.** Titles, levels, and class sizes for all courses taught over the past five years, annotated with brief comments about the way each course is taught. Comments should relate explicitly to the reflective statement and to published institutional goals.
4. **Representative instructional materials and student products.** Illustrate assignments statements and tests with grade distributions. Copies of outstanding and typical graded assignments, tests, and project reports. Discussion of the material in the context of the reflective statement.
5. **Evidence of teaching effectiveness**. Results of student ratings over the past six years. Results of retrospective alumni ratings and peer ratings. Data from the Lancaster Approaches to Studying Questionnaire and the Course Perceptions Questionnaire3,15,39 and the Perry or King/Kitchener Inventory.3,6,15. Reference letters from students and alumni.
6. **Efforts to improve teaching effectiveness.** Steps taken to keep knowledge of course content and effective instructional methods up-to-date: workshops, seminars, and conferences attended, papers read, networking done. Steps taken in response to student feedback and to improve the learning environment and quality of classroom instruction.
7. **Teaching innovations.** New courses developed and changes made to existing courses. New instructional materials generated, teaching strategies adopted, and methods used to motivate and empower students. Copies of publications or presentation abstracts describing innovations. Discussion of the innovations in the context of the reflective statement.
8. **Evidence of effectiveness of advising and mentoring.** Success of and recognition received by advisees. Reference letters from advisees. Implications of the evidence in the context of the reflective statement.
9. **Awards and recognition.** Nominations for awards and awards received.

Assessment and Evaluation of Educational Scholarship

What is educational scholarship?

1. **Subject knowledge.** The scholarly instructor has a deep conceptual understanding and a broad awareness of the current state of knowledge of the subject being taught.

2. **Pedagogical knowledge**. The scholarly instructor can formulate analogies, metaphors, and images that build bridges between his understanding of the subject and the knowledge and level of experience of the students. The instructor is also familiar with a variety of effective instructional methods and the research based that confirms their effectiveness.
3. **Commitment to continuing growth as an education.** The scholarly instructor is committed to continuous improvement of his disciplinary and pedagogical knowledge. Indications of such a commitment are books read, journal subscribed to, and seminars, workshops, and conferences attended.
4. **Involvement in development, assessment, and dissemination of innovative instructional methods and materials.**

Summary

- The assessment of teaching should be done to improve teaching effectiveness.
- The ultimate measure of the effectiveness of teaching is the quality of the resulting learning.
- Student rating of teaching are a valid and important source of evidence for teaching effectiveness, especially if they are average over at least a two-year period.
- A summative teaching portfolio may be assembled to evaluate the teaching effectiveness of faculty members.
- The defining elements of scholarly teaching are mastery of subject knowledge, familiarity with pedagogy, and commitment to continuing personal growth as an educator, and involvement in development, assessment, and dissemination of innovative instructional materials and methods.

VI. Making It Happen:
Responses to Faculty Concerns about Active Teaching Methods

Most classes still consist of professors talking and writing on the board and students sitting and listening; rigorous assessment of learning and teaching is not part of the culture of most institutions; and faculty members are still not routinely given any preparation for teaching.

How to Find Time to Implement Effective Instructional Strategies

Don't try to implement every new technique described here, or you will be overwhelmed by the time it takes and the student resistance you will encounter. Instead, select only one or two ideas at a time and try them long enough for the students to acclimate to the new methods. There is no hurry. Try these strategies first:

1. Motivate the presentation of each new topic by **relating it to previously learned material** and familiar applications, perhaps starting with a realistic problem or illustrative case study.
2. **Write clear instructional objectives** for course topics and give them to the students as study guides for tests.
3. **Assign brief small-group activities in class** (have the students respond to questions, formulate questions, begin problem solutions, brainstorm ideas…)
4. **Have students complete one or two out-of-class assignments in teams**.
5. **Periodically ask students to monitor and reflect on their learning**, either in the form of minute papers (What was the main point of the lecture? The muddies point?) or using feedback forms collected at the end of a lecture period.
6. **Collect midterm evaluation of the class**. (What am I doing in this class that is helping you learn and you would like me to continue to do? What am I doing that is hindering your learning and you would like me to discontinue?) Respond to any reasonable suggesting made by three or more student.

Once comfortable with these strategies, you can gradually move on to the methods that take more time to implement.2,3

How to Cover the Syllabus

- **The goal of teaching is not to cover material but to uncover it;** virtually all cognitive scientists agree that people learn by doing and reflecting, not by watching and listening to someone else tell them what they are supposed to know.13

- Instructors can present almost any amount of material in any amount of time by using transparencies or presentations graphics and talking quickly enough, but there is not much point in doing so if hardly any of the material is being learned.

- Using active learning does not require reducing the syllabus. Instructors should give flowcharts, schematics, and plots to the students in handouts or a coursepack. The handouts should include gaps—missing information that the student needs to complete and that will be included on the tests.

- If this recommendation is followed, most students will read the notes and make sure the gaps get filled one way or another—at least after the first test, when they discover that the instructor was serious about including them. Class sessions can now be devoted primarily to the most important and/or conceptually difficult material in the lecture notes, and the students will have opportunities during those sessions for the action and reflection that lead to true learning.

- The class time the instructor saves by not having to spell out every word and formula in the lecture notes is sufficient to allow for all the active learning exercises he might wish to include, and the syllabus may actually be expanded to cover more material rather than less.

How to Defuse Student Resistance

Students do not always welcome unfamiliar teaching methods with open arms, especially if the new methods push them out of the comfort zone in which the instructor tells them everything they need to know and then asks them to repeat it on th test.

- Students introduced to active learning, for example sometimes accuse their instructors of not doing their jobs when they require the students to learn some things on their own. This hostile reaction is extremely disturbing to instructors who are not expecting it and don't know how to deal with it, and many who encounter it become discouraged and revert to the less effective but safer lecture-based approach.

- The occurrence of student resistance is familiar to anyone who has attempted a centered-centered instructional approach like cooperative or problem-based learning.15-18 Woods[15] suggests that students who find themselves deprived of the support they are used to getting from their instructors go through some or all of the stages that psychologists associate with the grieving process: shock, denial, strong emotion, resistance and withdrawal, surrender and acceptance, struggle and exploration, return of confidence, and integration and success.

- Felder and Brent[17] suggest several things instructors might do to hold down the resistance of student-centered instruction long enough for the students to start seeing the benefits of the approach for themselves.

    1. **Start early, start small, and build**. It is better to take small steps and gradually to increase the level of commitment never venturing too far beyond the zone of personal comfort and confidence.

    2. **Explain what you are doing and why.** Before any of the new methods are implemented, they should be outlined to the class and some of the reasons for using them given, and periodic reminders might be beneficial at several points during the semester.[17-18]

3. **Be flexible when implementing new instructional methods**. Virtual team might be formed for students who cannot meet outside of class.

4. **When all else fails, consult the manual**. If student hostility to an instructional methods is excessive, check back in the literature on the method to see if any recommendations have been neglected. If any have, take remedial measures.

How to Create a Positive Climate for Teaching

- Provide funds for travel to education-related worships and conferences.
- Purchase good books on teaching--e.g. McKeachie25 and Boice26—and give them to new faculty members, perhaps in conjunction with an orientation workshop.
- Provide funds for a retreat to faculty working on course or program redesign.
- Offer a seminar for professors related to teaching.

Adapted from

Armando Rugarcia, Richard M. Felder, Donald R. Woods, James E. Stice, (2000) The Future of Engineering Education, I. A Vision for a New Century. *Chem. Engr. Education*, 34(1), 16-25