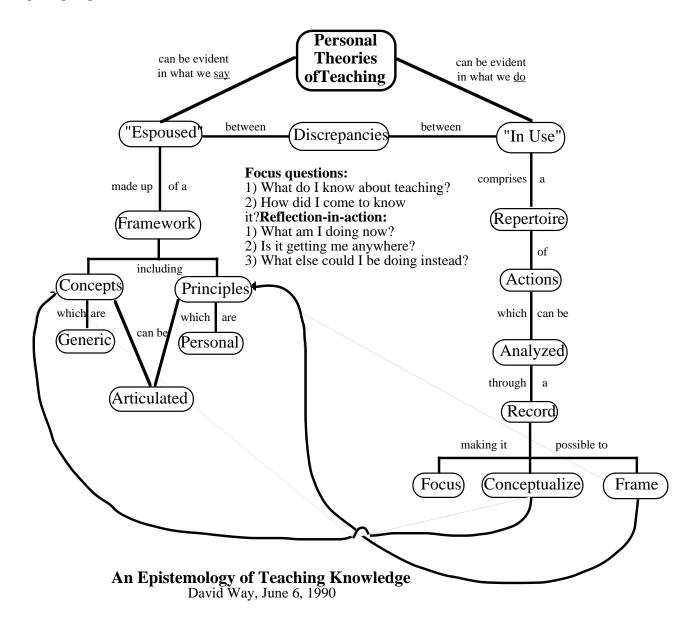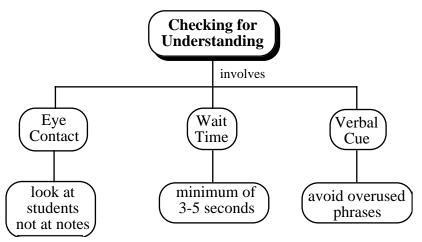sending out a *behavioral* cue that directly conflicts with my verbal cue. The net result is silence, filled with frustrated and confused expressions on the faces of my students. This mixed cue example points out where my espoused theory (checking for understanding) is discrepant from my theory in use (taking time to gather my thoughts and plan my next move). The diagram below helps to put this in epistemo-logical perspective.

Personal Theories ofTeaching

can be evident in what we <u>say</u>

can be evident in what we <u>do</u>

"Espoused"   between   Discrepancies   between   "In Use"

made up   of a

Focus questions:
1) What do I know about teaching?
2) How did I come to know it?**Reflection-in-action:**
1) What am I doing now?
2) Is it getting me anywhere?
3) What else could I be doing instead?

comprises   a

Framework

Repertoire

including

of

Concepts   Principles

Actions

which are

which   are

which   can be

Generic

can be   Personal

Analyzed

Articulated

through   a

Record

making it   possible to

Focus   Conceptualize   Frame

An Epistemology of Teaching Knowledge
David Way, June 6, 1990

This diagram illustrates how our espoused theory is made up of a framework of concepts and principles that we use to think about teaching and which guide, in some ways, our theory in use. Reflecting on our actions helps us to integrate the two, so that we are more consistent, successful in achieving our inten-tions, and more knowledgeable about teaching practice in the sense that we can explain it to others. If we can articulate the knowledge that is evident in our actions, the implication is that our actions become more governed and justified by a coherent framework that is part of a personal theory.
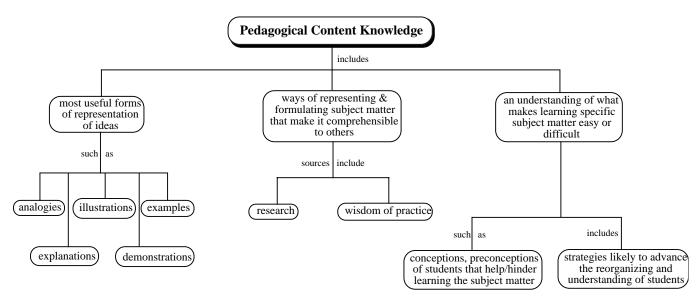
Research comparing novice and experienced teachers (Leinhardt, 1983) has indicated that as teachers learn from experience they develop a repertoire of strategies. These strategies can be called principles of teaching that guide their practice and help them deal with the variety of situations they come to face. A principle of teaching is a guide to action that includes at least one concept of teaching. Using the example of checking for understanding, we can see how concepts of teaching are generic in the sense that they do not, in and of themselves, guide us. We all must deal with the issue of checking for understanding, but we all do it in our own ways based on our preferred teaching style and on what our experience has taught us. A principle of teaching is our personal behavioral guide to how we check for understanding (the concept): I will pause after explaining an important point, make eye contact and ask, "Who would like me to go over that again?" leaving at least 3 seconds for students to react. This principle is now part of my espoused theory, which guides my practice (theory in use) and can be explicitly represented as part of a framework:

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                    ┌─────────────────┐
                    │  Checking for   │
                    │  Understanding  │
                    └─────────────────┘
                              │
                          involves
          ┌───────────────────┼───────────────────┐
     ┌─────────┐         ┌─────────┐         ┌─────────┐
     │   Eye   │         │  Wait   │         │ Verbal  │
     │ Contact │         │  Time   │         │   Cue   │
     └─────────┘         └─────────┘         └─────────┘
          │                   │                   │
   ┌─────────────┐     ┌─────────────┐     ┌─────────────┐
   │   look at   │     │ minimum of  │     │avoid overused│
   │  students   │     │ 3-5 seconds │     │   phrases   │
   │ not at notes│     └─────────────┘     └─────────────┘
   └─────────────┘
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Whereas a concept of teaching is relatively generic—such as "warm up," "wait time," or "summarizing"—a principle of teaching is an individualized way of dealing with that generic regularity. A principle for warming up in a foreign language class might be to engage students in casual conversation in the target language as they enter the classroom, to get them thinking in that language by the time formal instruction begins. An example of a *principle* to ensure enough wait time for students to respond effectively to a question is to count silently to yourself from one to five. A *principle* for effective summarizing might be to budget time into your teaching plan at the end of the period to review briefly the major concepts that have been covered—and summarize them in a fresh way. Of course there are many other principles to deal with each of these situations, which implies that effective teachers have extensive repertoires of principles. If one proves ineffective in a situation, they have others available to choose from.

Colleagues can help each other improve practice in a way that respects individual differences and personal style in teaching when they observe each other and discuss their teaching. As they do so, they are articulating their espoused theories and presenting an observational record of theories in use. If I am invited to reflect on my teaching actions by a colleague who has observed me and who asks me ques-

tions like, "What were you doing there? Was it effective? What alternative strategy might have been more productive?" I can begin to get used to reflecting on my teaching, which in turn may help me learn how to "reflect in action," as Schön calls it. I am able to reflect in action once I have articulated my personal theory to such a degree that my thinking and doing are consistent with each other. When I function on this level, I am very efficient. My attention is not cluttered by the necessity to think through every response and pay attention to every detail available to me. I can now use part of my attention to monitor my performance by asking myself questions like, "What am I doing now? Is it getting me anywhere? What other principle do I know, or can I invent, that may be more productive?" In this way, both collaboratively with my colleagues and individually through reflection, I continually develop and refine my knowledge about teaching and learning, which constitutes a personal theory I use to improve my practice.

The example of checking for understanding is a process-related teaching concept. It has more to do with how I handle the process of explaining something. Teaching involves other knowledge relating to the content that is taught. In his work on the knowledge base of teaching, Lee Shulman uses the term "peda-gogical content knowledge," which can be illustrated as follows:

Adapted from Shulman, L. "Those Who Understand: Knowledge Growth in Teaching,"*Educational Researcher*, Feb. 1986, pgs. 4-14

The area of pedagogical content knowledge is where colleagues can be extremely valuable in helping each other improve their teaching. There is a lot of creativity involved in devising analogies and choos-ing effective examples that prove to "achieve shared meaning" with my students, as D. B. Gowin[2] has defined teaching. The relationships that develop between faculty members are central to the evaluation of teaching within the tenure process. It has been the premise of this handbook that the most efficient use of faculty time with regard to the evaluation of teaching is to integrate the summative and formative

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[2] D. B. Gowin (1981). *Educating* (Ithaca, N.Y.: Cornell University Press), 62.

forms of evaluation. Documenting teaching for tenure files and the evaluation of the data gathered will be much more efficient if the proper work has been engaged in collaboratively between faculty colleagues during the six years leading up to the tenure decision process. Direct observation of teaching performance is the final outcome of considerable collaborative thinking and work with colleagues. The Teaching Portfolio described in chapter 2 is designed to foster both thoughtful discourse about teaching and professional inquiry into how to contribute more effectively to the students' learning. What follows are some real cases of portfolio components, each followed by comments that might be used to improve its quality.

Using the Teaching Portfolio to Improve the Quality of Discourse on Teaching

The analysis of tenure files conducted in preparation for the report, *Evaluation and Recognition of Teaching*, revealed a significant imbalance between the level of discourse regarding teaching compared to that dealing with research. This was evident in the following quote from a letter from the department head to the tenure candidate:

> We discussed your teaching activities and my indications are that your teaching . . . is going well and that it is well received by your students. We hope that the renovations of the laboratories . . . will provide opportunities for further improvements in our . . . teaching program.[3]

In spite of the fact that this letter is taken out of a larger context in which the tenure case was judged, it fails to document for anyone outside the department (the dean or provost) just what "indications" were used as evidence in making the judgment that the candidate's teaching was "going well" or in what way it was "well received by [the candidate's] students." Supervision by senior colleagues and department heads is critical in establishing an atmosphere where teaching is valued and constructively evaluated. The documentation of a candidate's teaching practice and level of thinking about teaching can be reviewed through the teaching portfolio. The level of discourse about teaching between the candidate and supervisor establishes a standard by which teaching is evaluated. The following case from a portfolio is discussed in terms of the relationships among the quality of discourse, the improvement of practice, and the establishment of professional standards.

Case 1[4]

Dr. Penelope Hansen
Faculty of Medicine, Memorial University of Newfoundland
My Approach to Teaching

> The teachers I have had who stand out in my memory have some attributes in common: they presented their subjects in a way that caught my interest, clarified difficult topics and led me through complex areas, and put knowledge into context so that its relevance was apparent. These role models have influenced my approach to teaching: I view myself primarily as a facilitator of learning, rather than as an expert who simply delivers informa-

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[3] A Report of the Select Committee, Jan. 14, 1992. *Evaluation and Recognition of Teaching*, Appendices (Ithaca, N.Y. : Cornell University), 20.
[4] Carol O'Neil and Alan Wright, pp. 32-33.

tion to students. When planning a curriculum or interacting with students, I am always conscious of their different learning styles and rates, what they have already learned and what they will need to learn in the future. Feedback from students has been vital to the process of growth I have undergone since I began teaching: I learned from them, for example, the pacing of lectures, and effective ways to help them learn in small group discussions.

Personal contact with students is essential to my approach. Many need encouragement to talk to their teachers, so I emphasize my availability for informal discussion and my willingness to help them sort out any problems they have with what they are learning. My experience as a teacher is greatly enriched by this contact with students. I am fortunate to teach in a professional school where I can follow the progress of the students through the program and sometimes beyond graduation.

As I gained experience and confidence as a teacher, I came to regard teaching as my primary professional responsibility. Consequently, I moved into areas of teaching administration and faculty development. My current position as Assistant Dean legitimizes my efforts to effect changes in the medical curriculum, and places me where I can have an influence on the "learning climate" of the medical school. I am able to help my colleagues develop as teachers in my roles as local chair of the Canadian Association for Medical Education and as a TIPS teaching skills instructor. Several years ago, I began to be interested in the theoretical background for teaching and learning. I have attended meetings and workshops to learn about this and am currently enrolled in a distance-education diploma course in medical education. I have begun to do collaborative education research.

As a physiologist working in a professional school, I benefit from having students who are eager to learn an intrinsically interesting subject. On the other hand, basic science teachers are often handicapped by having no clinical training, and therefore find it difficult to know the relevance of what they teach to the practice of medicine. Moreover, there is a torrent of new information in the basic medical sciences, and medical students have likened it to trying to sip from a fire hose. I have developed some teaching strategies to ameliorate these problems, including collaboration with clinicians for curriculum planning and teaching, and articulating clear educational objectives for myself and my students. Further, student autonomy is important in this situation: students must be encouraged to play an active role in determining what and how they learn. In so doing, they will develop the life-long learning skills needed to cope with progress in medical practice.

As chair of one component of a year-long course in Body Systems, I have had the opportunity of putting these strategies into practice. With my clinical colleagues, I have modified the content and format of the renal systems component so that it provides a bridge between preclinical and clinical sciences, and fosters students' self-education and self-evaluation.

I played an active role in developing a new course for the first year of medical studies: Introduction to Physiology is a model in our undergraduate program for its innovative use of demonstrations. As chair of this course, I continue to work with my colleagues and students to improve it and to demonstrate its unique qualities to physiologists around the world.

In this first case, the teacher describes herself as a "facilitator of learning" and indicates that she remains "always conscious of [students'] different learning styles and rates." She has learned how to be more effective in her pacing of lectures and has discovered how to use small group discussions effectively.

These are all good signs because she seems to be moving away from simple information delivery and is willing to make the effort to treat her students as individual learners. What is left out and not explained are the details of how she has made these innovations and what evidence she has to evaluate the effectiveness of these changes. Pacing and small group discussions are concepts of teaching. What principles specifically guide her pacing? Under what conditions does she use small group discussions and what other changes in the material she covers has she made to accommodate the time necessary for small group discussions? The clarity with which she can answer these questions will be a test of the degree her espoused theory (as it is evident in this written account) can be justified in practice. By bringing these questions to her attention, a supervisor may help her develop these innovations further.

She mentions that her experience stimulated her to "regard teaching as my primary professional responsibility" and that she has begun doing collaborative research. Examples or some kind of written accounting of such work would be exemplary evidence that could be used to evaluate her work more fully. She alludes only superficially to much of her work, "collaboration with clinicians for curriculum planning and teaching [in what way? Give examples?] . . . students must be encouraged to play an active role in determining what and how they learn [How?]. . . . I have modified the content . . . so that it provides a bridge between preclinical and clinical sciences." [How so? Give examples.] Admittedly, many of the details of her story may be well known to her colleagues and therefore may seem superfluous in a tenure file, but there are those who must evaluate her who have a less intimate knowledge of her work. Also, a more complete written account of her work in teaching development is itself a developmental exercise and good test of her new knowledge.

Case 2[5]

Dr. Graham J. Fishburne
Department of Elementary Education, University of Alberta
Personal Teaching Philosophy

Recently, while helping a University colleague from a Faculty other than my own to prepare a teaching project, the colleague asked me to articulate my own personal teaching philosophy. I answered in the following way: I explained that I thought too many Government agencies believe that the richest Canadian resources lie beneath the earth's surface, whereas I truly believe that one of the richest Canadian resources is its people. The process of socializing Canadian people to be educated and well-adjusted to life becomes a priority in my view. As a result, the young people of Canada need the best role models to work with them throughout their education. They need to experience a whole variety of learning situations; situations that will cater to their unique style of learning and development. In a world where there has been an 'Information' explosion, there needs to be an excellent education system to put order to what can be chaos. This is why, in my belief, one of the primary aims of any University is the role it plays as a 'Teaching' Institution. A University should not merely be a place for conducting research. Indeed, as I see it, the two activities of research and teaching should go hand in hand, and be mutually beneficial to each other.

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5 *Ibid.*, p. 33.

The University plays an absolutely vital role in the process of educating (socializing) Canadian people. Therefore, I see all University Professors, regardless of Faculty, as 'educators' who are involved in the world of instruction.

This introduction led to my second point which is best described with an analogy to sport. Throughout my life I have been involved in sport. The particular sporting activities that I give so much of my time to are team oriented. I have always been a team player. The most successful teams I have been involved with were successful because they were dedicated teams of individuals working together toward a common goal. Throwing a group of individuals together to separately work on a common goal was not the best way to achieve success. My teaching philosophy takes its basis from my sporting experiences. As a member of the University team of 'educators' I must possess certain knowledge and skills. I must offer the role model of 'instructor and educator' to my students. Further, as in sport, if the University team of educators is to achieve success in educating students, then in my opinion, we must work together (cooperate and share), with other University Professors who are on the same team working toward a common goal. When we combine our talents and expertise, we not only help to achieve the goal of educating our students, but we also improve our own skills and knowledge. Hence, as I explained to my colleague, this was the reason why I was sharing in the teaching project with her!

A major omission in this accounting is an explication of the relationship between *socialization* and *educating*. What does he mean here? There are a host of authors who have written on this distinction. Where does this person's thinking fit in? What experiences lead him to equate socializing with educating? Answers to these questions may help the author more clearly validate (or refine) his personal theory.

Case 3[6]

Dr. Jack Gerrow

Department of Removable Prosthodontics, Faculty of Dentistry, Dalhousie University

Personal Teaching Evolution

From 1981 until 1983, I was an instructor in the preclinical operative dentistry program and the preclinical fixed partial prodthodontics program at the University of Toronto. As a part time instructor, I was required to supervise groups of students during the laboratories and to prepare a number of presentations for all groups. It was during this time that I developed an awareness that improved teaching methodologies and evaluation procedures for both clinical and preclinical dental courses were needed. I worked with the Department Chairman, Dr. Bruce Hord to institute a number of changes in the preclinical laboratory that included the first anonymous grading of student projects and attempts at calibrating the course instructors.

While teaching at the University of Toronto, I was encouraged to pursue graduate training with the understanding that I would return to teach at a Canadian university and as a result received a Canadian Fund for Dental Education Training scholarship.

While in graduate school at the University of Iowa, I was involved with teaching both clinical and preclinical prosthodontics. In addition, I was responsible for supervising the prosthodontic rotation in a general practice residency program.

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6 *Ibid*., pp. 42-43.

After completing graduate school, I accepted a position in the Department of Restorative Dentistry, Division of Operative Dentistry, here at Dalhousie University. As can be seen from my time assignment, I was an instructor in numerous clinical and preclinical programs.

As a new faculty member, I was asked for, and gave, input regarding both course content, teaching methodology and evaluations systems. As a result of some of my input, some significant changes such as small group seminars, calibration procedures and anonymous grading were instituted in some of these courses. Attached to this section are letters from Drs. Bruce Graham and Ron Bannerman which document these changes.

In June, 1986, I was fortunate enough to attend the ACFD Summer Teaching Institute for two weeks. This Institute gave the participants the practical educational theory needed to organize and teach university courses.

Attached is a letter from Dr. Bruce Squires which outlines my participation and my subsequent success with applying the principles of the institute to courses at Dalhousie. Dr. Graham's and Dr. Bannerman's letters also deal with this. . . .

During the summer of 1986. I was made course director of two courses. Using the principles attained from the Summer Teaching Institute, I reorganized both courses to update subject matter taught, to make the teaching methodology as effective and efficient as possible, and to institute a reliable and valid grading system.

Courses D2303R, Preclinical Fixed Partial Prosthodontics (FPD)(course outline and other material attached) was traditionally taught using one hour lectures to impart didactic information and show technical procedures followed by a three hour laboratory. In this laboratory, students were required to perform the many procedures associated with the fabrication of a FPD. The students performed each procedure once and received some help from their instructor. At the completion of the procedure, the instructor would grade the project. Didactic information was tested on written examinations that generally involved only recall type questions.

The redesigned course replaced the majority of lectures with specific reading assignments which were done in conjunction with a reading guide (attached) to help emphasize the important points. The reading assignments were the basis of short class tests held at the beginning of each period. The answers to the test were discussed immediately after the test and instructions for the day were given. When necessary, short lectures were used to clarify, highlight, or expand upon the readings. Student-led seminars on specifically designated and timed topics also were used.

Laboratories involved the use of small group demonstrations of each step in each procedure by the instructors. The instructors were carefully calibrated to ensure consistency between them. Following the demonstrations, the students were encouraged to do multiple repetitions of each procedure. Numerous models and problem boxes were prepared and used to help students develop discrimination skills. After each repetition of a procedure the student was required to self-evaluate and obtain instructor feedback. None of the repetitions were graded (no summative grading, only formative evaluation). Clinical tests graded anonymously evaluated the students' performance along with "Bell Ringer" discrimination examinations and problem solving written examinations.

 A course review (attached) was carried out and changes suggested by the students and the instructors were implemented. The course has been reviewed by two outside consultants,

and received favorable comments along with constructive suggestions for change and improvement. Attached is an article written describing one of the evaluations. The University of Western Ontario has used this course as a model for one of their preclinical courses.

Course D3306B, Fixed Partial Prosthodontics Clinic, was redesigned to implement an evaluation system that would be more reliable and valid and allow better teaching on the clinic floor. The course material for the course is attached. Instructional aids such as self-instructional packages have been made to help students gain a better understanding of diagnosis and treatment planning. A problem solving written examination was used for the first time in this course last year.

In July of 1988, I was appointed Head of the Division of Removable Prosthodontics and assumed course directorship for three courses. Course D4302A is a lecture series for 4th year dental students. Course D3031R is a preclinical course on removable partial dentures and Course D2301R is a 2nd year preclinical removable prosthodontics course.   Many changes were made in the content and teaching methodologies of these courses this past year. The course material is attached. Most significant are the reading guide, the evaluations systems, and the overall format which is similar to that described for Course D2303R. In addition, numerous models and problem boxes have been prepared.

The changes implemented in the above listed courses have resulted in significant improvements in the instructional effectiveness of the courses as has been demonstrated in the course evaluations and from feedback from instructors and students. The use of instructional aids and self-instructional materials along with the reading guides and class tests has made the teaching effective and time-efficient, making it possible to include updated techniques and materials in the courses.

What is particularly impressive and appealing about this accounting is the reference to supplementary testimony by colleagues who have collaborated with the author. Perhaps these letters tell a more complete and objective story. Limiting his description to statements such as "updating subject matter" and "reorganizing both courses . . . to make the teaching methodology as effective and efficient as possible" does not do justice to the work that must have been involved. When he talks about "calibrating" the instructors, what is he referring to? The candidate needs guidance in how to adequately give an accounting of his teaching development that not only benefits himself but those reading it. Such guidance must encourage a higher level of discourse and at the same time enforce a limit on length.

A departmental standing committee on teaching can play a significant role in developing and improving the evaluation of teaching:

> training peers as teaching consultants has been indicated by a number of researchers. . . . Activities include individual goal setting, sharing goals with other team members and seeking clarification on these goals, planning feedback strategies, gathering teaching data (e.g., classroom observation), presenting and discussing feedback, and evaluating the improvement process itself . . . For this type of procedure to be effective faculty must learn appropriate consultation skills, good observation procedures, and effective ways of delivering feedback.[7]

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7 Peter Cohen and Wilbert McKeachie, p. 153.

It has been the goal of this handbook to provide some useful ideas and information to assist colleges, departments and faculty members in the complex and critical task of evaluating teaching within the tenure process. Further assistance and resources are available from the author:

David Way
Director of Instructional Support
400 CCC
Cornell University
Ithaca, NY 14853
(607) 255-2663