Teaching Students to Cope with Complexity and Uncertainty

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"We are faced with fundamental human disagreement not merely over what to believe, but over what would count in the first place as an adequate reason for belief."

This quote from *Reason and Commitment*, by Roger Trigg, succinctly describes a condition currently relevant to education: the need to learn how to live a more fulfilling life in the face of uncertainty and complexity. Although such uncertainty seems more widespread today than in the past few decades, this basic condition has long been a force behind university values.

Ever since the publication of Philip Jacob's *Changing Values in College* in 1957, interest has increased in ascertaining the degree to which colleges can help students deal with the complexity of compelling ideas. Jacob created a general stir by his conclusion that, with the exception of graduates from a few select colleges, there are not many important demonstrable changes in students that can be attributed to their four or more years of college. However, *Four Critical Years*, Alexander Astin's more recent extensive longitudinal study of over 225,000 students, relates important and extensive changes in students to different collegiate environments. The importance of studies such as these is emphasized by Astin's observation that almost every major policy change since World War II that af-

fects higher education leads to practices and structures that would minimize positive developmental change in students. For example, the data from Jacob through Astin clearly show that small private colleges (because of their singularity of purpose and the high level of student involvement) are more effective in carrying out the traditional mission of higher education, yet there has been a clear and consistent growth of large institutions with public support.

During the past several years, our particular research interest in the development of college students has focused on how they learn to cope with the complexity and uncertainty of modern conditions. We took our lead from the seminal work of William Perry, *The Intellectual Development of College Students*, first published in 1968. As director of Harvard's Bureau of Study Counsel—charged with providing assistance to students as they learned to cope with the demands of a rigorous academic program—Perry became interested in how this intellectual growth process occurred. In particular, he asked: "Were there any regularities to the changes that were taking place in students as they made sense out of the information, theories, experiences, and opinions with which they were confronted?" He and his colleagues began to interview students systematically at the end of each year. Eventually they launched a small but important longitudinal study of 20 men, in-

terviewing them at the end of each of their four years at Harvard. The interviewer began each interview with a very general probe: "What stands out for you this year?" From there, the interviewer followed the student lead.

Using these interview protocols, Perry and his associates were able to trace a systematic progression of development that seemed to be a function of intellectual change with certain ethical implications. Perhaps it can best be understood as an epistemological change: students seemed to give examples of the way they came to "know what they knew." Perry identified nine "positions" of development, which we have found can best be described in four *main* positions: dualism, multiplicity, relativism, and commitment in relativism. These four positions, described below by research team member Patricia King, are based on interviews with students in the University of Minnesota's College of Agriculture.

Dualism (Perry's Positions 1-2) Students who view the world dualistically use discrete, concrete, and absolute categories to understand people, knowledge, and values. Things are either right or wrong, good or bad, true or false. Knowledge is viewed as existing absolutely. "Right answers" are the domain of established authorities and it is the role of the student to master these answers, or to learn simple truths. These students are likely to be heard asking, "Why do we have to learn these approaches? Why can't you just teach us the right one?" Tasks that require a consideration of options or multiple points of view are confusing, as the legitimacy of alternative perspectives is not yet acknowledged. Judgments or evaluations are stated as if they were self-evident, without being substantiated.

Typical student response: "I have a fear of tests. I don't know what I'm supposed to know. Teachers should teach what they know. Sometimes when you ask a question, teachers will answer you, but they won't really tell you. A dedicated teacher would tell students what he knew."

Multiplicity (Positions 3-4). Students who view the world multiplistically acknowledge that there are multiple perspectives to a given topic or problem, and those who

hold different beliefs are no longer seen as being simply wrong. Questions that in dualism had single answers now have multiple answers. At this level, students are unable to adequately evaluate points of view, and question the legitimacy of doing so. They assert that points of view or opinions are equally valid, and are therefore not subject to evaluation. After all, they say, "anyone has a right to an opinion," and "you can't judge opinions." Students who reason in this way are often critical of teachers' evaluations of essays ("I'm being graded on my opinions") and are only beginning to separate the conclusion of an argument or opinion from its basis in fact. By position 4 (Perry), students can see the difference between an unconsidered belief and a considered judgment.

Typical student response: "Things can be a hundred different ways. Both sides can bring a ton of evidence to support their views. Both are equally right. Everybody's right. That's disillusioning."

Relativism (Positions 5-6). Students who reason relativistically recognize that knowledge is contextual and relative. Whereas in multiplicity the existence of different perspectives was simply acknowledged, in relativism these perspectives are seen as pieces that fit together into a larger whole; the context within which points of view exist has been established. At this level students show the capacity for detachment; they seek "the big picture," are able to think analytically, and can evaluate their own ideas as well as those of others. Authorities are no longer deified or resisted, but are valued for their expertise. This does not preclude their own judgments from being evaluated too, however. Relativists often resist decision-making. The merits of the alternative perspectives are so clear that it becomes nearly impossible to choose among them, fearing that to do so would sacrifice the appreciation for the other views. However, this often precludes or delays the establishment of one's own rules and responsibilities. By the time students reach position 6 (Perry), they are beginning to realize the need to evolve and endorse their own choices from the multiple "truths" that exist in a relativistic world.

Typical student response: "It depends on how deep your facts are. There are different

levels. Microscopic examination reveals different things than does the naked eye."

Commitment In Relativism (Positions 7-9)

Students who arrive at the upper positions on the scheme have made an active affirmation of themselves and their responsibilities in a pluralistic world, establishing their identities in the process. Personal commitments in such areas as marriage, religion, or career are made out of a relativistic frame of reference. This allows for the recognition of diverse personal themes in their lives, themes which must be balanced pro and con much as alternative explanations are balanced in relativism. The process of "moving off the fence" of relativism enables students to better understand their roles in a pluralistic world by establishing their own identities and life styles in a way that is consistent with their own personal themes.

Typical student response: "My opinions reflect what fits for me—how I perceive society to function and how I would see it functioning better. I can't do anything outside of my own perception. I have a model of my own. My opinions fit that model. Everything is interdependent. I view certain things as acceptable given that society follows a certain track. But if society takes choice B, then I have to reformulate my opinions."

From Theory to Practice

The question we began with was whether or not it is possible to use such a theoretical scheme to plan developmental experiences, courses, or curricula for students. Our first effort to use Perry's theory led to a course taught in the University's Experimental College (in the College of Liberal Arts). In 1973, Lee Knefelkamp and Carole Widick, then doctoral students, developed a course entitled "Themes in Human Identity." They taught the course and evaluated changes in students that seemed to be associated with the course itself. They wanted to see if they could promote psychological development using typical course content. Five main themes around which personal identity revolves—and about which one must make commitments in one's life—were identified. Each major theme had several subthemes and served as a course unit. To illustrate, the major themes are listed below, followed by an example of the development of the first theme:

Themes in Human Identity
A. Significant others (family, friends, lovers)
   1. the nature of love
   2. the nature of trust
   3. the nature of sexuality
B. Society: Identity as related to society, laws, institutions, norms, power
C. Work and Career
D. Meaning and Purpose for Existence
E. The Self (a synthesis of the above)

The course differed from a typical psychology course in that the readings were mostly derived from what might be expected in English or comparative literature. To develop the subthemes of the first unit, for example, readings were taken from *Zorba the Greek*, *Who's Afraid of Virginia Woolf*, and *Atlas Shrugged*. The most immediately apparent factor about these selections was the diversity in which the authors describe ways of relating to others. This was used to stimulate growth in the students' ability to cope with complexity and uncertainty in their lives. Our assumption was that dualists needed to accept the reality and validity of diversity, while relativists needed to choose—from among alternatives they considered valid—one that best fit their personal perspective.

Students were self-selected into two sections. One section was taught as if it consisted of dualists, the other was taught as if the students were relativists. To make it possible for students in the dualist class to change and develop, the instructors provided a more structured and supportive environment; in this case, instructors also assumed a great deal of responsibility for the conduct of the class and the checking of assignments. Their emphasis was on the *diversity* of content, and they used concrete and specific experiences as an attempt to stimulate and support more openness and acceptance of views different from the student's own. On the other hand, to assist the students in the relativist class, the instructors allowed for more individuality and more freedom in setting and completing assignments. There was less structure, more emphasis on vicarious learning experiences, and more support given to choices made from among alternatives and the student's *commitment* to a point of view consistent with other kinds of personal experience.

In exchanges with a student in the dualist class, for example, the focus of discussion for *Zorba the Greek* would be on the difference between the carefully considered, conservative, and Apollonian style of Boss, a main character, and Zorba's enthusiastic, playful, Dionysian manner. Students were encouraged to identify and compare the ways in which these differences were reflected in the central characters' attitudes toward life, other people, work, and play. To help a student in the relativist class, on the other hand, the instructors also noted the differences between Boss and Zorba, but encouraged students to compare each with themselves, begin. to state preferences, and eventually to describe themselves in terms of the novel's main characters.

The results of several classes conducted in a series of studies suggest that students *do* change in the direction and sequence that Perry and his co-workers have described. Furthermore, we found that in those courses in which a deliberate attempt was made to encourage such development, changes occur that do not occur in similar courses which are not taught deliberately to encourage development.

Soon after we began our work in the "Themes" class, we found that we could conscientiously construe other classes in "Perry terms." Observing carefully, we could detect student differences that suggested teaching approaches similar to those with which we had been experimenting. At the same time, we began to realize that a great deal of work needed to be done with the basic theory. For example, we had not found many students at the more advanced stages, even among seniors; we did not know whether the changes we were observing were due to maturation or education; we needed to know if students in different curricula developed differently; we could not clearly separate the intellectual aspects of development from the personal identity aspects; we needed to know more about some of the philosophical assumptions of the scheme; and, particularly, we needed a more practical and economical way to measure development. All of our research to that point had been based on a rather cumbersome and unreliable sentence and paragraph completion instrument that needed to be rated by expensively trained raters. From that point on, we concurrently pursued two lines of investigation: (a) a fairly rigorous exploration of the scheme itself with the attendant measurement problems, and (b) an attempt through individual consultation to help faculty recognize and respond to student differences in the classroom.

The Development of Reflective Judgment

Colleagues Patricia King and Karen Kitchener took on the task of assessing the progress students made toward coping with complexity and uncertainty. They devised an interview in which four "intellectual dilemmas" were posed to students. A typical dilemma was:

There have been frequent reports about the relationship between chemicals that are added to foods and the safety of these foods. Some studies indicate that such chemicals can cause cancer, making these foods unsafe to eat. Other studies, however, show that chemical additives are not harmful, and actually make the foods containing them more safe to eat.

Using standard probe questions, they were able to interview students so that answers could be rated reliably on a Perry-like dimension which they named *reflective judgment*. They were particularly interested in the intellectual component of Perry's work. Previous work had suggested that there was less change during college than we thought, so they were also interested in the early and later development of students' abilities to make complex judgments. Thus they drew samples from high school juniors, college juniors (one from the College of Liberal Arts and one from the College of Agriculture), and graduate students. Samples were matched on a measure of scholastic ability equivalent to that of a junior in high school. Findings showed that the high school juniors responded much as Perry's dualists might; the college juniors (no differences in the two majors) showed more ability to take evidence into account and to relate the problem to different contexts. It was *only* in the graduate sample, however, that the investigators discovered higher levels of reflective thinking and the

Human Development Model

Stage/Action Logic	Main focus	% adult pop. N=4510
Alchemist and above Deep processes and intersystemic evolution rules principles	Interplay of awareness, thought, action, and effects; transforming self and others	2.0
Strategist Most valuable principles rule relativism	Linking theory and principles with practice, dynamic systems interactions	4.9
Individualist Relativism rules single system logic	Self in relationship to system; interaction with system	11.3
Achiever System effectiveness rules craft logic	Delivery of results, effectiveness, goals, success within system	29.7
Expert Craft logic rules norms	Expertise, procedure and efficiency	36.5
Diplomat Norms rule needs	Socially expected behavior, approval	11.3
Opportunist and below Needs rule impulses	Own immediate needs, opportunities, self-protection	4.3

Diplomat/Conformist
-accept us and reject them-2
-to be liked is to have a pleasing personality(be nice, pleasant, & good looking/accept norms without question-6
-wanting to be accepted; worry about what others think-11
-very threatening to be disapproved of -16

Expert
-need to constantly measure and compare;do others measure up to my ideas and standards-9
- know answers, know what believe, feel righteous and often put others in "their" place showing a sense of superiority-12
- live in a world where things are sure and clear and feel entitled to impose will on others-13

- discredit counter-evidence, rationalize and explain away what doesn't fit their set beliefs so rarely at loss for answer-15
- blame others or structures-16
-have high moral stds & a strong sense of what should be-17
-concerned with fulfilling their responsibilities and duties so often compulsive and perfectionistic-18

Achiever
-driven to improve world and not themselves ——8
-self esteem from meeting own goals not needing others' affirmation, but drive to succeed can lead to exhaustion as limits on self hard to self impose and rarely look at pace or staying in present moment or seeing things as parts of whole-11
- guilt a central emotion as aggression turned inside, self criticism is harsh as plans so single minded and high aiming can be depressed for not accomplishing with ongoing fear of lost of control and independence-16

condition of stress in young who ... primates resulting from sudden and prolonged separation. Besides contributing to our understanding of human behavior, she states, research of this kind can have a direct benefit in helping to reduce stress in such situations as a child's hospitalization.

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ability to make judgments based on probabilistic thinking.

These results correspond to a growing body of evidence that higher forms of intellectual development are not as common in undergraduates, even seniors, as most professors assume. Mark Davison, Patricia King, Karen Kitchener and I are now following up these samples to see what has happened in two years; we have also added comparable samples of new students and non-students to separate the general maturing effects from the educational effects. Another investigator, Elizabeth Welfel, has just completed a study that shows comparable developmental effects in the College of Liberal Arts and the Institute of Technology.

Consulting with Faculty

In 1976-77, co-investigator Jane Lawson and I initiated a pilot project in the College of Agriculture to see if we could use any of the developmental findings to help faculty adapt instruction to the differences in their students' ability to comprehend and cope with the complexity of the subject matter being taught. After interviewing several faculty members and a large number of students in the College of Agriculture, we were convinced that one of the difficulties in college teaching comes from not knowing what to do with students who are at different developmental levels. Teachers often interpret dualistic students, for example, as "not ready for college," or multiplistic students as "indecisive." In fact, we have found that what many faculty expect undergraduates to accomplish can only be done by mature graduate students. As our work progressed, we evolved a three-part model of consultation: (a) individual interviews with faculty members, (b) direct observation of classroom instruction, and (c) small group seminars with the faculty involved. The interview is used to build a climate of trust and openness, to assess individual needs of professors; and to discuss observations made in class. Classroom observation is a critical component in order to move from the theoretical and abstract to the concrete and specific. In particular, we are interested in how a professor puts into practice his or her own ideas about teaching and adapting to students. We then have behavioral data as well as theories to talk about. The small group seminars serve as a place where we and often other faculty members can explore theory together, the consultant can teach some fundamental concepts, and the professors and consultant can discuss attempts made to improve instruction.

On the basis of the first two years' success, we have been able to secure outside funding from The Fund for the Improvement of Postsecondary Education to continue and to expand the pilot work. We are now in our second year of work in the College of Liberal Arts, the College of Pharmacy, and the College of Education, and our fourth year in the College of Agriculture. Participating faculty have expressed particular satisfaction with the opportunity to work on an individual basis with a consultant over the opportunity to work over a longer period of time than is usually possible with the typical instructional workshop.

Faculty Responsibility to Students

If, as Triggs asserts, we are "faced with fundamental human disagreement not merely over what to believe, but over what would count in the first place as an adequate reason for belief," then a major intellectual task for higher education is to find adequate means of helping students develop their capacity to cope with such uncertainty. Perry's work provides a frame of reference for organizing educational experiences in ways that can help students make sense out of such confusion and challenge them to increase their capability to do so. Although some faculty take the position that "students have to make it on their own" or "students who aren't prepared for college ought to get out," we disagree. As teachers ourselves, we have the responsibility to recognize the developmental nature of learning and to adapt our teaching to the students, keeping in mind the need to encourage continued development. For the most part, faculty seem to be searching for just such a framework to assist them in understanding what they encounter each day in the classroom. They often find, as we have, that Perry's formulation "makes sense."